

State Planning Policy—state interest guideline

# Natural hazards, risk and resilience

April 2016



# Preface

## Using this state interest guideline

The Queensland Government established the State Planning Policy (SPP) to define the specific matters of state interest in land use planning and development. To support the implementation of the SPP, each state interest in the SPP is supported by a state interest guideline such as this one.

This state interest guideline must be read in conjunction with the SPP.

The SPP does not prioritise one state interest over another and thus provides flexibility for local governments to respond to specific regional and local contexts. This allows for the state interests to be considered as an entirety rather than as individual competing or conflicting priorities.

The SPP guiding principles carry equal weight with the state interests and must be considered by local government as part of the integration of state interests as an entirety rather than as individual policies. This supports decision making which integrates and balances the economic, environmental and social needs of current and future generations, promotes innovative approaches to design and development where consistent with the strategic intent of a planning scheme and enables flexible and performance-based decisions as part of the assessment process.

Where text in this guideline is in a coloured text box, it is an excerpt from the SPP and is the state's policy about a matter of state interest.

In relation to making or amending a planning scheme, the SPP quoted text defines what a local government **should** do in preparing or amending a planning scheme (ie. the state prefers this policy but will consider alternative approaches based on specific local context or issues).

Where interim development assessment requirements apply for a state interest (because the relevant planning scheme has not yet integrated the state interest or an amendment to the SPP has occurred subsequent to the scheme), the SPP quoted text defines requirements that must be applied in the assessment of applicable development applications.

Content within this state interest guideline that is not an excerpt from the SPP provides further context and explains **how** the SPP policies can be applied. It does not introduce or define any new policies which do not exist in the SPP itself. **The use of such guidance material is optional**—it does not form a statutory component of the SPP and hence is not a mandatory requirement of the state.



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# PART A: Background and core concepts

## State interest—natural hazards, risk and resilience

*The risks associated with natural hazards are avoided or mitigated to protect people and property and enhance the community's resilience to natural hazards.*

### Background

Natural hazards<sup>1</sup>, flooding, bushfire, landslide and coastal hazards, can cause loss of life, property, infrastructure and environmental damage. They can also result in the use of significant resources as communities respond to and recover from natural hazard events.

Managing the risks from natural hazards and building community resilience requires an integrated response of which land use planning is a component<sup>2</sup>. Other core elements include emergency planning and management, structural works, building controls, landscape and environment programmes and community awareness and communication. 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 minimising the burden for emergency management.

Each natural hazard presents its own unique risk to people, property, the environment and infrastructure however planning responses to all natural hazards follow an evidence and risk-based approach.

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

### Core concepts

#### Fit for purpose

Fit for purpose includes a flexible approach to undertaking natural 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 natural 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 natural hazard;
- the population and land uses exposed to the natural hazard;
- the anticipated growth and development of the community; and
- the suitability of existing studies to informing the risks associated with the natural hazard.

#### Hazard and risk

The difference between 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 that will have an impact on objectives (AS/NZS ISO 31000:2009). It is measured in terms of consequences and likelihood.

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

<sup>1</sup> Natural hazards are defined in the SPP

<sup>2</sup> See National Strategy for Disaster Resilience – COAG February 2011 - <http://www.ag.gov.au/EmergencyManagement/About-us-emergency-management/Pages/National-strategy-for-disaster-resilience.aspx>, and QRA Planning for stronger more resilient floodplains Part 2. Measures to support floodplain management in future planning schemes - <http://www.qldreconstruction.org.au/u/lib/cms2/resilient-floodplains-part2-full.pdf>

**Acceptable risk**

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 risks any further.

**Tolerable risk**

A risk that, following an understanding of the likelihood and consequences, is low enough to allow the exposure 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 believe that as much as is reasonably practical should be done to reduce the risks further.

**Intolerable risk**

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 risks to at least a tolerable level.

**Resilience**

Resilience is defined as 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 risk identification, risk analysis and risk evaluation. In relation to this 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 and infrastructure.

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.

Natural hazard risk assessments should be consistent with the international risk management standard (AS/NZS ISO 31000:2009 Risk Management).

# PART B: Integrating the state interest into planning schemes

## Policy 1

*Identifying natural hazard areas for flood, bushfire, landslide and coastal hazards based on a fit for purpose natural hazard study.*

### Background

An understanding of the presence, extent, frequency and behaviour of a natural hazard is the foundation on which the risk to people, property, and infrastructure from that hazard can be assessed.

A hazard study 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 anticipated for that location.

The level of precision for a study should be determined at a local level by the responsible local government. For example, areas with low population and anticipated growth may be suited to a less precise study than would be needed for an area anticipating higher levels of growth, change of use or infill.

The tailoring of a study in response to local circumstances and needs is referred to as a 'fit for purpose' approach.

Within a Local Government Area (LGA) there may be areas that are anticipating growth at different levels or in different time frames. 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 anticipated, it may be appropriate that a detailed study be timed to coincide with later local area or site based planning that can consider the hazard in greater detail with more specific land use planning. This approach may be suited where a less precise study has indicated a general suitability for the anticipated land use.

Natural hazard events occur at many levels of severity and frequency. This variation has a direct influence on the level of risk that a natural hazard event poses to people, property and infrastructure. As natural occurrences, whilst their severity and probability of recurrence can be modelled, they are inherently unpredictable. In undertaking a natural hazard study, a local government may investigate a range of hazard events to accommodate this variability in its planning.

The effects of climate change need to be considered in hazard assessment as they are projected to impact on the footprint, frequency and intensity of natural hazards. Projected sea level rise for example, will increase the extent of coastal hazards, progressively causing the permanent inundation of low lying land and extending the risk of coastal erosion and storm tide inundation to new areas. Increased temperatures for example, will increase the likelihood, intensity and extent of areas affected by bushfire, extend fire seasons and decrease the opportunity for hazard reduction between fire seasons.

### How to appropriately integrate the policy

- 1.1 The preparation of the planning scheme is supported by a natural hazard study for each hazard identifying the likelihood and/or characteristics of the natural hazard in the planning scheme area. The outcomes of that study or studies need to be explicitly communicated in the planning scheme.
- 1.2 Natural hazard studies should be undertaken prior to or as early as possible in the preparation of the planning scheme to inform how natural hazards will be addressed.

- 1.3 Based on local circumstances and needs, the fit for purpose study may identify the hazard through one or a combination of the following means:
- the utilisation of state wide mapping and data for that hazard<sup>3</sup>, or
  - locally verified state wide mapping and data for that hazard, or
  - the localised identification of the hazard utilising methodology accepted by the state.
- 1.4 Where a local government's resources to undertake natural hazards studies are constrained and state wide mapping is not sufficiently detailed to support plan making, localised natural 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).
- 1.5 As a component of the state interest review, a local government, using the Evaluation Report Template<sup>4</sup>, could describe the considerations which informed their decisions and approaches to the hazard studies.

**REFER TO: PART E: Supporting information**  
**1. Technical manual – A 'fit for purpose' approach in undertaking natural hazard studies and risk assessments**

**REFER TO: PART E: Supporting information.**  
**Technical resources – Evaluation Report:**  
**1. Bushfire hazards**  
**2. Flood hazards**  
**3. Landslide hazards**

<sup>3</sup> No state wide hazard mapping is available for landslide. Land with a slope greater than 15 per cent can be used to identify land potentially subject to landslide hazard.

<sup>4</sup> Coastal hazards are not directly addressed under the Evaluation Report Template however local government is encouraged to follow similar considerations when describing decisions and approaches to hazard studies for the state interest review.

## Policy 2

*Including provisions that seek to achieve an acceptable or tolerable level of risk based on a fit for purpose risk assessment consistent with AS/NZS ISO 31000:2009 Risk Management.*

A hazard study will identify the characteristics of a natural hazard but further analysis is required to assess the risk that the hazard poses to people, property and infrastructure.

When hazard information is combined with information about the characteristics of development proposed in the affected area, the level of exposure, vulnerability and tolerability of that development to the impacts of the natural hazard can be understood. This process is referred to as a risk assessment—an assessment of the risk posed to proposed development by the natural hazard.

