State Planning Policy – state interest guidance material

Natural hazards, risks and resilience – Coastal hazards

May 2018



Department of State Development, Manufacturing, Infrastructure and Planning

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Using the SPP state interest guidance material

The Queensland Government established the State Planning Policy (SPP) to define the matters of state interest in land-use planning and development. State interests in the SPP consist of a state interest statement, state interest policies and, where applicable, assessment benchmarks.

This guidance material has been prepared to support the implementation of the SPP and the interpretation of the *Natural hazards, risk and resilience* state interest. Although the SPP broadly applies to a range of activities undertaken by state and local governments, the guidance material is particularly focused on assisting local governments when making or amending a local planning instrument and when applying the assessment benchmarks (to the extent relevant).

The SPP does not prioritise one state interest over another and thus provides flexibility for decision-makers to respond to specific regional and local circumstances. This allows for the state interests to be considered in their entirety rather than as individual or separate priorities. State interests are to be considered in the context of the guiding principles in the SPP, which promote an *outcome focused*, *integrated*, *efficient*, *positive* and *accountable* planning system.

The SPP guidance material is intended to be read in conjunction with the SPP and the relevant state interest. The SPP guidance material is not statutory in its effect and does not contain any new policy requirements. It is not mandatory for local governments to use the guidance material but it is provided to assist with the interpretation and application of the state interest policies and the assessment benchmarks contained in the SPP.



The SPP guidance material is structured as follows:

Part 1: Understanding the state interest – This section briefly explains why a particular matter is a matter of state interest, describes the purpose of the relevant state interest statement and defines the core concepts associated with the state interest.

Part 2: Integrating the state interest policies – This section provides background and further explanation for each of the state interest policies defined in the SPP. It also provides examples and options regarding how to appropriately integrate each state interest policy into a local planning instrument.

Part 3: Mapping – This section identifies and explains the mapping layers contained in the SPP Interactive Mapping System (IMS) relevant to a particular state interest. It also clarifies how a local government can locally refine state mapping in certain instances and outlines where online mapping for the state interest can be accessed (if relevant).

Part 4: Applying assessment benchmarks – In accordance with the Planning Regulation, an assessment manager or referral agency must have regard to the SPP when assessing a development application. For some state interests, there are also specific assessment benchmarks that must be used by a local government for development assessment. This section outlines the development applications to which the assessment benchmarks apply and how a development application may demonstrate compliance with these benchmarks, to the extent that these are relevant. The assessment benchmarks contained in this section will apply to assessable development in addition to any assessment benchmarks contained in a local planning instrument, to the extent of any inconsistency.

Part 5: Example planning scheme provisions – This section provides example planning scheme provisions that a local government may choose to adopt, or to adapt, when making or amending a local planning instrument. It is important to note that the example planning scheme provisions provided may only be in relation to a particular aspect of a state interest, rather than addressing all of the particular state interest policy requirements.

Part 6: Supporting information – This section provides a list of technical resources that a local government may wish to refer to when considering making or amending a planning scheme. This section also provides a glossary of terms and acronyms used throughout the SPP guidance material.

Where text in this guidance material is in a coloured text box, it is an excerpt from the SPP and is either the state interest statement, state interest policy or the assessment benchmarks applicable to the *Natural hazards, risk and resilience* state interest.

Any queries related to the SPP guidance material or the SPP should be sent to SPP@dsdmip.qld.gov.au.

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Part 1

Part 1: Understanding the state interest

State interest statement

The risks associated with natural hazards, including the projected impacts of climate change, are avoided or mitigated to protect people and property and enhance the community's resilience to natural hazards.

Background

Over three million Queenslanders live within 50 kilometres of the coast. While the Queensland coastal environment provides considerable environmental, social and economic benefits, it is an area that may be exposed to destructive natural hazards. Coastal hazards can cause loss of life, property and infrastructure, as well as environmental damage. They can also result in the use of considerable resources as communities respond to and recover from coastal hazard events. The most significant short-term coastal hazards of erosion and storm-tide inundation are associated with tropical cyclones, which cross the coast on average approximately five times a year. Planning systems need to respond to the lessons learned from recent extreme coastal events in Queensland, such as Tropical Cyclones Debbie and Yasi.

The Queensland Strategy for Disaster Resilience (QSDR) seeks to make Queensland 'the most disaster resilient State in Australia'. Achieving this requires a proactive approach to identifying and managing coastal hazards. Managing the risks from coastal hazards and building community resilience requires an integrated response, of which land-use planning is a component. Other core elements include disaster planning and management, climate change adaptation planning, improved governance arrangement, structural works, building controls, landscape and environment programs, improved staff capacity, community awareness, and communication and market-based mechanisms (e.g. insurance). Land-use planning plays a key role in ensuring that new development and communities are not placed at undue risk through strategies of hazard avoidance or risk mitigation and in doing so improve community safety and resilience, and minimise the burden for emergency management.

While each coastal hazard presents its own unique risk to people, property, the environment and infrastructure, planning responses to all natural hazards in Queensland should follow an evidence and risk-based approach. This includes avoiding or mitigating coastal hazards such that the residual risk remaining (which is the responsibility of disaster management or mitigation works to address) is acceptable or tolerable.

Different communities have different levels of exposure, vulnerability and tolerance to the risks presented by coastal hazards. In addition, climate change may alter exposure to, and the timing and severity of coastal hazards in different regions. In preparing a planning scheme that responds to these risks, local governments should tailor their studies, risk assessments and land-use planning strategies to meet their local circumstances and needs within an accepted framework and standard.

By its nature, coastal hazard risk management and community resilience involves a journey of continuous improvement. Land-use planning approaches should therefore be fit-for-

Part 1

purpose and flexible so that changing approaches to and improvements in risk management can be readily accommodated.

Core concepts

Climate change

Climate change refers to the changes in our climate associated with the effects of global warming. It is a risk multiplier and is likely to exacerbate the footprint, frequency, intensity, duration and timing of coastal hazards in Queensland. Climate change is projected to have a significant impact along the Queensland coastline, especially through sea-level rise and intensification of cyclones.

The Department of Environment and Heritage Protection's Coastal Hazard Technical Guide provides that coastal hazard assessments are to include the following factors to account for the projected impacts of climate change by the year 2100:

- a sea-level rise factor of 0.8m
- an increase in the maximum cyclone intensity by 10 per cent.

The projected sea-level rise of 0.8m by the year 2100 has been used for the state coastal hazard mapping. This level is based on climate modelling and probable scenarios from IPCC Fifth Assessment Report (AR5),¹ published in 2013.

Coastal hazard

A coastal hazard is defined in the *Coastal Protection and Management Act 1995* as erosion of the foreshore or tidal inundation. The SPP defines coastal hazards as either erosion-prone areas or storm-tide inundation areas, and these include the effects of climate change.

Coastal erosion

Coastal erosion is a natural phenomenon on beaches of sedimentary coasts including dunes, river deltas and mangrove plains. Beaches respond to environmental factors such as annual variations in the amount of sediment (typically sand) washed down from rivers; changes in the geometry of river delta channels; and changes in the weather, especially prevailing winds, waves, severe storms and tropical cyclones. As environmental conditions change, the beach profile changes, with sand moving onshore or offshore seeking an equilibrium profile or sand is added to or lost from a beach compartment by longshore transport. The movement of sand may appear as beach erosion, dune build-up or the formation of nearshore sand bars. Typically, beaches never achieve a stable profile due to ever-changing environmental conditions. However, in some cases there may be a trend of continuous erosion resulting in long-term shoreline recession.

It is likely that a number of these factors will be influenced by climate change and associated projected sea-level rise. The impact of sea-level rise will most likely be experienced in the form of more severe coastal erosion on exposed coasts and the permanent inundation of land in protected estuarine or riverine areas. Eroded coastlines will increasingly fail to rebuild fully following these extreme events, resulting in permanent losses of land to the sea.

Storm-tide inundation

A storm tide is the combination of a storm surge and wave effects, which add to a normal tide, elevating water levels well above normal tidal levels. A storm surge is an increase in water level associated with some significant meteorological event (such as a severe storm or cyclone). The magnitude of the storm surge depends on several factors including wind speed, barometric pressure, seabed shape, and the proximity of bays, headlands and

¹ IPCC – Intergovernmental Panel on Climate Change

islands. Local factors such as tides and coastal profile will influence the extent of the stormtide inundation area.

A storm tide results in large volumes of water being pushed against the coast. This causes flooding of low-lying areas and is referred to as 'storm-tide inundation'. The worst impacts occur when the storm surge coincides with a high tide or king tide. A storm tide can also include wave effects, such as wave set-up, which elevates water levels further as waves approach the coast. A storm-tide inundation can also cause waves to penetrate inland, adding to the damage.

Climate change, including the projected sea-level rise and an increase in cyclone intensity for Queensland's coast, will cause a progressive worsening of storm tides (refer to Figure 1), including:

- increased severity and frequency of storm-tide inundation, which will cause inundation to occur further inland
- increased cyclone and storm intensity, which will add to the magnitude of storm-tide events and the extent of inundation.



Figure 1: Impacts of climate change on storm-tide inundation

Hazard and risk

The difference between a hazard and risk is:

- a hazard is a source of potential harm or a situation with a potential to cause loss; whereas
- risk is the chance of something happening as a result of a natural hazard event that will have an impact on objectives (AS/NZS ISO 31000:2009). It is commonly determined in terms of consequence and likelihood.

The SPP refers to 'acceptable' and 'tolerable' risk, which are defined below along with a definition of 'intolerable' risk.

Acceptable risk

Acceptable risk is a risk that, following an understanding of the likelihood and consequences, is sufficiently low to require no new treatments or actions to reduce risk further. Individuals and society can live with this risk without feeling the necessity to reduce the risk of a natural hazard further.