The level of risk can be affected by the severity or frequency of the natural hazard or by the scale, sensitivity or tolerability of the community, property or infrastructure to the hazard.

A risk assessment will identify whether the level of risk to proposed development is acceptable, tolerable or intolerable. Planning strategies and provisions can reduce the level of risk to an acceptable and tolerable level by either avoiding the hazard or mitigating the risk through controls which will reduce the exposure or vulnerability of people, property or infrastructure to the hazard.

The risk assessment will assist a local government to understand whether or not their land use planning intentions are appropriate given the level of risk posed by the natural hazard. In applying the risk assessment, it should be noted that planning responses to defined natural hazards events or risk levels will not mitigate residual risks associated with less probable events.

An international risk management standard (AS/NZS ISO 31000:2009 Risk Management) has been established which provides an accepted methodological approach to undertaking a risk assessment.

Like the hazard studies, risk assessments for each natural hazard should be tailored to be fit for purpose depending upon the characteristics of the hazard and the settlement in that area and the rate of growth anticipated for that location.

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

## How to appropriately integrate the policy

- 2.1 The preparation of the planning scheme is informed by a risk assessment for each hazard assessing the risks to proposed development including people, property and infrastructure.
- 2.2 Based on local circumstances and needs, and having regard to best practice guidance on preparing a natural hazard risk assessment<sup>5</sup>, the fit for purpose risk assessment is consistent with AS/NZS ISO 31000:2009 Risk Management. AS/NZS ISO 31000:2009 Risk Management identifies risk management principles, framework and process.
- 2.3 The risk assessment should result in:
  - The identification of land uses that are existing, proposed and should not occur in natural hazard areas;
  - The risk criteria (that considers the communities exposure, tolerability and vulnerability) used to identify a broadly acceptable, tolerable or intolerable level of risk for each land use;
  - The planning provisions used to ensure that the community is not exposed to an unacceptable level of risk; and
  - The hazard and risk information that is available or will be required to achieve the planning provisions.
- 2.4 The risk assessments for each natural hazard should be used as a tool to inform:
  - The definition and mapping of a particular hazard event or events (e.g. 1 per cent, 0.5 per cent, 0.2 per cent Annual Exceedance Probability (AEP) for flooding and storm tide) or risk level (e.g. very high, high, medium, low bushfire risk) that will initiate planning and building controls (e.g. within zones, local plan areas or overlay codes).

<sup>5</sup> For additional guidance see also supporting information National Emergency Risk Assessment Guidelines October 2010 - <http://www.ag.gov.au/EmergencyManagement/About-us-emergency-management/Pages/National-strategy-for-disaster-resilience.aspx>



- The drafting of the strategic framework in order to ensure natural hazards are recognised and settlement patterns, infrastructure networks and land use strategies avoid, or are compatible with, the level of risk posed by natural hazards.
  - The allocation of zones to land affected by the one or more natural hazards to avoid or mitigate the risk of natural hazards.
  - The assignment of land use levels of assessment within zones affected by one or more natural hazards, to ensure sensitive uses are avoided or are subject to a higher level of assessment. Special consideration should be given to community infrastructure where it is anticipated to perform a role or service during and immediately following a natural hazard event.
  - The use of thresholds, overlay maps and codes, and the setting of levels of assessment for uses in areas affected by one or more natural hazard, to:
    - trigger a higher level of assessment if required,
    - encourage development to avoid hazard areas,
    - direct site specific hazard investigations and risk assessment where required,
    - apply development requirements to development locating in hazard areas to avoid or mitigate risk to an acceptable or tolerable level, and
    - clearly communicate the risk to the community.
  - The content of zone, local plan, overlay, and development codes that:
    - encourage particular development to avoid hazard areas,
    - direct site specific hazard investigations where required, and
    - apply development requirements to development locating in hazard areas to avoid or mitigate risk to an acceptable or tolerable level.
  - The enabling of building assessment provisions which regulate to avoid or mitigate risks associated with building work in an area affected by a natural hazard or hazards by the declaration of a natural hazard area.
  - The content of any planning scheme policy specifying the scope and methodology to be followed in preparing a site based natural hazards study and risk assessment to support a development application within a natural hazard area.
- 2.5 As a component of the State Interest Review, a local government, using the Evaluation Report Template<sup>6</sup>, should describe the considerations which informed their decisions and approaches to the risk assessment and its integration with the planning scheme structure and content.

**REFER TO: PART E: Supporting information**  
**1. Technical manual – A 'fit for purpose' approach in undertaking natural hazard studies and risk assessments**

**REFER TO: PART E: Supporting information.**  
**Technical resources – Evaluation Report:**  
**1. Bushfire hazards**  
**2. Flood hazards**  
**3. Landslide hazards**

<sup>6</sup> See footnote 5

## Policy 3

*Including provisions that require development to:*

- (a) avoid natural hazard areas or mitigate the risks of the natural hazard to an acceptable or tolerable level, and*
- (b) support, and not unduly burden, disaster management response or recovery capacity and capabilities, and*
- (c) directly, indirectly and cumulatively avoid an increase in the severity of the natural hazard and the potential for damage on the site or to other properties, and*
- (d) maintain or enhance natural processes and the protective function of landforms and vegetation that can mitigate risks associated with the natural hazard.*

The consideration of natural hazards and their risks should be integrated within all elements of the planning scheme.

Provisions should be aligned to ensure that they do not inadvertently create conflict or inconsistency and thereby reduce the clarity of the intended outcomes for natural hazard areas.

The planning scheme should complement but not duplicate other regulation that mitigates the risk of natural hazards to elements of development e.g. building assessment provisions.

### How to appropriately integrate the policy

- 3.1 For each natural hazard, planning schemes incorporate provisions consistent with those model provisions contained within Part D, tailored to meet the local needs and circumstances.
- 3.2 In drafting of planning provisions, the use of terminology that may reduce understanding of the risk of natural hazards to development should be avoided.

3.3 The strategic framework should acknowledge the presence of natural hazards in the planning scheme area and establish the principle of only appropriate development occurring in natural hazard areas. This principle should guide the zoning of areas affected by natural hazards and the level of assessment for uses within the zone. The level of assessment should increase in line with the level of risk and vulnerability of the use, ensuring the development or infrastructure will function during and immediately after a defined event. Where the level of risk from natural hazards is intolerable, zoning that provides for vulnerable uses should be avoided.

- 3.4 Development requirements in any zone, local plan, overlay and development codes should ensure that development within an area affected by a natural hazard:
  - (1) avoids or mitigates the risk to people, property and infrastructure to an acceptable or tolerable level,<sup>7</sup>
  - (2) does not increase the number of people at risk to an intolerable level,
  - (3) provides safe and efficient access and operation for emergency services,
  - (4) 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,

<sup>7</sup> In addition, state interest—Emissions and hazardous activities - Policy 6 relates to development involving the storage of hazardous chemicals, minimising the likelihood of inundation of storage areas by flood waters, refer to SPP Guideline—Emissions and hazardous activities for further information.

- (5) does not cause or contribute to an increase in the level of risk affecting surrounding areas, and
  - (6) 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.
- 3.5 Where other regulation regulates development affected by natural hazards, the planning scheme should avoid duplicating this assessment and regulation. In some cases the planning scheme plays a role in triggering these requirements, for example the Building Regulation 2006 allows a local government through its planning scheme to designate a 'flood hazard area' or 'bushfire prone areas' whereby building requirements related to the mitigation of risks are triggered.<sup>8</sup>
- 3.6 As a component of the state interest review, a local government, using the Evaluation Report Template<sup>9</sup>, should describe the considerations which informed their decisions and approaches to the drafting of planning provisions.

**REFER TO: PART E: Supporting information.**

**Technical resources – Evaluation Report:**

1. Bushfire hazards
2. Flood hazards
3. Landslide hazards

**REFER TO: PART D: Model code provisions**

## Policy 4

*Facilitating the location and design of community infrastructure to maintain the required level of functionality during and immediately after a natural hazard event.*

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 and recover from an event.

Different types of community infrastructure perform different roles during and after a natural hazard. 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 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 may perform an important role in the recovery after an event.