Tolerable risk

Tolerable risk is a risk that, following an understanding of the likelihood and consequences, is low enough to allow the exposure to a natural hazard to continue, and at the same time high enough to require new treatments or actions to reduce risk. Society can live with this risk but believes that as much as is reasonably practical should be done to reduce the risk further.

Intolerable risk

Intolerable risk is a risk that, following an understanding of the likelihood and consequences, is so high that it requires actions to avoid or reduce the risk. Individuals and society will not accept this risk and measures are to be put in place to reduce risk to at least a tolerable level.

Examples of intolerable risk include:

- likely to cause serious injury, illness or loss of life
- repeated disaster response and recovery required in the same location
- reduction in insurance availability and affordability
- reduced mortgage viability
- permanent damage to key environmental attributes (e.g. species loss).

Resilience

Resilience is the ability to adapt to changing conditions and prepare for, withstand, and rapidly recover from disruption.

Risk assessment

Risk assessment is the overall process of hazard identification, risk analysis and risk evaluation. The SPP requires a risk assessment to be undertaken, consistent with the AS/NZ ISO 31000:2009 risk assessment framework (see Figure 2 below).



Figure 2: AS/NZS ISO 31000:2009 risk assessment framework

Understanding the state interest

A risk assessment is the means used to understand the likelihood and consequences of a natural hazard event or events for existing and proposed communities, property, natural environment and infrastructure to determine the level of risk.

Likelihood

The likelihood of a risk occurring should be linked with the natural hazard probability. AS/NZS ISO 31000:2009 suggests that the probability of an event has the following levels: almost certain, likely, possible, unlikely, and rare. Most local governments in Queensland will have a likelihood and consequence table in line with their risk management policy.

Consequence

In understanding the consequences of a natural hazard event, the risk assessment will consider the exposure, vulnerability and tolerability of communities and their assets to the risks associated with that natural hazard event.

The consequences of the event should be based on a 'risk consequence' scale that should be used to assign a 'consequence level' to different coastal hazards. Councils should determine which consequence scale is most appropriate for the area being evaluated based on the values of the land affected by the hazard and the scale of the hazard.

Fit-for-purpose

Fit-for-purpose includes a flexible approach to undertaking coastal hazard studies and risk assessments. The approach may be tailored to meet the local needs, circumstances and resources of a community.

The tailoring of a coastal hazard study or risk assessment to be 'fit-for-purpose' must be informed by an integrated consideration of matters including, but not limited to:

- the characteristics of the coastal hazard
- the population and land uses exposed to the coastal hazard
- the anticipated growth and development of the community
- the effects that climate change will likely have on the coastal hazard
- the suitability of existing studies to informing the risks associated with the coastal hazard.

Residual risk

Residual risk is the risk a community is exposed to that has not been remedied through established risk treatment processes, or after treatment measures have been implemented. In simple terms, it is the total risk to the community, less any measure to reduce that risk (see Figure 3).



Figure 3: Residual risk

Coastal hazard adaptation strategies

Managing risks associated with natural hazards and climate change can be supported by adaptation strategies. Coastal hazard adaptation strategies provide actions or plans for actions to eliminate or limit the risks posed by a coastal hazard. The purpose of a coastal hazard adaptation strategy is to guide risk mitigation for coastal communities through informed, coordinated and timely actions over the long term. For example, a long-term management option for a community at risk may be to not intensify the use of the area and/or

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defend the area from current and future risks. Other strategic options may be to accommodate the risk (e.g. through building standards) or retreat to areas of less risk.

An adaptation strategy for land-use planning would generally explore the following four adaptation actions:

- 1. Avoid the risk (e.g. develop new urban areas elsewhere).
- 2. Retreat from the hazard zone (e.g. relocate or build setbacks).
- 3. Accommodate the hazard (e.g. zone for land uses that provide greater resilience to the hazard).
- 4. Defend from the hazard (e.g. include coastal protection works to protect development).

Part 2: Integrating the state interest policies

When making or amending a local planning instrument, each local government is required to consider all state interests in the SPP and appropriately integrate those state interests applicable to their local area.

Appropriately integrating a state interest requires all state interest policies to be considered by a local government, but it does not necessarily mean a local government must address each and every state interest policy when making or amending a local planning instrument. For example, if a local government needs to balance competing state interests in a local planning instrument, it may not be possible to address all policies for a particular state interest.

This balancing of state interests may mean that the planning scheme preferences one state interest policy over another. This outcome will be considered as part of the state interest review, and ministerial approval means the approach taken by the local government in balancing the state interest polices is endorsed by the state.

Part 2 provides examples for how to appropriately integrate each state interest policy for the *Natural hazards, risk and resilience* state interest.

The guidance material focusses on three key elements relevant for planning scheme preparation – hazard identification, risk assessment, and planning scheme responses.

To meet the objectives of the SPP for the *Natural hazards, risk and* resilience state interest a local government would have to follow the process of risk identification (policy 1) and risk assessment (policy 2) in order to develop fit-for-purpose measures in its planning scheme (policies 3–9).





State interest policy 1

Natural hazard areas are identified, including:

- (a) bushfire prone areas
- (b) flood hazard areas
- (c) landslide hazard areas
- (d) storm tide inundation areas
- (e) erosion prone areas.

Background

An understanding of the presence, extent, frequency and behavior of a natural hazard is the foundation on which the risk to people, property and infrastructure from that hazard can be assessed. As such, a suitable coastal hazard study should be completed prior to, or as early as possible in, the plan-making process, to inform how coastal risks will be addressed through land-use planning and development assessment.

The coastal hazard study should identify areas at risk, and can be undertaken at varying levels of precision depending upon the characteristics of the hazard, the land uses in that area and the rate of growth expected for that location. Depending on the capacity and available resources of the local government, coastal hazards may be identified through available state mapping to broadly identify hazard areas (referred to as level 1 mapping) or through a localised and more detailed coastal hazard assessment (referred to as level 2 mapping).

The level of detail for a study should be determined at a local level by the responsible local government. For example, areas with low population and anticipated low growth may be suited to a less detailed study than would be needed for an area anticipating higher levels of growth, change of use or infill. However, it should be recognised that detailed coastal hazard mapping may also help determine if an area should or should not be earmarked for higher future growth.

The effects of climate change should be considered in any study in accordance with best practice requirements.

How to appropriately integrate the policy

- 1.1 Identify coastal hazard areas through one or a combination of the following means, based on a fit-for-purpose study:
 - Level 1 mapping use of statewide mapping and data at a scale/precision appropriate to the local context
 - Level 2 mapping localised identification of the coastal hazards using methodology accepted by the state.

Note: Where a local government's resources to study natural hazards are constrained, localised studies should be prioritised for areas where growth and development pressures are greatest and most imminent. A program of mapping works should identify how the necessary level of mapping will be available to enable informed development decisions (e.g. scheduled local area planning or site-based mapping as part of a development application).

State interest policy 2

A fit-for-purpose risk assessment is undertaken to identify and achieve an acceptable or tolerable level of risk for personal safety and property in natural hazard areas.

Background

A coastal hazard study (policy 1) will identify the characteristics of a coastal hazard, but further analysis is required to assess the risk that the hazard poses to people, property and infrastructure, as well as the potential effects on the economy and disaster-management planning. This is achieved by performing a fit-for-purpose risk assessment, consistent with AS/NZS ISO 31000:2009.

In undertaking coastal hazard studies and conducting risk assessments, refer to QCoast2100's Minimum Standards.² These standards incorporate the AS/NZS ISO31000 approach and can be used as a core guiding document for local governments when considering coastal hazards in their land-use planning mechanisms. Completion of all phases will allow local governments to apply comprehensive, informed land-use planning responses to coastal hazards when preparing a local planning instrument.

The level of risk can be affected by the severity or frequency of the coastal hazard or by the scale, sensitivity or tolerability of the community, property or infrastructure to the hazard. Like the hazard studies prepared to inform them, risk assessments should be tailored to be fit-forpurpose depending upon the characteristics of the hazard and the settlement in that area and the rate of growth expected for that location.

The extent and precision of the risk assessment should be determined at a local level by the responsible local government, informed by local needs and knowledge.

This may result in some LGAs choosing to undertake a detailed region-wide risk assessment, while others may choose to undertake risk assessments for specific towns or areas over time, as resources or requirements dictate.

A risk assessment will identify whether the level of risk for a proposed development or zoning is acceptable, tolerable or intolerable. Land-use strategies and supporting planning provisions can reduce the level of risk to an acceptable and tolerable level by articulating locations where – based on the level of exposure or vulnerability of people, property or infrastructure to the hazard – one or more of the following can occur:

- Avoiding new development in coastal hazard areas.
- Accepting residual risk, and accommodating the coastal hazard (e.g. zone land for uses that provide greater resilience to coastal hazards).
- Mitigating risks from coastal hazard (e.g. coastal protection works).
- Retreating from the coastal hazard area due to intolerable risk (e.g. down zoning).

Table 1 demonstrates examples of land-use strategies that can be implemented through a local planning instrument to reduce risk to an acceptable or tolerable level.

State interest guidance material – Natural hazards, risk and resilience: Coastal hazards

² Developing a coastal hazard adaptation strategy: Minimum standards and guideline for Queensland local governments.

Land-use response	Examples to deliver the response
Avoiding coastal hazard areas	 Avoid zoning areas of medium or high risk for future urban purposes Intensify existing areas that are acceptable Avoid particular land uses in areas that create an intolerable risk (such as vulnerable uses) Avoid placing key transport/infrastructure linkages in coastal hazard areas, or by ensuring their resilience to such events
Mitigating coastal hazard risk to an acceptable or tolerable level	 Promote resilient development outcomes through built form responses and appropriate consideration of siting, design, access, evacuation and floodplain impact Include mitigation infrastructure or changes to the natural environment that will reduce coastal hazard risk
Accepting residual risk in coastal hazard area	 Maintain acceptable or tolerable land uses in existing developed areas Restrict uses in developed areas subject to coastal hazards to those that are less vulnerable and more resilient Do not further intensify development (such as via rezoning) in tolerable areas No further developing in areas of intolerable risk.
Retreating due to intolerable risk posed by coastal hazard	• Conduct down zoning/back zoning in areas of intolerable risk where there is no feasible alternative.