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

- 4.1 Development requirements stipulate a minimum level of immunity e.g. Flood Immunity Level (AEP) or Recommended Storm Tide Event Level (RSTEL) 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 anticipated to perform during and immediately following a natural hazard event.
- 4.2 Designation of land for community infrastructure should consider the following:
  - 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.

<sup>8</sup> Note: State Development Assessment Provisions Module 10 Coastal protection, incorporates development requirements for developments in coastal hazard areas where the state is responsible for assessing or deciding development applications.

<sup>9</sup> See footnote 5

- 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.
- 4.3 As a component of the state interest review, a local government, using the Evaluation Report Template<sup>10</sup>, should describe the considerations which informed their decisions and approaches to planning for community infrastructure.

**REFER TO: PART E: Supporting Information**

**1. Technical resources – Guidance for considering natural hazards, risk and resilience when designating land for community infrastructure**

**REFER TO: PART E: Supporting information.**

**Technical resources – Evaluation Report:**

- 1. Bushfire hazards**
- 2. Flood hazards**
- 3. Landslide hazards**

<sup>10</sup> See footnote 5

## Policy 5

*Maintaining erosion prone areas within a coastal management district as development-free buffer zones unless:*

*(a) the development cannot be feasibly located elsewhere, and*

*(b) it is coastal-dependent development, or is temporary, readily relocatable or able to be abandoned development.*

The declaration of erosion prone areas along the coast seeks to identify the areas at risk from coastal erosion. The coastal management district identifies those lots where new development should be set back 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 that is vulnerable to erosion, without the need for any direct intervention. Coastal management districts generally exclude small or intensively developed lots in urban areas. Policy 6 applies to these areas.

Providing an adequate buffer zone does not impose artificial constraints on beach behaviour and ensures the continued existence and recreational and scenic value of a beach.

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

## How to appropriately integrate the policy

- 5.1 The planning scheme avoids allocating development within an erosion prone area, other than for:
- coastal-dependent development, or
  - temporary, readily relocatable, or able to be abandoned development.
- 5.2 As a component of the state interest review, a local government, using the Evaluation Report Template<sup>11</sup>, should describe the considerations which informed their decisions and approaches to the drafting of planning provisions.

**REFER TO: PART D: Model code provisions**

**REFER TO: PART E: Supporting information.  
Technical resources – Evaluation Report:**

1. Bushfire hazards
2. Flood hazards
3. Landslide hazards

<sup>11</sup> See footnote 5

## Policy 6

*Requiring the redevelopment of existing permanent buildings or structures in an erosion prone area to, in order of priority:*

- (a) avoid coastal erosion risks, or*
- (b) manage coastal erosion risks through a strategy of planned retreat, or*
- (c) mitigate coastal erosion risks.*

It is preferable for the erosion prone area to remain development free however where development is existing and redevelopment is anticipated, redevelopment should respond to the risks posed by coastal hazards.

Redevelopment is development that modifies or replaces permanent built structures on an already developed site. It typically may include remodelling, demolition and replacement of existing structures, and minor extensions to building floor area.

Redevelopment or change of use within the erosion prone area should not significantly increase the existing development footprint and should not increase the risk to people, property and infrastructure. Where the intensity of development at the site is to be increased, redevelopment should mitigate future risk.

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

### How to appropriately integrate the policy

- 6.1 Development requirements in any zone, local plan, overlay and development codes should ensure that redevelopment within an erosion prone area:
- be coastal-dependent development, temporary, readily relocatable, or able to be abandoned development, or
  - be located outside of the erosion prone area, or
  - where this is not feasible, be located as far landward from the seaward property boundary as possible, or landward of the seaward alignment of the neighbouring buildings, and

- mitigate coastal erosion risk through location, design, construction and operating standards, and
- provide space seaward of the development within the lot to allow for the future construction of erosion control structures, such as a sea wall, or
- construct erosion control structures to a specified standard as part of the redevelopment, where part of a coordinated erosion control strategy.

- 6.2 Where a local or regional coastal erosion hazard and risk assessment has shown an erosion prone area to be at an intolerable level of risk at a point in the future that cannot be avoided or mitigated, development requirements may:
- (1) restrict redevelopment in these areas to temporary, readily relocatable, or able to be abandoned development, or
  - (2) define a currency period for redevelopment approvals that coincide with that timing.
- 6.3 As a component of the state interest review, a local government, using the Evaluation Report Template<sup>12</sup>, should describe the considerations which informed their decisions and approaches to the drafting of planning provisions.

**REFER TO: PART D: Model code provisions**

**REFER TO: PART E: Supporting information.  
Technical resources – Evaluation Report:**

- 1. Bushfire hazards**
- 2. Flood hazards**
- 3. Landslide hazards**

<sup>12</sup> See footnote 5

# PART C: Application of interim development assessment requirements

This component of the SPP is used in the assessment of development applications when a local government does not appropriately reflect the state interest - natural hazards, risk and resilience.<sup>13</sup>

## Development assessment requirement 1

### *For all natural hazards*

#### *Development:*

- (1) avoids natural hazard areas or mitigates the risks of the natural hazard, and*

### **How a development application may demonstrate compliance with the assessment requirements:**

Development does not involve land uses that create an intolerable risk to people and property. Development is located and designed to avoid or mitigate the risk to people, property and infrastructure to an acceptable or tolerable level.

## Development assessment requirement 2

### *For all natural hazards*

#### *Development:*

- (2) supports, and does not unduly burden, disaster management response or recovery capacity and capabilities, and*

### **How a development application may demonstrate compliance with the assessment requirements:**

Development is located and designed to enable 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. Development also provides for safe and efficient access and operation for emergency services. If development involves community infrastructure, the infrastructure will function

effectively during and immediately after a defined natural hazard event.

## Development assessment requirement 3

### *For all natural hazards*

#### *Development:*

- (3) 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, and*

### **How a development application may demonstrate compliance with the assessment requirements:**

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

## Development assessment requirement 4

### *For all natural hazards*

#### *Development:*

- (4) avoids risks to public health and safety and the environment from the location of hazardous materials and the release of these materials as a result of a natural hazard event, and*

### **How a development application may demonstrate compliance with the assessment requirements:**

Development demonstrates that:

- 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 in a natural hazard event; or for flood, and
- structures used for the manufacture or storage of

<sup>13</sup> Note: State Development Assessment Provisions Module 10 Coastal protection, incorporates development requirements for developments in coastal hazard areas where the state is responsible for assessing or deciding development applications.

hazardous materials are located above the defined flood event (DFE)/ RSTEL level where adopted; or designed to prevent the intrusion of floodwaters, and

- if a flood level is not adopted, hazardous materials and their manufacturing equipment are located on the highest part of the site to enhance flood immunity and designed to prevent the intrusion of floodwaters.<sup>14</sup>

## Development assessment requirement 5

### *For all natural hazards*

#### *Development:*

- (5) maintains or enhances natural processes and the protective function of landforms and vegetation that can mitigate risks associated with the natural hazard.*

### **How a development application may demonstrate compliance with the assessment requirements:**

Development incorporates natural processes, landforms and vegetation that contribute to the mitigation of natural hazards and risks into design and operation to enable these natural processes and functions to continue.

## Development assessment requirement 6

### *For coastal hazards – erosion prone areas*

#### *Development:*

- (6) is not located in an erosion prone area within a coastal management district unless*
- (a) it cannot feasibly be located elsewhere, and*
- (b) is coastal-dependent development, or temporary, readily relocatable or able to be abandoned development, and*

### **How a development application may demonstrate compliance with the assessment requirements:**

The SPP defines coastal-dependent development. Development should demonstrate that it meets the definition of coastal-dependent development and:

- relevant buildings or structures are located, designed and constructed to withstand coastal erosion impacts, and
- the development installs and maintains coastal protection works to mitigate adverse impacts to people, property the environment and infrastructure from coastal erosion.

Where development is temporary, readily relocatable or able to be abandoned, the following is demonstrated:

- (1) built structures are located landward of an applicable coastal building line, or
- (2) where there is no coastal building line, habitable built structures are located landward of the alignment of adjacent habitable buildings, or
- (3) Surf lifesaving towers or beach access infrastructure is located to minimise its impacts on physical coastal processes, or
- (4) where it is demonstrated that (1) or (2) are not reasonable and (3) does not apply:
  - a. built structures are located as far landward as practicable, and
  - b. layout design is used to minimise the footprint of the development that remains within the erosion prone area.

<sup>14</sup> 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.



## Development assessment requirement 7

### *For coastal hazards – erosion prone areas*

#### *Development:*

*(7) that is the redevelopment of existing permanent buildings or structures, is located outside an erosion prone area or where this is not feasible, redevelopment:*

*(a) is located:*

*i. as far landward from the seaward property boundary as possible, or*

*ii. landward of the seaward alignment of the neighbouring buildings, and*

*(b) provides space seaward of the development within the premises to allow for the future construction of erosion control structures such as a seawall, and*

## Development assessment requirement 8

### *For coastal hazards – erosion prone areas*

#### *Development:*

*(8) proposes to undertake coastal protection work (excluding beach nourishment) only as a last resort where coastal erosion presents an imminent threat to public safety or existing buildings and structures, and all of the following apply:*

*(a) the property cannot reasonably be relocated or abandoned, and*

*(b) the coastal protection work to protect private property is located as far landward as practicable and on the lot containing the property to the maximum extent reasonable, and*

*(c) the coastal protection work mitigates any increase in coastal hazard risk for adjacent areas.*

### **How a development application may demonstrate compliance with the assessment requirements:**

- built structures are relocated outside that part of the erosion prone area that is within the coastal management district, or
- built structures are relocated as far landward as practicable, and landward of an applicable coastal building line, or
- where there is no coastal building line:
  - built structures are located landward of the alignment of adjacent habitable buildings,
  - layout design is used to minimise the footprint of the development that remains within the erosion prone area, and
  - sufficient space seaward of the development is provided within the premises to allow for the construction of erosion control structures.

### **How a development application may demonstrate compliance with the assessment requirements:**

- coastal protection works are consistent with a relevant shoreline erosion management plan or coastal engineering investigation that demonstrated that there are no viable alternatives to hard protection works at the site, and
- coastal protection works are located wholly on private land unless it can be demonstrated that it is not feasible to locate the structure on private land, and
- coastal protection works are located as close as practicable to the development it is intended to protect and in order to mitigate any increase in coastal hazard risk for adjacent areas.

# PART D: Model code provisions

Example model code provisions for the natural hazards, risk and resilience guidance material has been prepared below that may be adapted by a local government when making or amending a planning scheme. Where a local government seeks to adopt model code provisions, it should ensure the provisions are suitable to local circumstances prior to adoption. It is not intended that a local government would use all of these model provisions verbatim, as local context and tailoring is an essential part of adopting the SPP.

If a natural hazard exists in the local government area it is logical that the acknowledgement of natural hazard should be the first mention of the natural hazard in a planning scheme. The acknowledgement is often found in the strategic intent and the strategic outcomes of the strategic framework and reflects the outcomes from natural hazard investigations and mapping. The following are important when drafting these provisions:

- where natural hazards are present they are acknowledged, and
- natural hazards are identified in order to avoid or mitigate the hazard impacts.

The following table provides best practice examples and a commentary:

Example	Commentary
The Aurukun Shire is subject to natural hazards including bushfire, flood and storm tide inundation, however future development will be resilient to the potential effects of natural hazards and protect health and safety through avoiding areas that are at significant risk of hazard, and building better in appropriate locations.	Aurukun Shire Council has acknowledged that the local government area is subject to flooding and has identified avoiding and mitigating as the land use strategies to address flooding.
Development responds to the tropical climate and incidence of flooding by providing sufficient drainage infrastructure for minor local flooding or overland flow, using water sensitive design of road infrastructure and open spaces, and establishing evacuation routes through disaster risk management. Urban and rural residential development adopts best practice water catchment planning, water cycle management and tropical building design. Settlements in the Mackay region adjust to the risks associated with natural hazards through appropriate location and design of urban development and new development avoid places at significant risk of hazard.	Mackay Regional Council has identified flooding as an issue. An integrated risk management approach to address flooding, including land use planning, has been outlined.

## Themes

A specific theme relating to natural hazards 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 natural hazards in particular locations. The following content may be used when developing other themes in the strategic framework:

- The settlement pattern theme identifies where natural hazard areas are avoided or mitigated.
- The natural environment theme protects natural processes and landforms such as the function of the floodplain and could limit 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 natural hazard event and for multi-purpose social infrastructure to be utilised as emergency shelters.
- The natural resources and landscape theme protects natural processes and landforms such as the function of the floodplain 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 service.

- The economic development theme addresses a resilient economy that will be able to operate after a natural hazard event.

Conversely, a community can become more resilient to natural hazards if a planning scheme recognises the interrelationship between planning for natural hazards and other themes. The following example illustrates how the access and mobility theme can integrate with the natural hazards theme:

*'A coordinated approach to achieving a high level of flood immunity will be progressed through the timely implementation of the projects identified by the Fitzroy River Floodplain and Road Planning Study. This supports improved access and mobility to major industrial areas including Parkhurst and Gracemere, major mining areas further west and safer and more efficient road and rail travel generally'.*

### 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. 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 the function of the floodplain 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.

The following table provides best practice examples of specific outcomes and a commentary on the key components.

Example of strategic outcomes	Commentary
Rockhampton: (4) The identified settlement pattern is adhered to as it has been determined to avoid further expansion of urban and rural residential uses into high and extreme hazard areas and to mitigate the hazard risk in built up urban areas.	This strategic outcome articulates that the settlement patterns theme has considered natural hazards to avoid and mitigate risks.
Rockhampton: (6) Significant areas of Rockhampton are already established within the Fitzroy River floodplain. Within these areas, the flood risk will be managed by avoiding the intensification of development and the subdivision of land in high or extreme hazard areas.	This strategic outcome recognises the risks in existing areas and articulates the outcomes for future development in these areas.
Brisbane: SO3 Brisbane's development is located, sited, designed and constructed to tolerate, not worsen, and adapt to natural hazards.	This strategic outcome recognises that natural hazards will happen and the need to develop in a manner that does not worsen the severity or impact of flooding.
Rockhampton: (9) Development ensures the natural processes and the protective function of landforms and vegetation is maintained in natural hazard areas.	This strategic outcome protects natural processes and landforms such as the function of the floodplain.
Brisbane's development is located to avoid natural hazards, and ensure appropriate and efficient access to emergency and disaster response services.	This strategic outcome provides for effective disaster response and recovery.

## Land use strategies

Land use strategies identify how a specific outcome can be achieved and, wherever possible, identify locations where the specific outcomes are particularly relevant. Land use strategies can deliver specific outcomes by articulating locations where the following will occur:

- Avoiding natural hazard areas:
  - by expanding into new areas with acceptable or tolerable risks,
  - by intensifying existing areas that are acceptable or tolerable, and
  - by avoiding particular land uses in areas that creates an intolerable risk.
- Accepting residual risk in natural hazard areas by:
  - maintaining acceptable or tolerable land uses,
  - no further intensification in tolerable areas, and
  - no further development in areas of intolerable risk.
- Mitigating risk to an acceptable or tolerable level by intensifying with mitigation through built form responses, by including mitigation infrastructure or change to the natural environment that will reduce the risk of a natural hazard and treat risks to transport/evacuation routes.
- Retreating due to intolerable risk by down zone/back zone areas of intolerable risk.

## Overlays and mapping

Overlays and maps can be used to:

- identify the natural hazard area,
- identify areas outside of the natural hazard area,
- identify areas where no natural hazard (e.g. flood) information is available,
- identify locations where land use strategies can be used to avoid or mitigate,
- trigger specific natural hazard related provisions in a zoning code,
- trigger a natural hazard overlay code, and
- trigger building requirements.

## Zones

Zones:

- identify land uses that are appropriate in natural hazard areas subject to the outcomes of the risk assessment which identify the acceptable, tolerable and intolerable levels of risk for each land use type.
- are located to avoid intolerable risks by delivering the specific outcomes and land use directions articulated in the strategic framework.
- have associated levels of assessment which can be calibrated against the strategic framework to ensure that desired development is not required to undergo unnecessary assessment and approval processes.