Table 1: Example land-use strategies to reduce risk to an acceptable or tolerable level

In some locations, the easiest and most efficient way of managing risk is to avoid placing settlements, development and some specific land uses in the coastal hazard area. It is also prudent not to increase the exposure of existing settlements to coastal hazards (e.g. by actively promoting population growth in coastal hazard areas).

The risk assessment will help a local government understand whether their proposed landuse planning strategies are appropriate, given the level of risk posed by the coastal hazard.

The risk assessment should build upon or integrate with the risk assessment conducted as part of disaster management planning in the local government area. Key points of focus include any areas where emergency response constraint or limitation may exist – particularly where future development is being considered in those areas.

For high-growth, high-risk coastal hazard areas (where significant infrastructure or population growth is anticipated or already exists), a coastal hazard adaptation strategy can be developed to plan for how people and property in these areas can be protected from adverse coastal hazard impacts over time.

How to appropriately integrate the policy

2.1 Undertake a fit-for-purpose risk assessment for each coastal hazard, assessing the risks to the area and/or proposed development (including people, property and infrastructure) based on local circumstances and needs and having regard to leading practice guidance on assessing coastal hazards (e.g. QCoast2100 Minimum Standards). The fit-for-purpose risk assessment is to be consistent with AS/NZS ISO 31000:2009 Risk Management.

Prepare the coastal hazard risk assessment with regard to:

- risks presented by coastal hazards to existing and future communities and infrastructure
- acceptable, tolerable and intolerable levels of risk for each land-use type/zone

Part 2

Integrating the state interest policies

- locations where particular land-use planning strategies are required to achieve acceptable or tolerable levels of risk to people and property
- the need to maintain natural landforms, vegetation and coastal processes that mitigate risks associated with coastal hazards.

At a minimum, the coastal hazard risk assessment should result in:

- the identification of land uses that are existing, proposed and should not occur in the coastal hazard areas
- the development of risk criteria that consider the community's exposure, tolerability and vulnerability, and are used to identify a broadly acceptable, tolerable or intolerable level of risk for each land use
- the identification of suitable land-use strategies and planning provisions used to ensure that the community is not exposed to an intolerable level of risk.

State interest policy 3

Land in an erosion prone area is not to be used for urban purposes, unless the land is located in:

- (a) an urban area in a planning scheme; or
- (b) an urban footprint identified in a regional plan.

Background

Erosion-prone areas are intended to provide a buffer between permanent infrastructure and coastal waters to allow for fluctuations of the coastline to occur as a result of physical coastal processes, without the need for intervention to protect infrastructure or public safety. The buffer also allows for land to be permanently inundated by the sea, removing the need for buildings and infrastructure to accommodate, respond to, or be protected from sea-level rise.

Problems associated with coastal erosion generally occur when shoreline recession threatens development in an area of fluctuating coastline. Most property owners will opt to defend infrastructure from coastal erosion where the cost of defence works is less than the value of the infrastructure. Undertaking defence works has implications for the protection and management of coastal resources, as well as other economic and potentially social consequences.

Any development, including structures or defence works, in an erosion-prone area can alter the way physical coastal processes occur and prevent sediment being available for longshore transport processes. These changes are to be expected and mitigated to ensure against unexpected and unwanted changes to coastal landforms, particularly in adjacent areas.

Many coastal areas where there is existing development in the erosion-prone area will need to plan for and respond to the risk of permanent inundation from sea-level rise. Such risk mitigation measures can be costly for both individuals and governments. To avoid increasing the number of people, amount of development and infrastructure at risk, new urban expansion should not occur in erosion-prone areas that are currently designated for non-urban uses, such as rural, rural residential and conservation.

How to appropriately integrate the policy

- 3.1 Identify a settlement pattern in the strategic framework and supporting zones that avoids designating non-urban land for future urban purposes in an erosion-prone area.
- 3.2 Include strategic outcomes that promote infill and redevelopment of existing urban areas to accommodate anticipated urban growth and avoid urban footprint expansion into erosion-prone areas.
- 3.3 Include assessment benchmarks that ensure urban expansion does not occur in nonurban areas.

State interest policy 4

Development in bushfire, flood, landslide, storm tide inundation or erosion prone natural hazard areas:

- (a) avoids the natural hazard area; or
- (b) where it is not possible to avoid the natural hazard area, development mitigates the risks to people and property to an acceptable or tolerable level.

Background

Land-use planning is the prime way of avoiding incompatible development in hazard areas beyond an acceptable or tolerable level of risk. Risks to existing development can also be limited or removed through responsive zoning and assessment benchmarks in existing areas.

Land-use responses should acknowledge the risks identified through the coastal hazard risk assessment and present a clear settlement vision that supports the achievement of those broader coastal risk management objectives for the local government area.

How to appropriately integrate the policy

- 4.1 Through the strategic framework, acknowledge the presence of coastal hazards in the planning scheme area, articulate a risk-responsive settlement strategy for at-risk locations, and establish the principle of only appropriate development occurring in coastal hazard areas.
- 4.2 Apply zones to land within coastal hazard areas that reflect the level of risk to people and property. Where the hazard presents an intolerable risk, land should be included in zones that limit the development of land and do not increase the exposure of people or property to the coastal hazard.
- 4.3 Assign levels of assessment for development in coastal hazard areas in line with the level of risk and vulnerability of the use. Special consideration should be given to community infrastructure that performs a role or service during and immediately after a natural hazard disaster.
- 4.4 Include assessment benchmarks that require development to avoid coastal hazard areas. For example, where suitable areas exist on site to accommodate development without encroaching into identified coastal hazard areas, development should be designed and located to avoid the hazard areas. Where it is not possible to avoid the coastal hazard areas, assessment benchmarks should require development to mitigate the risk to an acceptable or tolerable level, including through appropriate design and

siting criteria, as well as necessary coastal protection work where appropriate (refer to policy 7).

Note: Where located in a coastal erosion area, responses to manage risk should consider the location of development relative to other land uses located in closer proximity to the seaward hazard.

State interest policy 5

Development in natural hazard areas:

- (a) supports, and does not hinder disaster management capacity and capabilities
- (b) directly, indirectly and cumulatively avoids an increase in the exposure or severity of the natural hazard and the potential for damage on the site or to other properties
- (c) avoids risks to public safety and the environment from the location of the storage of hazardous materials and the release of these materials as a result of a natural hazard
- (d) maintains or enhances the protective function of landforms and vegetation that can mitigate risks associated with the natural hazard.

Background

Land-use planning plays a significant role in disaster management, and together they share an important responsibility in building strong and resilient communities. The aim of the Queensland Strategy for Disaster Resilience (QSDR) is to make Queensland the most disaster resilient state in Australia. The QSDR recognises the importance of a cooperative approach, with a strong focus on the ability of local government to influence resilient settlements.

Local governments have a primary role in working with communities to build their resilience to disasters. Key functions include ensuring exposure to hazards is reduced through suitable land-use planning, maintaining the natural environment and building community understanding of all hazards and risks.

Avoid increases to hazard exposure or severity (whether on site or on other properties) is a key coastal risk management objective. The effect of development on hazard behavior and other properties (including altering flow-paths or changing duration, depth, velocity, hazard or warning time), must be considered and appropriately addressed through development assessment.

Release of hazardous materials during a storm tide event can create dangerous public health conditions and impair water quality, vegetation and the general health of the environment during the storm tide and following the event. Design criteria are required to prevent hazardous materials from being exposed to floodwaters, or are otherwise appropriately sealed to avoid discharge during an event.

The natural environment has an important role to play in risk mitigation. Coastal foreshores and wetlands vegetation can provide a protective and hazard-attenuation function during coastal hazard events. Retaining environmental and landscape values reduce the need for built mitigation infrastructure and maintains the natural function of the coast.

How to appropriately integrate the policy

- 5.1 Include strategic outcomes to:
 - avoid or mitigate the risk from coastal hazards
 - protect natural processes and landforms that can mitigate risks against coastal hazards
 - allow social infrastructure to function effectively during and after a coastal hazard event
 - provide for effective disaster response and recovery through evacuation routes, access for emergency services and the supply of essential goods.
- 5.2 Include planning provisions both in the strategic framework and as assessment benchmarks in relevant codes to ensure that development within a coastal hazard area:
 - does not increase the number of people at risk to an intolerable level
 - provides safe and efficient access and operation for emergency services
 - enables the self-evacuation of occupants and visitors depending on the nature of the risk, requirements that enable people, prior to or during an event, to safely shelter in place or evacuate via safe routes from the hazard area may be appropriate
 - does not cause or contribute to an increase in the severity of the coastal hazard and does not significantly increase the potential for damage on the site or to other properties
 - incorporates natural processes, landforms and vegetation that contribute to the mitigation of natural hazards and risks into development design, location and operation to enable these natural processes and functions to continue
 - avoids locating hazardous material in coastal hazard areas alternatively, where the location of hazardous materials in a coastal hazard area is unavoidable, appropriate safeguards are incorporated into the design of the development to prevent the release of hazardous materials.

State interest policy 6

Community infrastructure is located and designed to maintain the required level of functionality during and immediately after a natural hazard event.

Background

The ability of community infrastructure to function effectively during and after a natural hazard event can have a significant effect on the ability of a community to respond to and recover from an event.