Zoning and their associated levels of assessment are a highly effective statutory mechanism for ensuring that the right development occurs in the right locations and it is consistent with the strategic framework which reflects the risk assessment.

## Tables of assessment

A table of assessment reflects the strategic framework and risk assessment which should be consistent with the level of risk identified for the particular land use.

- The level of assessment for a particular land use should be relative to the level of risk identified through the risk assessment, see policy 2. A lower the level of risk should translate into a lower level of assessment.
- The level 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.

## Zone codes

- Natural hazards may be addressed by utilising a limited development (constrained land) zone code and/or including planning provisions to address natural hazards in each zone code.
- Zone codes clearly and consistently articulate how natural hazards will be addressed through the purpose of the zone code, the performance outcomes and the acceptable solutions.

## Overlay codes

- The overlay code identifies siting, design and layout techniques that can be used to achieve an acceptable or tolerable level of risk for the development.
- If a local planning instrument includes a flood, bushfire, landslide or coastal hazard overlay code, it should address natural hazards and associated risks to people, property, economic activity, social wellbeing and the environment by articulating the following or similar performance outcomes:
  - the development is compatible with the level of risk associated with the natural hazard;
  - the development siting, layout and access responds to a potential natural hazard and minimises risk to personal safety;
  - the development supports, and does not unduly burden, disaster management response or recovery capacity and capabilities;
  - the development is resilient to natural hazard events by ensuring siting and design accounts for the potential risks of natural hazards to property;
  - the development directly, indirectly and cumulatively avoids an unacceptable increase in severity of the natural hazard and does not significantly increase the potential for damage on the site or to other properties;
  - the development avoids the release of hazardous materials as a result of a natural hazard event;
  - natural processes and the protective function of landforms and/or vegetation are maintained in natural hazard areas; and
  - not include matters that are already covered by the building assessment provisions, unless otherwise allowed under the *Building Act 1975*.

## Model code provisions

The codes below for each hazard are presented as an overlay code however the provisions could be included in one code or across several relevant codes (for example, the provisions may be included a zone code or overlay code).

### Flood hazard

#### Application

This code applies to assessing material change of use, building work, reconfiguring a lot and operational work for development in the flood hazard overlay.

#### Purpose

The purpose of the flood hazard overlay code is to:

- (a) provide for the assessment of the suitability of development in the Flood Hazard Overlay area to ensure that risk to life, property, community, economic activity and the environment during flood events is minimised; and
- (b) ensure that development does not increase the potential for flood damage on-site or to other property.

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

- (a) the development siting, layout, and access responds to the risk of the natural hazard and minimises risk to personal safety;
- (b) the development is resilient to natural hazard events by ensuring siting and design accounts for the potential risks of natural hazards to property;
- (c) the development supports, and does not unduly burden disaster management response or recovery capacity and capabilities;
- (d) the development directly, indirectly and cumulatively avoids an unacceptable increase in severity of then natural hazards and does not significantly increase the potential for damage on the site or to other properties;
- (e) the development avoids the release of hazardous materials as a result of a natural hazard event; and
- (f) natural processes and the protective function of landforms and/or vegetation are maintained in natural hazards areas.

## Assessment criteria

### Criteria for assessable development—example development assessment code

Performance outcomes	Acceptable outcomes
For assessable development	
<p><b>PO1</b></p> <p>The development is compatible with the level of risk associated with the natural hazard.</p>	<p><b>AO1.1</b></p> <p>The following uses are not located on land inundated by the DFE:</p> <ul style="list-style-type: none"> <li>a) retirement facility</li> <li>b) community care centre</li> <li>c) child care centres</li> </ul>
<p><b>PO2</b></p> <p>Development siting and layout responds to flooding potential and maintains personal safety at all times.</p> <p><b>Editor's note:</b> Council may choose to require the applicant to submit a site-based flood study that investigates the impact of the development on the floodplain and demonstrates compliance with the relevant performance outcomes</p> <p>Council may set appropriate water depth, distances and velocities deemed to allow for safe and clear access.</p>	<p><b>For material change of use</b></p> <p><b>AO2.1</b></p> <p>New buildings are:</p> <ul style="list-style-type: none"> <li>(a) not located within the overlay area, or</li> <li>(b) located on the highest part of the site to minimise entrance of floodwaters, and</li> <li>(c) provided with clear and direct pedestrian and vehicle evacuation routes off the site.</li> </ul> <p><b>Editor's note:</b> Council may set appropriate water depth, distances and velocities deemed to allow for safe and clear access.</p> <p>OR</p> <p>The development incorporates an area on-site that is at least 300 mm above the highest known flood level with sufficient space to accommodate the likely population of the development in safety for a relatively short time until flash flooding subsides or people can be evacuated.</p> <p>OR</p> <p>Where involving an extension to an existing dwelling house that is situated below the DFE, the maximum size of the extension does not exceed (number no greater than 70 m<sup>2</sup>) gross floor area.</p> <p><b>Editor's note:</b> If part of the site is outside the Flood Hazard Overlay area, this is the preferred location for all buildings.</p>

Performance outcomes	Acceptable outcomes
For assessable development	
	<p><b>For reconfiguring a lot</b></p> <p><b>AO2.2</b> Additional lots:</p> <ul style="list-style-type: none"> <li>(a) are not located in the flood hazard overlay area, or</li> <li>(b) are demonstrated to be above the flood level identified for the site</li> </ul> <p><i><b>Editor's note:</b> If part of the site is outside the Flood Hazard Overlay area, this is the preferred location for all lots (excluding park or other relevant open space and recreation lots).</i></p> <p><i><b>Editor's Note:</b> Buildings subsequently developed on the lots created will need to comply with the relevant building assessment provisions under the Building Act 197</i></p>
	<p><b>AO2.3</b> Road and/or pathway layout ensures residents are not physically isolated from the adjacent flood free urban areas and provides a safe and clear evacuation route path:</p> <ul style="list-style-type: none"> <li>(a) by locating entry points into the reconfiguration above the flood level and avoiding culs-de-sac or other non-permeable layouts, and</li> <li>(b) by direct and simple routes to main carriageways.</li> </ul>
	<p><b>AO2.4</b> Signage is provided on-site (regardless of whether land is in public or private ownership):</p> <ul style="list-style-type: none"> <li>(a) indicating the position and path of all safe evacuation routes off the site, and if the site contains or is within 100m of a floodable waterway, hazard warning signage and depth indicators are also provided at key hazard points, such as at floodway crossings or entrances to low-lying reserves.</li> </ul>
	<p><b>AO2.5</b> There is no intensification of residential uses within flood affected areas on land situated below the DFE.</p>
<p><b>PO3</b> Development is resilient to flood events by ensuring design and built form account for the potential risks of flooding.</p>	<p><b>For material change of use (residential uses)</b></p> <p><b>AO3.1</b> The design and layout of buildings used for residential purposes minimise risk from flooding by providing:</p> <ul style="list-style-type: none"> <li>(a) parking and other low intensive, non-habitable uses at ground level.</li> </ul> <p><i><b>Editor's note:</b> The highset 'Queenslander' style house is a resilient low-density housing solution in floodplain areas. Higher density residential development should ensure only non-habitable rooms (e.g. garages, laundries) are located on the ground floor.</i></p>