Different types of community infrastructure perform different roles and have differing vulnerabilities during and after a coastal hazard event. For this reason it is only intended that 'where appropriate' community infrastructure will need to function effectively during or after a broad range of natural hazard events. For example, a state-controlled road performs a more important function than a bikeway during and after a natural hazard event. Similarly a sporting facility may not serve a particular function during a natural hazard event, but will probably perform an important role in the recovery after an event.

Part 2

Community infrastructure should be located and designed in accordance with appropriate standards to achieve the required level of functionality during or after a range of natural hazard events.

How to appropriately integrate the policy

- 6.1 Identify land for community infrastructure purposes through the strategic framework and/or appropriate zones, and where possible are located to avoid coastal hazard areas.
- 6.2 Where it is necessary that community infrastructure be located within coastal hazard areas, include assessment benchmarks in the planning instrument that respond to the coastal hazard risk assessment and mitigate risk to an acceptable or tolerable level.
- 6.3 Include assessment benchmarks that stipulate Recommended Storm Tide Event Levels (see Table 2 and Figure 5) or location and design standards for the establishment of each type of community infrastructure, consistent with the role and level of service that the infrastructure is expected to perform during and immediately after a natural hazard event.
- 6.4 Identify areas suitable for accommodating community infrastructure, based on the following considerations:
 - the function that the community infrastructure serves during or immediately after a natural hazard event and whether or not it contributes to a broader community infrastructure network
 - the standards proposed for the siting and design of the community infrastructure
 - the consequences of a loss of service
 - the community's tolerance to loss of service during or immediately after a natural hazard event
 - the natural hazard scenario under which the community infrastructure will cease to function effectively
 - the compatibility of the siting of the infrastructure with the level of hazard
 - where natural hazard areas cannot be avoided, whether the risks associated with the natural hazard can be mitigated to acceptable or tolerable levels to achieve the required level of service during and immediately after a defined event.
 - the likelihood and consequences of a future natural hazard event that exceeds the defined event.

Community infrastructure	Storm-tide immunity level
Community and cultural facilities, including facilities where an education and care service under the Education and Care Services National Law (Queensland) is operated or a child care service under the <i>Child Care Act 2002</i> is conducted, community centres, meeting halls, galleries and libraries	Locate outside 1% AEP
Correctional facilities	Locate outside 0.2% AEP
Educational facilities	Locate outside 1% AEP
Emergency services facilities	Police facilities: Locate outside 0.5% AEP Emergency services: Locate outside 0.2% AEP Emergency shelters: Building floor levels above 0.01% AEP*
Hospitals and associated institutions	Locate outside 0.2%
Operating works under the <i>Electricity Act 1994</i>	Power station: Locate outside 0.2% AEP Substations: Locate outside 0.5% AEP
Water cycle management infrastructure	Water treatment plant: Locate outside 0.5% AEP
All other community infrastructure not mentioned above	No specific recommended coastal hazard level, but development proponents should ensure that the infrastructure is optimally located and designed to achieve suitable levels of service. Note: Where possible, community infrastructure for the purpose of transport should avoid high storm- tide areas
* As per Design Guidelines for Queensland Public Cyclone Shelters, Department of Public Works, September 2006	

Table 2: Community infrastructure storm-tide immunity level (AEP)

Part 2



Building floor level above 0.01% AEP for emergency shelters

Figure 5: Example storm-tide immunity level for community infrastructure

State interest policy 7

Coastal protection work in an erosion-prone area is undertaken only as a last resort where coastal erosion or inundation presents an imminent threat to public safety or existing buildings and structures, and all of the following apply:

- (a) The building or structure cannot reasonably be relocated or abandoned.
- (b) Any erosion control structure is located as far landward as practicable and on the lot containing the property to the maximum extent reasonable.
- (c) Any increase in coastal hazard risk for adjacent areas from the coastal protection work is mitigated.

Background

Erosion-prone areas are part of the active beach system and are subject to natural cycles of erosion and accretion of sand. Urban development in these areas can expose people and property to sea erosion and potential loss. These risks will likely be exacerbated by climate change, which presents an imminent threat for many coastal communities.

To manage the risks posed by coastal erosion, coastal protection works can be constructed, reducing the risk to life, property and infrastructure. Such works, however, can have adverse consequences on the coastal environment, as the defensive infrastructure prevents sand from being included in natural beach movements.

Part 2

For these reasons, it remains important that coastal protection work in an erosion-prone area is undertaken only as last-resort means of reducing risk to life, property and infrastructure. Rather, alternative options for reducing the risk should first be explored to ensure that, where possible, the natural processes of our coastal environments remain unimpeded.

The monetary value of an existing building or structure that is proposed to be protected by coastal protection works should be of greater value than the cost of associated coastal protection works.

How to appropriately integrate the policy

- 7.1 Include assessment benchmarks in zone/overlay codes applying to land in an erosionprone area, which:
 - limit development involving coastal protection work, unless:
 - there is evidence of significant erosion, or there is an immediate threat of significant erosion
 - alternative means to address coastal hazard risk have been considered and demonstrated to be ineffective
 - there is an inadequate erosion buffer zone and managed retreat is not possible
 - infrastructure, structures or buildings are not able to be relocated and are in a condition that warrants protection
 - ensure that where coastal protection work is permitted such works are consistent with a relevant shoreline erosion management plan or coastal engineering investigation that demonstrates there are no viable alternatives to hard protection works at the site
 - require coastal protection works be located wholly on private land, unless it can be demonstrated that it is not feasible to locate the structure on private land
 - ensure coastal protection works are located as close as practicable to the development it is intended to protect and is limited to the length required to protect the building or infrastructure in order to mitigate any increase in coastal hazard risk for adjacent areas.

State interest policy 8

Erosion prone areas within a coastal management district:

Development does not occur unless the development cannot feasibly be located elsewhere and is:

- (a) coastal-dependent development; or
- (b) temporary, readily relocatable or able to be abandoned development; or
- (c) essential community infrastructure; or
- (d) minor redevelopment of an existing permanent building or structure that cannot be relocated or abandoned.

Background

The *Coastal Protection and Management Act 1995* provides for the declaration of a Coastal Management District (CMD) over coastal areas that need protection or management, especially with respect to the area's vulnerability to erosion, to maintain or enhance coastal resources or for planning and development management of the area.

The declaration of erosion-prone areas along the coast seeks to identify the areas at risk from coastal erosion. The CMD identifies lots where new development should be located outside the erosion-prone area to provide an adequate buffer zone between the seaward boundaries of development and the foreshore. This allows for future beach movements to be accommodated within this area, which is vulnerable to erosion, without the need for any direct intervention.

While the state government has jurisdiction over particular developments within the erosionprone areas of the CMD, it remains appropriate for local governments to consider the impact of development within these areas and frontload development considerations through appropriate zonings to limit potential uses, in line with level or risk.

Certain development, by its nature, may need to be located in erosion-prone areas in a CMD to function, as it requires either access to tidal water or a location in close proximity to tidal water – such as coastal-dependent development.

Coastal-dependent development also represents a unique and necessary component of the state's economy. To function effectively, coastal-dependent development must be located in suitable areas adjacent to the coast to allow for access to coastal resources such as tidal water. It is important that opportunities for this are supported.

Minor redevelopment in an erosion-prone area in a coastal management district includes replacing an existing permanent building/structure with a building/structure that is the same, or substantially the same, in location and size, and the monetary value of the existing building or structure is more than the cost of the associated coastal protection works required to protect it. Examples of minor redevelopment may include:

- extending the existing footprint of a building by less than 50 metres,
- an additional storey to a single-storey building.

While the siting of essential community infrastructure should focus on areas outside of coastal hazard areas, local context may dictate that the siting of such development in the erosion-prone areas of the CMD is the only feasible alternative to meet community needs.

How to appropriately integrate the policy

- 8.1 Identify land in an erosion-prone area in the CMD within the strategic framework and include strategic outcomes that express the limited development potential of this area.
- 8.2 Include strategic outcomes that facilitate and support coastal-dependent development in locations that minimise exposure to coastal hazards. This may include strategic framework maps that identify areas intended to be developed as coastal-dependent development.
- 8.3 Include land within an erosion-prone area in the CMD in appropriate zones and include assessment benchmarks that limit development opportunities to:
 - coastal-dependent development
 - temporary, readily relocatable or able to be abandoned development
 - essential community infrastructure
 - minor redevelopment of an existing permanent building or structure that cannot be relocated or abandoned.

Note: The state government has jurisdiction for the consideration of certain types of development within the erosion-prone area of the CMD in accordance with schedule 10 of the Planning Regulation. A local planning instrument should not duplicate assessment requirements for matters where the state government is identified as a referral agency.

8.4 Ensure development in an erosion-prone area in the CMD is identified as assessable development.

Integrating the state interest policies



Figure 6: Graphical representation of policy 8

State interest policy 9

Erosion prone areas within a coastal management district:

Development permitted in policy 8 above mitigates the risks to people and property to an acceptable or tolerable level.

Background

Though development may be a permitted use in the erosion-prone area of the CMD, in accordance with policy 8 above, there still remains a need to respond to risks associated with the coastal hazards. Development should ensure that risks to life, property and infrastructure are appropriately mitigated to an acceptable or tolerable level.

Where a coastal hazard study and risk assessment has shown that an erosion-prone area may be at an intolerable level of risk at a point in the future and that this risk cannot be avoided or mitigated, planned retreat to avoid that risk may need to be considered.

How to appropriately integrate the policy

- 9.1 Include assessment benchmarks to ensure that where development is required to be located within the erosion-prone area of the CMD, development is designed and sited to:
 - be located as far landward from the seaward property boundary as possible, or landward of the seaward alignment of the neighbouring buildings

- mitigate coastal erosion risk through location, design, construction and operating standards
- not contribute to an increase in the level of coastal hazard risk affecting surrounding areas
- provide safe and efficient access and operation for emergency services
- enable the self-evacuation of occupants and visitors
- incorporate into the development design and siting natural processes, landforms and vegetation that contribute to the mitigation of coastal hazard risk
- provide space seaward of the development within the lot to allow for the future construction of erosion-control structures, if necessary, such as a sea wall, or construct erosion control structures to a specified standard to comply with a coordinated erosion-control strategy for the locality with respect to the location and standard of erosion-control structures.