Performance outcomes	Acceptable outcomes
For assessable development	
	<p><b>For material change of use (non-residential uses)</b></p> <p><b>AO3.2</b> Non-residential buildings and structures:</p> <ul style="list-style-type: none"> <li>(a) orient to the street by activating the street frontage through ground floor commercial uses or urban design treatments such as recess wall treatments, screening and or landscaping, and</li> <li>(b) allow for flow through of flood waters on the ground floor.</li> </ul> <p><b>Editor's note:</b> <i>Businesses should ensure that they have the necessary continuity plans in place to account for the potential need to relocate property prior to a flood event (e.g. allow enough time to transfer stock to the upstairs level of a building or off-site).</i></p> <p><b>Editor's note:</b> <i>The relevant building assessment provisions under the Building Act 1975 apply to all building work within the Flood Hazard Area and need to take account of the flood potential within the area.</i></p> <p><b>AO3.3</b> Materials stored on-site:</p> <ul style="list-style-type: none"> <li>(a) are those that are readily able to be moved in a flood event, and</li> <li>(b) where capable of creating a safety hazard by being shifted by flood waters, are contained in order to minimise movement in times of flood.</li> </ul> <p><b>Editor's note:</b></p> <ul style="list-style-type: none"> <li>(a) <i>Businesses should ensure that the necessary continuity plans are in place to account for the potential need to relocate property prior to a flood event (e.g. allow enough time to transfer stock to the upper-storey of a building or off-site).</i></li> <li>(b) <i>Queensland Government Fact Sheet 'Repairing your house after a flood' provides information about water resilient products and building techniques.</i></li> </ul>
<p><b>PO4</b> Development directly, indirectly and cumulatively avoids any increase in water flow velocity or flood level, and does not increase the potential for flood damage either on-site or on other properties.</p>	<p><b>For operational works</b></p> <p><b>AO4.1</b> Works in urban areas<sup>15</sup> associated with the proposed development do not involve:</p> <ul style="list-style-type: none"> <li>(a) any physical alteration to a watercourse or floodway including vegetation clearing, or</li> <li>(b) a net increase in filling (including berms/mounds).</li> </ul> <p><b>Editor's note:</b> <i>Berms/mounds are considered to be an undesirable built form outcome and are not supported.</i></p>

<sup>15</sup> Urban areas is defined in the *Sustainable Planning Regulation 2009*



Performance outcomes	Acceptable outcomes
For assessable development	
	<p><b>AO4.2</b> Works (including buildings and earthworks) in non-urban areas either:</p> <ul style="list-style-type: none"> <li>(a) do not involve a net increase in filling greater than 50 m<sup>3</sup>, or</li> <li>(b) do not result in any reductions of on-site flood storage capacity and contain within the subject site any changes to depth/duration/velocity of flood waters, or</li> <li>(c) do not change flood characteristics outside the subject site in ways that result in: <ul style="list-style-type: none"> <li>i. loss of flood storage,</li> <li>ii. loss of/changes to flow paths, or</li> <li>iii. acceleration or retardation of flows or any reduction in flood warning times elsewhere on the floodplain.</li> </ul> </li> </ul> <p><b>For material change of use</b></p> <p><b>AO4.3</b> Where development is located in an area affected by DFE, a hydraulic and hydrology report, prepared by a suitably qualified professional, demonstrates that the development:</p> <ul style="list-style-type: none"> <li>(a) maintains the flood storage capacity on the subject site, and</li> <li>(b) does not increase the volume, velocity, concentration or flow path alignment of stormwater flow across sites upstream, downstream or in the general vicinity of the subject site, and</li> <li>(c) does not increase stormwater ponding on-sites upstream, downstream or in the general vicinity of the subject site.</li> </ul> <p><b>For material change of use and reconfiguring a lot</b></p> <p><b>AO4.4</b> In non-urban areas, buildings and infrastructure are set back 50 m<sup>16</sup> from natural riparian corridors to maintain their natural function of reducing velocity of flood waters.</p> <p><b>Editor's note:</b> <i>Fences and irrigation infrastructure (e.g. irrigation tape) in rural areas should be managed to minimise adverse impacts that they may have on downstream properties in the event of a flood.</i></p>
<p><b>PO5</b> Development avoids the release of hazardous materials into floodwaters.</p>	<p><b>AO5.1</b> 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 in a flood event.</p> <p>OR</p>

<sup>16</sup> Council can determine appropriate setbacks for their local circumstances.

Performance outcomes	Acceptable outcomes
For assessable development	
	<p>If a DFE level is adopted<sup>17</sup>, structures used for the manufacture or storage of hazardous materials are:</p> <ul style="list-style-type: none"> <li>(a) located above the DFE level, or</li> <li>(b) designed to prevent the intrusion of floodwaters.</li> </ul> <p>If a flood level is not adopted, hazardous materials and their manufacturing equipment are located on the highest part of the site to enhance flood immunity and designed to prevent the intrusion of floodwaters.</p> <p><b>Editor's note:</b> 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.</p>
<p><b>PO6</b></p> <p>The development supports, and does not unduly burden, disaster management response or recovery capacity and capabilities.</p>	<p><b>AO6.1</b></p> <p>Development does not:</p> <ul style="list-style-type: none"> <li>(a) increase the number of people calculated to be at risk from flooding,</li> <li>(b) increase the number of people likely to need evacuation,</li> <li>(c) shorten flood warning times, and</li> <li>(d) impact on the ability of traffic to use evacuation routes, or unreasonably increase traffic volumes on evacuation routes.</li> </ul>
<p><b>PO7</b></p> <p>Development involving community infrastructure:</p> <ul style="list-style-type: none"> <li>(a) remains functional to serve community need during and immediately after a flood event,</li> <li>(b) 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,</li> <li>(c) retains essential site access during a flood event, and</li> <li>(d) is able to remain functional even when other infrastructure or services may be compromised in a flood event.</li> </ul>	<p><b>AO7.1</b></p> <p>The following uses are not located on land inundated during a DFE:</p> <ul style="list-style-type: none"> <li>(a) community residence,</li> <li>(b) emergency services,</li> <li>(c) residential care facility,</li> <li>(d) utility installations involving water and sewerage treatment plants, and</li> <li>(e) stores of valuable records or items of historic or cultural significance (e.g. archives, museums, galleries, libraries).</li> </ul> <p>OR</p> <p>The following uses are not located on land inundated during a 1 per cent AEP flood event:</p> <ul style="list-style-type: none"> <li>(a) 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>Education and Child Care Services Act 2013</i> is conducted</li> <li>(b) community centres</li> <li>(c) meeting halls</li> <li>(d) galleries</li> </ul>

<sup>17</sup> As resolved by council.

Performance outcomes	Acceptable outcomes
For assessable development	
	<p>(e) libraries.</p> <p>The following uses are not located on land inundated during a 0.5 per cent AEP flood event:</p> <ul style="list-style-type: none"> <li>(a) emergency shelters</li> <li>(b) police facilities</li> <li>(c) sub stations</li> <li>(d) water treatment plant.</li> </ul> <p>The following uses are not located on land inundated during a 0.2 per cent AEP flood event:</p> <ul style="list-style-type: none"> <li>(a) correctional facilities</li> <li>(b) emergency services</li> <li>(c) power stations</li> <li>(d) major switch yards.</li> </ul> <p>AND/OR</p> <p><b>AO7.2</b></p> <ul style="list-style-type: none"> <li>(1) Any components of infrastructure that are likely to fail to function or may result in contamination when inundated by flood, such as electrical switch gear and motors, telecommunications connections, or water supply pipeline air valves are: <ul style="list-style-type: none"> <li>(a) located above the DFE or highest known flood level for the site</li> <li>(b) designed and constructed to exclude floodwater intrusion/infiltration.</li> </ul> </li> <li>(2) infrastructure is designed and constructed to resist hydrostatic and hydrodynamic forces as a result of inundation by a flood.</li> </ul> <p><b>AO7.3</b></p> <p>The following uses have direct access to low hazard evacuation routes as defined in Table 1:</p> <ul style="list-style-type: none"> <li>(a) community residence</li> <li>(b) emergency services</li> <li>(c) hospitals</li> <li>(d) residential care facility</li> <li>(e) substations</li> <li>(f) utility installations involving water and sewerage treatment plants.</li> </ul>

**Table 1—Evacuation route requirements**

Criteria	Degree of Flood Hazard			
	Low	Medium	High	Extreme
Wading ability	If necessary children and the elderly could wade. (Generally, safe wading velocity depth product is less than 0.25.)	Fit adults can wade. (Generally, safe wading velocity depth product is less than 0.4.)	Fit adults would have difficulty wading. (Generally, where wading velocity depth product is less than 0.6.)	Wading is not an option.
Evacuation distances	< 200 metres	200 – 400 metres	400 – 600 metres	> 600 metres
Maximum flood depths	< 0.3 metres	< 0.6 metres	< 1.2 metres	> 1.2 metres
Maximum flood velocity	< 0.4 metres per second	< 0.8 metres	< 1.5 metres	> 1.5 metres
Typical means of egress	Sedan	Sedan early, but 4WD or trucks later	4WD or trucks only in early stages, boats or helicopters	Large trucks, boats or helicopters
Timing <b>Note: This category cannot be implemented until evacuation times have been established in the Counter Disaster Plan (flooding).</b>	Ample for flood forecasting. Warning and evacuation routes remain passable for twice as long as evacuation time.	Evacuation routes remain trafficable for 1.5 times as long as the evacuation time.	Evacuation routes remain trafficable for only up to minimum evacuation time.	There is insufficient evacuation time.