Note: The state government has jurisdiction over certain types of development within the erosion-prone area of the CMD in accordance with schedule 10 of the Planning Regulation. A local planning instrument should not duplicate assessment requirements for matters where the state government is the referral agency.

Part 3: Mapping

To support the SPP, wherever possible and to the extent relevant, matters of state interest are spatially represented as layers included in the SPP IMS. The mapping is necessary to help local government, the community and industry understand and interpret where and how state interest policies and assessment benchmarks included in the SPP apply.

Several mapping layers contained in the SPP IMS are prepared by entities other than the Department of Infrastructure, Local Government and Planning and may serve an additional purpose outside the Queensland planning system. Where relevant, the SPP IMS represents the single point of truth for the spatial representation of the state interests expressed in the SPP.

Appendix 1 of the SPP identifies three categories of mapping layers provided or referred to in the SPP IMS that are intended to be used in one of the following ways:

- **Category 1** State mapping layers that must be appropriately integrated in a local planning instrument in a way that achieves the relevant state interest policy.
- **Category 2** State mapping layers that must be appropriately integrated, and can be locally refined by a local government in a local planning instrument in a way that achieves the relevant state interest policy.
- **Category 3** State mapping layers that are provided for local government information purposes only.

The SPP IMS is located at: <u>https://planning.dsdmip.qld.gov.au/maps</u>. Any queries related to the SPP mapping should be sent to <u>mappingenquiries@dsdmip.qld.gov.au</u>.

This section provides clarity regarding the mapping layers on the SPP IMS relevant to the *Natural hazards, risk and resilience* state interest.

Mapping layers

Erosion-prone area	
Purpose	The EPA mapping is a representation of the declared erosion-prone area plans for the coastline and covers the entire coast. It is termed indicative mapping as it is an interpretation of the declared EPA and recognises that the mapping is a snapshot in time. The actual EPA location may change over time as the coast erodes and builds up, and more recent information may allow the EPA to be better mapped. The purpose of this mapping layer is to give governments, business and
	communities understanding of areas potentially at risk of coastal erosion and to guide land-use planning and development decisions.
Mapping category	Category 2
Data custodian	Department of Environment and Heritage Protection
Head of power	Coastal Protection and Management Act 1995
Methodology	Methodology for the preparation of erosion prone areas in accordance with the <i>Coastal Protection and Management Act 1995</i> is provided in the Coastal hazard technical guide: www.ehp.qld.gov.au/coastalplan/pdf/hazards-guideline.pdf

Storm-tide Inundatio	n
Purpose	The storm-tide inundation area is the area of land inundated by a defined storm-tide event. The one-in-100 ARI (or 1% AEP) water level has been chosen as the defined storm-tide event level, below which special management of the threat is required. The state provides a first-pass assessment of storm-tide inundation hazard for the coast, which is based on regional default water levels of 1.5m, above the highest astronomical tide (HAT) for south-east Queensland, and 2.0 m HAT for the remainder of the state. DEHP recommends the use of local storm-tide studies to inform planning and development assessment wherever this is available.
Mapping category	Category 2
Data custodian	Department of Environment and Heritage Protection
Head of power	State Planning Policy
Methodology	Methodology for the preparation of storm-tide inundation areas is provided in the Coastal hazard technical guide: Determining coastal hazard areas: www.ehp.qld.gov.au/coastalplan/pdf/hazards-guideline.pdf

Coastal management district (CMD)	
Purpose	The purpose of the CMD is to identify those coastal areas that require protection or management, especially with respect to the area's vulnerability to coastal processes, to maintain or enhance coastal resources or for planning and management of development in the area. The CMD provides a line of differentiation between SPP policies that apply to erosion-prone areas.
Mapping category	Category 1
Data custodian	Department of Environment and Heritage Protection
Head of power	Coastal Protection and Management Act 1995
Methodology	The Department of Environment and Heritage Protection has identified a methodology to determine the limits of the CMD to comply with the requirements of the <i>Coastal Protection and Management Act 1995</i> . The methodology can be found at: www.ehp.qld.gov.au/coastal/development/assessment/cmd-mapping-methodology.html

Part 4

Applying assessment benchmarks

Part 4: Applying assessment benchmarks

The SPP contains specific assessment benchmarks for the *Natural hazards, risk and resilience* state interest.

Under the Planning Regulation 2017 the assessment benchmarks apply if the *Natural hazards, risk and resilience* state interest has not been appropriately integrated in a planning scheme. If this is the case, a development application must be assessed against the assessment benchmarks to the extent of any inconsistency with the planning scheme and where the assessment manager considers these assessment benchmarks are relevant to the proposed development.

In addition, the assessment manager must have regard to the SPP (including the *Natural hazards, risk and resilience* state interest statement and policies), where the planning scheme has not appropriately integrated the state interest. The SPP applies as a matter to have regard to where the assessment manager considers these matters are relevant to the proposed development and only to the extent of any inconsistency with the planning scheme.

This section provides guidance for local government when determining how a development application may satisfy these assessment benchmarks.

Applicable development:

A development application for a material change of use, reconfiguration of a lot or operational works on premises in any of the following:

- (1) bushfire prone areas
- (2) flood hazard areas
- (3) landslide hazard areas
- (4) storm tide inundation areas
- (5) erosion prone area.

Assessment benchmark 1

Erosion prone areas within a coastal management district:

- (1) Development does not occur in an erosion prone area within a coastal management district unless the development cannot feasibly be located elsewhere and is:
 - (a) coastal-dependent development; or
 - (b) temporary, readily relocatable or able to be abandoned development; or
 - (c) essential community infrastructure; or
 - (d) minor redevelopment of an existing permanent building or structure that cannot be relocated or abandoned.

Part 4

How a development application may demonstrate compliance with the assessment benchmark

A development application should demonstrate that the proposed development meets the definition of one of the following uses:

- coastal-dependent development; or
- temporary, readily relocatable or able to be abandoned development; or
- essential community infrastructure; or
- minor redevelopment of an existing permanent building or structure that cannot be relocated or abandoned.

Where the application is for coastal-dependent development that includes co-located residential and tourist uses, the applicant must demonstrate that:

- such uses are located directly landward of a marina that is part of the integrated development; and
- such uses are appropriately protected from coastal hazards; and
- the residential and tourist uses are not the primary purpose of the development.

Development should also demonstrate that it cannot feasibly be accommodated on the site without encroaching on the coastal hazard area. It is noted that, in some cases, a better outcome can be achieved in a different location, particularly for community infrastructure.

Minor redevelopment in an erosion-prone area in a coastal management district includes replacing an existing permanent building/structure with a building/structure that is the same, or substantially the same, in location and size, and the monetary value of the existing building or structure is more than the cost of the associated coastal protection works required to protect it.

Examples of minor redevelopment may include:

- extending the existing footprint of a building by less than 50 metres
- adding an additional storey to a single-storey building.

Assessment benchmark 2 Erosion prone areas within a coastal management district:

Development permitted in (1) above, mitigates the risks to people and property to an acceptable or tolerable level.

How a development application may demonstrate compliance with the assessment benchmark

Where development is of a use in accordance with assessment benchmark 1, an application may demonstrate through a site-based risk assessment prepared in accordance with AS/ NZ ISO 31000:2009 Risk Management – Principles and Guidelines that the risk presented by the development is acceptable or tolerable, at least for the 1% Annual Exceedance Probability (AEP) event determined for the location.

In considering the level of risk associated with the development, the application may have regard to the following considerations:

- permanent inundation due to sea-level rise
- the impact of a defined storm-tide inundation event on associated infrastructure such as roads, transport networks, educational or recreational facilities

- the extent, timing and consequence of coastal erosion
- high demands on emergency relief agencies and the need for clear evacuation routes should the need arise
- ongoing maintenance costs for coastal protection works
- compatibility of the development with the level of hazard presented, including use and built form/site layout
- likely property damage as a result of the development
- processes for evacuation of people on-site, and impacts on evacuation off-site
- extent of upstream or downstream impact on tidal flows and other properties
- performance of infrastructure, services and utilities on-site including emergency response requirements during and in the aftermath of an extreme coastal hazard event
- safety of residents, workers or other occupants on-site
- changes to natural coastal processes as a result of the design of the development.

Development for the purpose of those uses in assessment benchmark 1 may demonstrate compliance with the assessment benchmark by incorporating mitigation/resilience measures to minimise the risk to people and property to an acceptable or tolerable level. This may include:

- locating habitable buildings outside of, or as far landward of, the coastal hazard area as possible
- minimising the footprint of the development on that part of the site within the coastal hazard area
- allowing for natural barriers or buffers on the site
- filling land to a level above the defined temporary or permanent inundation level
- designing habitable buildings so that habitable rooms remain above the temporary inundation level
- designing the development so that operational components remain above the level of inundation, or waterproof components if located below temporary inundation level
- designing buildings or structures to be decommissioned, disassembled or relocated either on the site or to another site
- providing for or installing and maintaining on-site erosion control structures.

Assessment benchmark 3

Bushfire, flood, landslide, storm tide inundation, and erosion prone areas outside the coastal management district:

Development other than that assessed against (1) above, avoids natural hazard areas, or where it is not possible to avoid the natural hazard area, development mitigates the risks to people and property to an acceptable or tolerable level.

How a development application may demonstrate compliance with the assessment benchmark

Development should demonstrate that it cannot feasibly be accommodated on the site without encroaching onto the coastal hazard area.

Where development cannot be located outside the coastal hazard area, the application may demonstrate through a site-based risk assessment prepared in accordance with AS/ NZ ISO 31000:2009 Risk Management – Principles and Guidelines (or State guidance, if available) that the risk presented by the development is acceptable or tolerable, at least for the 1% Annual Exceedance Probability (AEP) event determined for the location.

Where the development is proposed to be located in a coastal-erosion area, responses to manage risk should consider the location of development relative to other land uses located in closer proximity to the seaward hazard.

In considering the level of risk associated with the development, the application may have regard to at least the following considerations:

- permanent inundation due to sea-level rise
- the impact of a defined storm-tide inundation event on associated infrastructure such as roads, transport networks, educational or recreational facilities
- extent, timing and consequence of coastal erosion
- high demands on emergency relief agencies and the need for clear evacuation routes should the need arise
- ongoing maintenance costs for coastal protection works
- compatibility of the development with the level of hazard presented, including use and built form/site layout
- likely property damage as a result of the development
- processes for evacuation of people on-site, and impacts on evacuation off-site
- extent of upstream or downstream impact on tidal flows and other properties
- performance of infrastructure, services and utilities on-site including emergency response requirements during and in the aftermath of an extreme coastal hazard event
- safety of residents, workers or other occupants on-site
- changes to natural coastal processes as a result of the design of the development.

Where development cannot be avoided, development may demonstrate compliance with the assessment benchmark by incorporating mitigation/resilience measures to minimise the risk to people and property to an acceptable or tolerable level. This may include:

- locating habitable buildings outside of, or as far landward of, the coastal hazard area as possible
- minimising the footprint of the development on that part of the site within the coastal hazard area
- allowing for natural barriers or buffers on the site
- filling land to a level above the defined temporary or permanent inundation level
- designing habitable buildings so that habitable rooms remain above the temporary inundation level
- designing the development so that operational components remain above the level of temporary or permanent inundation or waterproof components if located below temporary inundation level
- designing buildings or structures to be decommissioned, disassembled or relocated either on the site or to another site
- providing for or installing and maintaining on-site erosion-control structures.

Assessment benchmark 4

All natural hazard areas:

Development supports and does not hinder disaster management response or recovery capacity and capabilities.

How a development application may demonstrate compliance with the assessment benchmark

Development provides for safe and efficient access and operation for emergency services. This should include consideration both to the development site and access within, where applicable.

Depending on the nature of the risk, an application may consider a development's location and design to enable the self-evacuation of occupants and visitors to be undertaken in an orderly way that does not require additional burden for emergency services.

Where self-evacuation may not be possible, alternative arrangements (such as shelter in place) should be considered to demonstrate that the safety of people on-site or elsewhere is not adversely affected by the development.

Shelter in place may not be considered an appropriate response for uses involving vulnerable persons, unless the warning time is sufficient to evacuate all vulnerable persons.

A site-based evacuation plan that does not hinder existing disaster-management plans in the surrounding area may be required to demonstrate the above.

Assessment benchmark 5 All natural hazard areas:

Development directly, indirectly and cumulatively avoids an increase in the severity of the natural hazard and the potential for damage on the site or to other properties.

How a development application may demonstrate compliance with the assessment benchmark

Development is designed to ensure that the location, form and scale of buildings, structures and operational work do not cause or contribute to an increase in the coastal hazard affecting the site or surrounding areas.

An application may comply with the assessment benchmark by demonstrating that the development would not result in:

- any increase in storm-tide height, velocity or duration on nearby properties due to development impacts on storm-tide hydrodynamics
- an impediment to or diversion in the natural transport of sediment along the coast, which may cause or increase erosion risk to nearby properties
- any change to the tidal prism of a waterway that can affect tidal or riverine currents and sediment transport or deposition rates in the waterway
- the effects of any other hazard management actions on neighbouring properties.

Part 4

Assessment benchmark 6 All natural hazard areas:

Risks to public safety and the environment from the location of hazardous materials and the release of these materials as a result of a natural hazard are avoided.

How a development application may demonstrate compliance with the assessment benchmark

Development may comply with the assessment benchmark by demonstrating that:

- materials manufactured or stored on-site are not hazardous or noxious, or comprise
 materials that may have a detrimental effect on the environment if discharged as a result
 of a costal hazard event; or
- structures used for the manufacture or storage of hazardous materials are located above the defined storm-tide level, or designed to prevent the intrusion of tidal waters.

Note: Refer to the Work Health and Safety Act 2011 and associated regulation and guidelines, the Environmental Protection Act 1994, and the relevant building assessment provisions under the Building Act 1975 for requirements related to the manufacture and storage of hazardous substances.

Assessment benchmark 7 All natural hazard areas:

The natural processes and the protective function of landforms and the vegetation that can mitigate risks associated with the natural hazard are maintained or enhanced.

How a development application may demonstrate compliance with the assessment benchmark

Development retains or reinstates natural processes, landforms and vegetation that contribute to the mitigation of natural hazards and risks.

An application may comply with the assessment benchmark by demonstrating that development:

- retains height and sediment volume of coastal landforms, especially dunes
- avoids loss or damage of vegetation that has a role in the building or stabilisation of coastal land forms against wind and water erosion
- retains or reinstates native coastal vegetation on damaged or disturbed areas
- ensures surface flow modifications do not occur or, where necessary, do not cause coastal erosion or create land instability.

Part 4

Part 5: Example planning scheme provisions

Example planning scheme provisions for the *Natural hazards, risk and resilience* state interest are provided below, which a local government may choose to adopt or otherwise adapt these when making or amending a planning scheme.

The example planning scheme provisions should not be seen as the only way to appropriately reflect the *Natural hazards, risk and resilience* state interest. It is not intended that a local government would use these example provisions verbatim.

Where a local government seeks to adopt the example planning scheme provisions, variations will be required to reflect the local circumstances, opportunities and aspirations of each local government area.

Planning scheme element	Role in treating coastal hazard risk
Strategic framework	The strategic framework articulates how the land-use strategies will implement the approach to managing the coastal hazard risk in future and existing developments in the local government area, and how the planning scheme zoning will contribute to this intent.
Overlays and mapping	 Identify the areas of coastal hazard. Identify areas outside of the areas of coastal hazard. Identify areas where further hazard assessment is required. Identify locations where land-use strategies can be used to avoid or mitigate hazard. Trigger specific coastal hazard-related provisions in a zoning code. Trigger a coastal hazard overlay code.
Land use zones	 Identify land uses that are appropriate in areas of coastal hazard, as highlighted by the risk assessment that outlined the acceptable, tolerable and intolerable levels of risk for each land-use type. Avoid intolerable risks by delivering the specific outcomes and land-use directions articulated in the strategic framework. Ensure that the right development occurs in the right locations and is consistent with the strategic framework and risk assessment.
Tables of assessment	 The table of assessment should reflect the strategic framework and risk assessment, and can be used to establish the category of development and category of assessment for particular land uses, relative to the level of risk identified through the risk assessment. A lower level of risk should translate into a lower category, e.g. accepted development (subject to requirements) instead of assessable development, or code assessment rather than impact assessment for assessable development. The category of assessment may vary throughout Queensland depending on the level of tolerability (as determined by the local government) and the information available to make an assessment.
Land-use zone codes	 Address risks from coastal hazards, e.g. by including planning provisions to address coastal hazards in each zone code. Clearly and consistently articulate how coastal hazards will be addressed through the purpose of the zone code, the performance outcomes and the acceptable solutions.
Overlay codes	 Identify siting, design and layout techniques that can be used to achieve an acceptable or tolerable level of risk for the development.

Table 3: Example planning scheme provisions

	 Address coastal hazards and associated risks to people, property, economic activity, social wellbeing and the environment.
Planning scheme policies	 Additional technical guidance can be provided through a coastal hazard planning scheme policy. The policy can provide additional specific detail on how to meet particular performance outcomes or acceptable outcomes in the coastal hazard overlay code. The policy can provide details on coastal hazard modelling and risk management investigations required as part of development assessment.

Strategic outcomes - safety and resilience to hazards

Where coastal hazards exist in the local government area, the acknowledgement of coastal hazards should be the first mention of the natural hazard in a planning scheme. The strategic outcomes should be reflected throughout the planning instrument and be informed by the outcomes of natural hazard investigations and mapping.

The strategic outcomes provide an opportunity to succinctly articulate a local government's intent for managing development (both existing and future) with regard to coastal hazards.

Strategic outcomes explicitly relating to the management of coastal hazard risk is an appropriate vehicle to articulate the specific outcomes and land-use strategies to build community resilience and avoid and/or mitigate the risks associated with coastal hazards in particular locations.

An example strategic outcome or component of the strategic intent for the local government area may include:

• The shape of the city/region evolves to respond to the natural hazards affecting it, including bushfire, storm tide, landside flooding and erosion, by ensuring that the location and intensity of development does not place people, property and infrastructure at intolerable risk of the hazard. The settlement pattern in this planning scheme has been prepared with consideration to the risks posed by natural hazards.

In addition, the land-use strategy for managing coastal hazards may be incorporated across a number of other, non-coastal hazard specific strategic outcomes, including:

- The settlement pattern theme identifies where coastal hazard areas are avoided or mitigated.
- The natural environment theme protects natural processes and landforms such as the coastal environment and could reduce the severity or impact of the natural hazard.
- The community identity and diversity theme addresses the ability for resilient social infrastructure to function effectively during and after a hazard event and for multi-purpose social infrastructure to be used as emergency shelters.
- The natural resources and landscape theme protects natural processes and landforms such as the function of the coastal environment and no worsening of the severity or impact.
- The access and mobility theme provides for effective disaster response and recovery through evacuation routes, access for emergency services and the supply of essential goods and services.
- The economic development theme addresses a resilient economy that will be able to operate after a hazard event. Conversely, a community can become more resilient to natural hazards if a planning

scheme recognises the interrelationship between planning for coastal hazard risk and other themes.