**Note:** *The evacuation times for various facilities or areas would (but not necessarily) be included in the Counter Disaster Plan (flooding).*

*Generally, safe wading conditions assume even walking surfaces with no obstructions, steps, soft underfoot, etc.*

## Relationship with building assessment provisions

For the building assessment provisions, the flood hazard area defined by the planning scheme is also designated to be the Natural Hazard Management Area (flood) pursuant to section 13 of the Building Regulation 2006 (Building Regulation). In accordance with section 13(1)(b) of the Building Regulation, the following parameters may be defined for all or part of the natural hazard management area (flood):

- (1) the Defined Flood Level (DFL) as <local government may insert map references or height datum information>
- (2) the maximum flow velocity of water as < local government may insert map references>

- (3) an inactive flow or backwater area as < local government may insert map references>
- (4) a freeboard of < local government should insert freeboard that is greater than 300mm>
- (5) the finished floor level of Class 1 buildings as < local government may insert floor level>.

In accordance with section 13 of the Building Regulation, the local government may choose which of the requirements ((a) to (e)) they want to declare.

The table below provides an overview of how the planning and building provisions can complement each other under different scenarios.

Scenario	Planning provisions	Building provisions
Where level 2 or 3 mapping has been undertaken.	a) Include relationship with the building assessment provisions to declare a DFE and defined flood level (DFL). b) Include provisions that: <ul style="list-style-type: none"> <li>• avoid natural hazard areas or mitigate the risks of the natural hazard;</li> <li>• support, and not unduly burden, disaster management response or recovery capacity and capabilities;</li> <li>• directly, indirectly and cumulatively avoid an increase in the severity of the natural hazard and the potential for damage on the site or to other properties; and</li> <li>• maintain or enhance natural processes and the protective function of landforms and vegetation that can mitigate risks associated with the natural hazard.</li> </ul>	Trigger Queensland Development Code (QDC) provisions that address: <ul style="list-style-type: none"> <li>• structural stability.</li> <li>• floor levels.</li> <li>• utilities above DFL.</li> <li>• infrastructure above DFL.</li> <li>• backflow devices.</li> </ul>
Where level 1 mapping is the only mapping available, level 2 data inputs are available but level 2 mapping has not been undertaken (no depth or velocity information available).	c) Include relationship with the building assessment provisions to state a DFL which could be based on: <ul style="list-style-type: none"> <li>• AHD;</li> <li>• natural ground level;</li> <li>• above a historical event that was recorded by an authority; or</li> <li>• above a historical event recorded by a local resident and supported by a statutory declaration.</li> </ul> d) Include provisions stated in (b).	Trigger QDC provisions that address: <ul style="list-style-type: none"> <li>• floor levels.</li> <li>• utilities above DFL.</li> <li>• infrastructure above DFL.</li> <li>• backflow devices.</li> </ul> Apply standard structural stability requirements.
Where level 1 mapping is the only mapping available, level 2 data inputs are not available.	Include relationship with the building assessment provisions to set a finished floor level and include provisions stated in (b). Trigger QDC provisions that relate to a finished floor levels.	Apply standard structural stability requirements.
Where level 1 mapping is the only mapping available or where the potential for flooding is unknown.	Utilise zoning to determine the appropriate land uses and include provisions stated in (b).	No building provisions triggered.

### Flood hazard planning scheme policy

While not a mandatory element of a planning scheme, a planning scheme policy is a useful tool to provide guidance to an applicant about the flooding information required to support a development application and how that information should be presented.

If a flood related planning scheme policy is included in a planning scheme it may:

- for development proposed on land susceptible to flooding, outline what additional information an applicant should provide to the assessment manager as part of the development application, or
- for development proposed on land where the potential for flooding is unknown, requires an applicant to provide:
  - as part of the development application, information to enable an assessment of whether the subject land is susceptible to flooding, and
  - upon determination that the subject land is susceptible to flooding, more detailed information is required to allow an assessment of the flood risk.

Key aspects that can be considered when drafting a flood planning scheme policy include:

- Under what circumstances does the planning scheme policy apply?
- What is the purpose and scope of the planning scheme policy?
- Who is a suitably qualified professional to undertake flood modelling and flood assessments?
- Who is a suitably qualified professional, on behalf of the local government, to assess flood modelling and flood assessments submitted to support the application?
- What information is required to support the development application and how it should be presented?
- What information does not need to be provided to support the development application?
- What information can the local government or other stakeholders provide on request to the applicant?
- What guidance can the local government provide to assist the applicant decide:
  - which flood modelling methodology to be used?
  - what assumptions or specific data should be used?
  - how should the data be presented in a report and/or in what electronic format?
  - when should the local government or other stakeholders be consulted?
- What references and/or standards should be used?

## Bushfire hazard code is currently under review

When the planning scheme designates an area bushfire-prone, it triggers assessment against the Building Codes of Australia (BCA) and Australian Standard 3959-2009, Construction of buildings in bushfire-prone areas. This standard determines how a building is to be constructed, sited and oriented to resist a hazard level, providing an acceptable construction practice, which is deemed to satisfy the requirements of the BCA. It requires a site by site assessment of the hazard by a building certifier. A planning scheme cannot duplicate the requirements of the BCA about the construction of buildings, including building orientation, boundary clearance requirements and distances of buildings or structures from vegetation to address a bushfire hazard.

Accordingly, the role of the planning scheme in relation to bushfire hazard development requirements can be limited to:

- appropriate land use,
- the lot layout,
- property access,
- management of open space (including protection of protected vegetation) and provision of bushfire management trails,
- an adequate water supply for fire fighting
- adequate evacuation routes.

A draft Bushfire Model Code has been prepared and is in the process of being finalised. For a copy of this Code, please contact DILGP.

# Landslide hazard

## Application

This code applies to assessing the following aspects of development where in the landslide hazard overlay area:

- a) material changes of use and associated reconfiguration of a lot that:
  - i. increase the number of people living or working in the natural hard management areas (e.g. residential development, shopping centres, tourist, facilities, industrial or commercial uses) except where the premises are occupied on a short-term or intermitted basis (e.g. by construction/maintenance workers, certain agricultural and forestry workers), or
  - ii. involves institutional uses where evacuating people may be particularly difficult (e.g. hospitals, education establishments, child care, aged care, nursing homes and high security correctional centres), or
  - iii. involve the manufacture or storage of hazardous materials in bulk, or
  - iv. would involve the building or other work described in b) as an intrinsic element of the development proposal, and
- b) building or other work on potentially unstable slopes that involves:
  - i. earthworks exceeding 50 cubic metres (other than the placement of topsoil), or
  - ii. vegetation clearing, or
  - iii. redirecting the existing flow of surface or groundwater.

## Purpose

The purpose of the landslide hazard overlay code is to:

- (a) Provide for the assessment of the suitability of development in the landslide hazard area to ensure that risk to life, property, community, economic activity and the environment during landslide events is minimised.
- (b) Ensure that development does not increase the potential damage on-site or to other property.

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

- (a) the development is compatible with the level of risk associated with the natural hazard;
- (b) the development siting, layout, and access responds to the risk of the natural hazard and minimises risk to personal safety;
- (c) the development is resilient to natural hazard events by ensuring siting and design accounts for the potential risks of natural hazards to property;
- (d) the development supports, and does not unduly burden disaster management response or recovery capacity and capabilities;
- (e) the development directly, indirectly and cumulatively avoids an unacceptable increase in severity of the natural hazards and does not significantly increase the potential for damage on the site or to other properties;
- (f) the development avoids the release of hazardous materials as a result of a natural hazard event; and
- (g) natural processes and the protective function if landforms and/or vegetation are maintained in natural hazards areas.