Specific outcome

Specific outcomes relating to natural hazards seek to achieve development in areas that are compatible with the level of risk. Specific outcomes articulate what the local government area will look like if the natural hazard-related planning provisions in the planning scheme are successfully implemented. These should be tailored to meet local circumstance, specific to each of the coastal hazards (i.e. erosion-prone and storm-tide inundation areas), and support the detailed planning provisions throughout the planning instrument. For example:

- Development avoids and mitigates risks to property damage.
- Infrastructure functions effectively during and after a hazard event.
- Natural processes and landforms such as coastal resources and processes are protected.
- The severity or impact of the natural hazard is not increased.
- Development supports, and does not unduly burden, disaster-management response or recovery capacity and capabilities.

Example code: coastal hazard code

The following code provisions have been written to be incorporated as an overlay code triggered by an overlay map that includes:

- erosion-prone area
- storm-tide inundation area
- coastal management district

Note: Using an overlay code is one of a number of ways to reflect the policies of the Natural hazards, risk and resilience state interest relating to coastal hazards. The provisions detailed in this model code can be adopted in appropriate zone, use or overlay codes, and should be adapted to align with the local context where relevant.

Application

This code applies to accepted development and to the assessment of assessable for a material change of use, building work, reconfiguring a lot and operational work in the coastal hazard overlay.

Purpose

The purpose of the coastal hazard overlay code is to ensure development in a coastal hazard area is planned, designed, constructed and operated to:

- (a) protect people, property and infrastructure from coastal hazard impacts, including having regard to the projected impacts of climate change
- (b) enhance the community's resilience to the effects of coastal hazards
- (c) maintain coastal processes including fluctuations of the coast to enable these natural functions to continue
- (d) maintain the protective function of coastal resources to mitigate risks associated with coastal hazards.

The purpose of the code will be achieved through the following overall outcomes:

- (a) new urban expansion is avoided in the erosion-prone area
- (b) the exposure of communities and development to coastal hazards is avoided or mitigated including impacts of projected climate change
- (c) the development siting, layout, and access responds to the identified risk and minimises risk to an acceptable or tolerable level
- (d) the development supports, and does not unduly burden disaster-management response or recovery capacity and capabilities
- (e) development does not directly, indirectly and cumulatively increase the exposure or severity of coastal hazards on adjoining properties
- (f) development does not increase, or introduce additional adverse impacts on the environment or public safety as a result of impacts from a coastal hazard event

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- (g) the development ensures coastal landforms and vegetation are protected or enhanced to mitigate coastal hazard risk
- (h) essential community infrastructure is located and designed to function effectively during and immediately after a coastal hazard event
- (i) development avoids the use of coastal protection works as a means of reducing risk from coastal hazards, unless there are no feasible alternatives.

Table 4: Criteria for accepted and assessable development		
Performance outcomes	Acceptable outcomes	
For accepted development (storm-tide	inundation areas only)	
PO1 Development is resilient to storm-tide events by ensuring design and built form accounts for the potential risks of storm- tide inundation.	AO1.1 New buildings or extensions to existing buildings are not located in storm-tide inundation areas.	
	AO1.2 New residential buildings within the storm-tide inundation area provide a finished habitable floor level to at least the level specified in Table 5: Storm-tide planning floor levels.	
	AO1.3 New non-residential buildings (other than Class 10 buildings) within the storm-tide inundation area provide a finished floor level to at least the level specified in Table 5: Storm-tide planning floor levels.	
	AO1.4 For minor extensions (e.g. less than 50 m2) to existing buildings, the finished floor level of any new habitable room is not less than the floor level of existing habitable rooms.	
PO2 Development avoids release of hazardous materials into waters.	AO2.1 Materials stored on site are readily able to be relocated outside of the coastal hazard area in a storm-tide event;	
	AND	
	AO2.2 Development ensures the manufacture or storage of hazardous materials is located to at least the level specified in Table 5: Storm-tide planning floor levels.	
	Note : Businesses should ensure that necessary emergency and continuity plans are in place to account for the potential need to evacuate personnel and to relocate property before a flood event (e.g. to allow enough time to transfer stock to the upstairs level of a building or off-site).	
For assessable development (Erosion prone areas only)		
 PO3 Development does not occur in an erosion-prone area in a coastal management district unless the development: a) cannot feasibly be located elsewhere and: b) is one of the following types of development: a. coastal-dependent development; or 	No acceptable outcome is provided.	

Performance outcomes	Acceptable outcomes
 temporary, readily locatable or able to be abandoned development; or 	
c. is essential community	
infrastructure; or	
existing permanent building or	
structure that cannot be	
relocated or abandoned.	404
Development does not increase the	No new lots are created.
number of lots within the erosion-prone	
area.	OR
	Sufficient areas exist on-site to accommodate the future intended use of the site without encroaching upon the erosion-prone area.
PO5	AO5
Coastal protection works are undertaken	Coastal protection works are consistent with an approved
only as a last resort where coastal	snoreline-erosion management plan.
imminent threat to public safety or	
existing buildings or structures, and all	
of the following apply:	
be relocated or abandoned	
b) any erosion control structure is	
located as far landward as	
containing the property to the	
maximum extent reasonable	
c) any increase in coastal hazard	
risk for adjacent areas from the	
mitigated.	
P06	No acceptable outcome is provided.
Development is located, designed and	
from coastal erosion by:	
a) locating the development as far	
landward as practicable; or	
where it is demonstrated that (a) is not feasible mitigate or	
otherwise accommodate the	
risks posed by coastal erosion.	

For assessable development (Storm tide inundation areas only)		
PO7 Development is resilient to storm tide events by ensuring design and built form accounts for the potential risks of storm- tide inundation.	 AO7.1 New residential buildings within the storm tide inundation area provide a finished habitable floor level to at least the level specified in Table 5. AO7.2 New non-residential buildings (other than Class 10 buildings) within the storm-tide inundation area provide a finished floor level to at least the level specified in Table 5. OR Where a finished floor level is not prescribed, new non-residential buildings (other than Class 10 buildings) are not located within the storm-tide inundation area. AO7.3 For minor extensions (e.g. less than 50 m2) to existing buildings not located within a high hazard or risk area and situated below the level specified in Table 5, the finished floor level of any new habitable room is not less than the floor level of existing habitable rooms. AO7.4 Buildings use pier and pole construction or other suitable means to create an open under story or ground floor to allow for the flow through of storm-tide water. 	
PO8 Development does not change inundation characteristics outside the subject site.	No acceptable outcome is provided.	
 AO9 Development in a storm-tide inundation area is located, designed, constructed and operated to: a) maintain dune crest heights, or where a reduction in crest heights cannot be avoided, mitigate risks to development from wave overtopping and storm surge inundation b) maintain or enhance coastal ecosystems and natural features, such as mangroves and coastal wetlands, between the development and tidal waters, where the coastal ecosystems and natural features and natural features protect or buffer communities and infrastructure from sea-level rise and impacts from storm-tide inundation. 	No acceptable outcome is provided.	
For assessable development (all coasta	al hazard areas)	
PO10 Development in a coastal hazard area mitigates risk to people, property and infrastructure to an acceptable or tolerable level.	No acceptable outcome is provided.	

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Example planning scheme provisions

PO11 In areas affected by coastal hazards, development that results in the creation of additional lots or an increase in the number of dwellings on the land only occurs on land zoned for residential, commercial or industrial purposes. PO12	No acceptable outcome is provided. No acceptable outcome is provided.
Development involving the accommodation or congregation of vulnerable sectors of the community, such as child care centres, community care centres, educational establishments, detention centres, hospitals, rooming accommodation, retirement facilities or residential care facilities, is not located within coastal hazard areas.	
PO13 Development siting, and layout responds to risks from coastal hazards and maintains personal safety at all times.	AO13.1 Development does not result increase the number of people residing on a site affected by coastal hazards, unless it is provided with at least one road route that is trafficable for evacuation by a motor vehicle during a reasonable period prior to the coastal hazard event.
	AO13.2 Road and/or pathway layout within the development provides a safe and clear evacuation path to ensure persons are not physically isolated from an adjacent urban area that is outside the storm-tide inundation area.
PO14 The extent of filling utilized to achieve the necessary floor levels, evacuation routes and community infrastructure immunity is minimised.	AO14 Development complies with the filling requirements of Table 6.
P015 Utilities within a site (including roads electricity, gas, water supply, wastewater and telecommunications) support community resilience during coastal hazard events.	 AO15 Utilities that are likely to fail to function as a result of impacts from coastal hazard events, or are likely to result in adverse environmental impacts are: a) not located in the coastal hazard areas b) located outside erosion-prone areas and above the storm-tide planning level (Table 5); or c) located on the highest part of the site to enhance storm-tide immunity and designed to prevent the intrusion of storm-tide waters.
P016 The development supports, and does not unduly burden, disaster- management response or recovery capacity and capabilities, and ensures occupants are prepared for coastal hazard events.	 AO16.1 Development supports self-evacuation of persons and ensures sufficient warning time for the nature of the use. AO16.2 Development does not impact on the ability of traffic to use evacuation routes, or unreasonably increases traffic volumes on evacuation routes. AO16.3 Materials stored on site are readily able to be relocated outside of the coastal hazard area in a storm-tide event.
	Note: Businesses should ensure that necessary emergency and continuity plans are in place to account for the potential need to evacuate personnel and to relocate property before a flood (e.g. to allow enough time to transfer stock to the upstairs level of a building or off-site).

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Development avoids the release of hazardous materials into waters as a result of a coastal hazard event.	Materials manufactured or stored on-site are not hazardous or noxious, or comprise materials that may cause a detrimental effect on the environment if discharged during a flood event. OR Structures used for the manufacture or storage of hazardous materials are: a) located above the storm-tide planning level, or b) designed to prevent the intrusion of storm-tide waters. OR Hazardous materials and their manufacturing equipment are located on the highest part of the site to enhance storm-tide immunity and designed to prevent the intrusion of storm-tide waters. Note: Refer to the Work Health and Safety Act 2011 and associated regulation and guidelines, the Environmental Protection Act 1994 and the relevant building assessment provisions under the Building Act 1975 for requirements related to the manufacture and storage of hazardous substances
	substances.
PO18 Natural processes and the protective function of landforms and vegetation are maintained in coastal hazard areas.	No acceptable outcome is provided.
PO19	AO19.1
Development involving community infrastructure: a) avoids areas or circumstances of intolerable risk	Community infrastructure is located in accordance with the community infrastructure flood immunity standards specified in Table 7. AO19.2
 b) remains functional to serve community need during and immediately after a storm tide event if required 	Infrastructure that is likely to fail to function as a result of intrusion of storm-tide waters or is likely to result in contamination from storm-tide waters are: a) not located in a coastal bazard area:
 c) is designed, sited and operated to avoid adverse impacts on the community or the environment due to the impacts of flooding on infrastructure, facilities or access and egress routes 	 b) located above the storm-tide planning level; or c) located on the highest part of the site to enhance flood immunity and designed to prevent the intrusion of storm-tide waters d) to temporarily stop functioning during a recommended storm tide event without causing significant adverse
d) retains essential site access during a storm tide evente) is able to remain functional even	 impacts to the infrastructure or the community e) are designed and constructed to resist hydrostatic and hydrodynamic forces as a result of inundation by storm
when other infrastructure or services may be compromised in a storm tide event.	tide. AO19.3 Uses that include vulnerable persons or community infrastructure that must operate during and immediately after a storm tide event have direct access to evacuation routes during a coastal hazard event.
Reconfiguration of a lot	
PO20 Development layout does not increase the risk to people, property or infrastructure located on the premises or other premises.	AO20 Development ensures there is sufficient area outside the storm-tide inundation area to accommodate the intended use(s).

Table 5: Storm-tide planning level		
Storm-tide inundation area	Freeboard	Storm-tide planning level
As determined by available mapping and/or risk assessment e.g. areas determined by level of risk; or areas determined by adopted level of mapping (i.e. Level 1 – state mapping, Level 2 – Locally refined mapping) Note: these areas may be broken down into hazard or risk areas on the basis of the outcomes from the risk assessment.	As determined by available mapping and/or risk assessment e.g. 300 mm or 600 mm, or other locally appropriate freeboard. Note: a local government should select a suitable freeboard based on local circumstances. In some areas, storm-tide information may be less precise, thus a higher freeboard may be necessary to address uncertainties in modelling. A local government may also wish to set different freeboards in different parts of the storm-tide inundation area depending on risk or use	Defined Storm Tide Event level + freeboard

Table 6: Fill requirements

Storm tide inundation area	Fill level
Storm-tide inundation area	To be determined
Note: These areas may be broken down into hazard or risk areas on the basis of the outcomes from the risk assessment.	 Note: Local governments may wish to provide more detailed circumstances regarding the appropriateness of filling in key areas of coastal hazard. Matters to be addressed can include: a) Avoiding any filling (either across the storm-tide and erosion-prone areas, or in high hazard or risk areas, for example) b) Allowing filling in high hazard or risk areas where only for the purposes of community infrastructure or otherwise as directed by an approved shoreline erosion management plan c) Setting an appropriate fill level for areas where, strategically, filling may be acceptable, such as the Defined Flood Event or the Storm Tide Planning Level d) Setting different fill levels across the floodplain, if necessary to achieve a local intent.

Table 7: Community infrastructure storm-tide immunity level (AEP)

Community infrastructure	Storm-tide immunity level
Community and cultural facilities, including facilities where an education and care service under the Education and Care Services National Law (Queensland) is operated or a child care service under the <i>Child Care Act 2002</i> is conducted, community centres, meeting halls, galleries and libraries	Locate outside 1% AEP
Correctional facilities	Locate outside 0.2% AEP
Educational facilities	Locate outside 1% AEP
Emergency services facilities	Police facilities: Locate outside 0.5% AEP Emergency services: Locate outside 0.2% AEP Emergency shelters: Building floor levels above 0.01% AEP*
Hospitals and associated institutions	Locate outside 0.2%
Operating works under the <i>Electricity Act 1994</i>	Power station: Locate outside 0.2% AEP Substations: Locate outside 0.5% AEP
Water cycle management infrastructure	Water treatment plant: Locate outside 0.5% AEP

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Community infrastructure		Storm-tide immunity lev	vel
All other community infrastructure not men above	ntioned	No specific recommende level, but development pre- ensure that the infrastruct located and designed to of service. Note: Where possible, com the purpose of transport sho tide areas.	d coastal hazard roponents should cture is optimally achieve suitable levels munity infrastructure for ould avoid high storm-
* As per Design Guidelines for Queensland September 2006	d Public Cyc	lone Shelters, Department	of Public Works,

Part 6: Supporting information

- Coastal Construction Manual: Principles and Practices of Planning, Siting, Designing, Constructing, and Maintaining Residential Buildings in Coastal Areas (Fourth Edition). FEMA (2011). www.fema.gov/media-library/assets/documents/3293
- Coastal Hazard Technical Guideline www.ehp.qld.gov.au/coastalplan/pdf/hazardsguideline.pdf
- Guideline A risk assessment approach to development assessment in coastal hazard areas, EHP Queensland Government (2013).
 www.ehp.qld.gov.au/coastal/development/pdf/guideline-risk-assessment-approach.pdf
- Guideline for Developing a Coastal Hazard Adaptation Strategy Department of Environment and Heritage Protection, Queensland Government (2012) www.qcoast2100.com.au/documents/6143606/6155749/QCoast2100_Minimum%20Stan dards%20and%20Guidelines_Draft_V4_SR2.pdf
- National Land Use Planning Guidelines for Disaster Resilient Communities https://www.planning.org.au/documents/item/7804
- National Strategy for Disaster Resilience developed by the Federal Government (Council of Australian Governments).
 www.ag.gov.au/EmergencyManagement/Documents/NationalStrategyforDisasterResilie nce.PDF
- QCoast2100 Minimum Standards and Guidelines www.qcoast2100.com.au/minimumstandards-guidelines
- Rollason, V, Fisk, G, Haines, P (2010), 'Applying the ISO 31000 Risk assessment framework to coastal zone management', 19th NSW Coastal Conference, 10–12 November, Batemans Bay www.coastalconference.com/2010/papers2010/Verity%20Rollason%20full%20paper%2 02.pdf
- Standards Australia, 2004. Handbook HB436 Risk management
- Standards Australia, 2009 AS/NZS ISO 31000-2009 Risk management— Principles and guidelines

Appendix 1: Fit-for-purpose coastal hazards mapping

Mapping of identified coastal hazards is a critical component of land-use planning. Mapping can be used to identify the extent of a coastal hazard as well as the characteristics of the land and land use that may be exposed to the hazard. Coastal hazard maps for implementation of the SPP can be identified by using either:

- the state mapping of coastal hazard area (Level 1), or
- locally refined mapping of coastal hazard areas based on localised studies, compliant with EHP's Coastal Hazard Technical Guide.

Mapping of coastal hazard areas should include consideration of the hazard characteristics (e.g. frequency, depth, permanent inundation) as a way of considering the risks associated with the coastal hazard in the risk assessment and determining appropriate land-use planning responses in local planning schemes.

An important step in this process is to determine the level of detail in the coastal hazards mapping required to achieve good planning outcomes. While the SPP Interactive Mapping System displays indicative coastal hazard mapping, local government may choose to undertake their own localised coastal hazards investigation when determining their own erosion-prone and storm-tide inundation areas. The state government can work with local governments when identifying coastal hazard areas to provide guidance and appropriate responses to planning for coastal hazards.

A fit-for-purpose approach for mapping of coastal hazards should be based on a response to natural hazards that is tailored to the characteristics of the hazard, the population exposed, development growth pressures experienced, and the resources available to address the natural hazard.

Within a local government area (LGA) there may be areas that are anticipating growth at different levels or in different timeframes. In these circumstances, a single level of precision across the whole LGA may not be required, though more precise studies should be considered for those areas where development pressures are greatest and most imminent.

Where limited development activity is expected, it may be appropriate that a detailed study be timed to coincide with later local area or site-based planning which can consider the hazard in greater detail with more specific land-use planning.

Settlement context	Expected levels of growth			
	None to very low	Low	Medium-high	
Regional landscape low-intensity rural	Level 1	Level 1	N/A	
Intensive rural production areas	Level 1	Level 1	Level 2	
Low-density rural towns and settlements	Level 1	Level 1	Level 2	
Urban areas (existing or known future)	Level 2	Level 2	Level 2	
Industry or infrastructure of regional or state significance (e.g. mines, state development areas)	Level 2	Level 2	Level 2	
Community infrastructure	Level 2	Level 2	Level 2	

 Table 8: Settlement characteristics and fit-for-purpose coastal hazard area mapping: Level 1 –

 State Mapping; Level 2 – Localised Studies

Where a local government's resources to undertake coastal hazard studies are constrained and statewide mapping is not sufficiently detailed to support plan-making, localised coastal hazard investigations should be prioritised for areas where growth and development pressures are greatest and most imminent. A program of mapping works should identify how the necessary level of mapping will be available to enable informed development decisions (e.g. scheduled local area planning or site-based mapping as part of a development application).

As part of the state interest review process for a local planning scheme, it is anticipated that a local government report will demonstrate:

- what level of mapping has been undertaken in particular locations of the local government area
- where future mapping is proposed
- locations where mapping is unavailable or not considered necessary due, for example, to very low risks.

The results from a risk assessment can also be displayed through mapping – identifying acceptable, tolerable and unacceptable risk areas. This would support the development of land-use strategies and planning schemes.

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