## Assessment criteria

### Criteria for assessable development—example development assessment code

Performance outcomes	Acceptable outcomes
For assessable development	
<p><b>PO1</b></p> <p>Development maintains the safety of people, property and hazardous materials manufactured or stored in bulk from the risk of landslide.</p>	<p><b>AO1.1</b></p> <p>The development site is not subject to landslide hazard, either internally or from sloping land above the site.</p> <p><b>Editor's note</b>—<i>The applicant can demonstrate that the development site is not subject to landslide hazard because the development is not proposed on a slope greater than 15 per cent.</i></p> <p><i>Alternatively, a site-specific geotechnical analysis prepared by a registered professional engineer may be required to demonstrate that the site not subject to landslide hazard.</i></p> <p><i>A site-specific geotechnical assessment prepared by a suitably qualified person certifies that:</i></p> <ul style="list-style-type: none"> <li>a) <i>the stability of the site, including associated buildings and infrastructure, will be maintained and operational life of the development;</i></li> <li>b) <i>the site not subject to risk of landslide activity originating from other land, including land above the site;</i></li> <li>c) <i>the development will not increase the risk of landslide on other land; and</i></li> <li>d) <i>may make specific reference to assembly uses, essential community infrastructure, vulnerable uses or difficult to evacuate uses.</i></li> </ul> <p>OR</p> <p>The development does not</p> <ul style="list-style-type: none"> <li>(a) involve any new building work other than a minor extension (&lt;20 m<sup>2</sup> Gross Floor Area) to an existing building, or</li> <li>(b) involve vegetation clearing, or</li> <li>(c) alter ground levels or stormwater conditions.</li> </ul> <p>OR</p> <p>The development includes measures that ensure:</p> <ul style="list-style-type: none"> <li>(a) the long term stability of the site;</li> <li>(b) the site will not be adversely affected by landslide activity originating on sloping above the site; and</li> <li>(c) filling and excavation does not redirect the flow of, or concentrate surface water or groundwater on the site or neighbouring sites.</li> </ul> <p><b>Editor's note</b>—<i>A site-specific geotechnical analysis as specified in Note 1.1 above is required to demonstrate achievement of this solution. The building assessment provisions address the stability of buildings and structures in relation to landslide.</i></p> <p><i>In relation to (b), local governments may adopt lower thresholds than 50m<sup>3</sup> to reflect the particular landslide hazard characteristics of different localities</i></p>



## Assessment criteria

### Criteria for assessable development—example development assessment code

Performance outcomes	Acceptable outcomes
For assessable development	
<b>P02</b> Community Infrastructure is able to function effectively during and immediately after landslide events.	<b>A02.1</b> Development involving community infrastructure includes measures identified by a site-specific geotechnical assessment prepared by a competent person that ensures: <ul style="list-style-type: none"> <li>(a) the long term stability of the site including associated building and infrastructure;</li> <li>(b) access to the site will not be impeded by a landslide event; and</li> <li>(c) the community infrastructure will not be adversely affected by landslides originating from other land, including land above the site.</li> </ul>

## Coastal hazard

### Application

This code applies to assessing material change of use, building work, reconfiguring a lot and operational work for development 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) avoid risk to people and property from coastal hazards, and
- b) manage the protection of coastal processes and fluctuations of the coast as far as possible.

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

- a) the exposure of communities and development to coastal hazards is mitigated;
- b) coastal landforms and vegetation are protected or enhanced to mitigate coastal hazard risk; and
- c) where practicable, vulnerable community infrastructure is located and designed to function effectively during and immediately after a coastal hazard event.

## Assessment criteria

### Criteria for assessable development—example development assessment code

Performance outcomes	Acceptable outcomes
For assessable development	
<b>PO1</b> Protecting people and property from coastal hazard impacts.	<b>AO1.1</b> New urban development is situated wholly outside of the mapped coastal hazard areas. OR A report certified by an appropriately qualified person demonstrating to the satisfaction of the assessment manager, that the development site is not at risk from coastal hazards. OR Where urban development is: <ul style="list-style-type: none"> <li>• ‘community infrastructure’</li> <li>• ‘coastal-dependent development’</li> <li>• ‘temporary and/or relocatable’</li> <li>• ‘tourism access infrastructure’</li> <li>• ‘redevelopment of existing built structures’</li> </ul> and it is not practical to locate the development elsewhere outside the coastal hazard area, a report certified by an appropriately qualified person demonstrates to the satisfaction of the assessment manager that: <ul style="list-style-type: none"> <li>(a) impacts on people and property from coastal hazards will be mitigated through appropriate location, design, construction and operating standards.</li> </ul>

# PART E: Supporting information

## 1. Technical resources

1. State Interest Technical Manual - Natural Hazards, Risk and Resilience
  - A 'fit for purpose' approach in undertaking natural hazard studies and risk assessment
  - Evaluation Report: Bushfire hazards
  - Evaluation Report: Flood hazards
  - Evaluation Report: Landslide hazards
  - Scoping a Terms of Reference for undertaking a flood hazard investigation
  - Guidance for considering natural hazards, risk and resilience when designating land for community infrastructure[www.dilgp.qld.gov.au/planning/state-planning-instruments/state-planning-policy-guidance-material.html](http://www.dilgp.qld.gov.au/planning/state-planning-instruments/state-planning-policy-guidance-material.html)
2. National Strategy for Disaster Resilience COAG February 2011 <https://www.ag.gov.au/EmergencyManagement/About-us-emergency-management/Pages/National-strategy-for-disaster-resilience.aspx>
3. Queensland Reconstruction Authority, Planning for stronger more resilient floodplains Part 2. Measures to support floodplain management in future planning schemes <http://qldreconstruction.org.au/publications-guides/land-use-planning/planning-for-stronger-more-resilient-flood-plains>
4. National Emergency Risk Assessment Guidelines October 2010 <http://www.ag.gov.au/EmergencyManagement/Pages/default.aspx>
5. Australian Emergency Management Handbook 7 - Managing the floodplain: Best practice in flood risk management in Australia <https://ema.infoservices.com.au/collections/handbook>
6. Australian Emergency Management Institute, Technical Flood Risk Management Guideline: Using the floodplain specific management process to support land use planning (supporting document for the implementation of Australian Emergency Management Handbook 7, Managing the floodplain: Best practice in flood risk management in Australia. <https://ema.infoservices.com.au/items/HB7-2ND>

7. Queensland Flood Mapping Program: Flood mapping implementation kit [https://www.dnrm.qld.gov.au/\\_data/assets/pdf\\_file/0009/230778/flood-mapping-kit.pdf](https://www.dnrm.qld.gov.au/_data/assets/pdf_file/0009/230778/flood-mapping-kit.pdf)

## 2. Mapping information

### Online mapping

- The SPP Interactive Mapping System (plan making) includes state-wide natural hazard mapping for flooding, bushfire and coastal hazards, as referred to within this guideline. The SPP Interactive Mapping System can be found at <http://www.dilgp.qld.gov.au/planning/state-planning-instruments/spp-interactive-mapping-system.html>

## 3. Glossary

**AS1596-2002**—see Standards Australia (2002), The storage and handling of LP gas

**AS2419-1 – 2005**—see Standards Australia (2005), Fire hydrant installations- System design, installation and commissioning

**AS3959-2009**—see Standards Australia (2009), Construction of buildings in bushfire-prone areas

**AEP**—the Annual Exceedance Probability is the likelihood of occurrence of a flood or storm tide inundation event of a given size or larger in any one year, usually expressed as a percentage. For example, if an event has an AEP of 1 per cent, it means that there is a 1 per cent risk (i.e. a likelihood of 1 in 100) of this event occurring in any one year. A 1 per cent AEP event should not be interpreted as only occurring once in 100 years.

**BCA**—Building Code of Australia

**DFE**—Defined Flood Event is the flood event adopted by a local government for the management of development in a particular locality.

**ISO 31000:2009**—see Standards Australia (2009), AS/NZ ISO 31000:2009 Risk Management- Principles and Guidelines

**RSTEL**—Recommended Storm Tide Event Level

**Vulnerable**—in relation to uses, persons and population, may include, for example low lying development, including an aged care facility without flood protection.

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