

## SC6.10 Planning scheme policy – Natural hazards

### SC6.10.1 Purpose of the planning scheme policy

- (1) The purpose of this planning scheme policy is to provide guidance and identify information Council may request for development within an identified natural hazard risk area.

### SC6.10.2 Information Council may request

#### SC6.10.2.1 General matters to be addressed

##### SC6.10.2.1.1 Planning scheme intent

- (1) The planning scheme seeks to avoid the risk and impacts of natural hazards on people and property. In meeting this high level strategic intent, development needs to respond to the presence of bushfire, landslide, flood and storm tide hazard events that occur in the Cairns region. The form of response for development will vary from site to site based on the severity and impact of an event and the impact over different parts of the region and the type of development proposed, and the relevance of emerging science in relation to climate change.

##### SC6.10.2.1.2 Modelling and studies background

- (1) Modelling of catchment based flood events has been undertaken particularly over the urban parts of the former Cairns city area, the Barron river delta flood plain, and the Mount Peter growth area. Development needs to respond to the outcomes of individual catchment management plans and flood plain management to ensure the continued safety of existing and growing urban areas is achieved.
- (2) Broad flood plain mapping is provided for the balance of the Cairns region. In these areas the proponent of development is required to undertake an assessment of the potential flood hazard and respond through built form to reduce the risk to people and property in these areas. Mapping of the flood plain will be refined over time as more detailed catchment based modelling is undertaken.
- (3) Modelling of storm tide inundation has been undertaken for the Cairns region. The modelling incorporates best known science in relation to the nature and impact of cyclonic activity and incorporates a sea level rise of 0.8 metres to incorporate climate change to 2100. The modelling utilised the most up to date Lidar data for the region providing a Digital elevation model with which to base levels of inundation on.
- (4) Bushfire hazard mapping has been sourced from the State Planning Policy default mapping (as at January 2014)
- (5) Potential landslip areas (medium and high) are identified within the Potential landslip hazard overlay. The modelling does not take into consideration all aspects that contribute to landslide risks. However, the mapping corresponds to the slope and potential stability of land and is therefore used as a guide as to where geotechnical investigations are required for new development.

##### SC6.10.2.1.3 Meeting planning scheme outcomes

- (1) Council may request additional information to demonstrate compliance with the strategic framework and the applicable planning scheme codes.

- (2) In responding to information requests, development may need to have regard to the relevant background information and studies for each type of natural hazard represented and responded to by the planning scheme.

**SC6.10.2.2 Specific matters to be addressed****SC6.10.2.2.1 Natural hazard assessment – Landslide risk assessment report**

- (1) A geotechnical report and Natural hazard assessment – Landslide report is prepared by a qualified and experienced geotechnical engineer with references naming other similar reports prepared by the consultant or consultants.
- (2) This report/s shall include, but not be limited to assessment of the following:
- (a) Existing site conditions, including:
    - (i) soil type, depth and properties;
    - (ii) rock type and properties;
    - (iii) depth of weathering;
    - (iv) angles of dip of rock bedding planes and fault planes;
    - (v) slope stability;
    - (vi) erosion stability;
    - (vii) existing surface water characteristics;
    - (viii) proposed treatments for surface water;
    - (ix) location of and concentration of ground water;
    - (x) disposal of sewage;
    - (xi) allotment specific geotechnical assessments;
    - (xii) history of any known geological problems or occurrences on the site or adjoining property.
  - (b) Details of measures proposed to be incorporated in the development to ensure safe and otherwise satisfactory construction practices, including:
    - (i) measures to be adopted to control soil and rock movement from future weathering and saturated conditions; and
    - (ii) design matters to be considered during the construction of building foundations, roads, driveways or any other works involving the excavation or filling of any land.
    - (iii) development of allotments and dwellings outside Potential landslip areas.
  - (c) A slope stability and analysis report including revegetation and stabilisation measures is provided. The measures shall address the driveway batters (existing and any further proposed works) as well as the earthworks to be undertaken for the construction of within proposed development envelopes.
  - (d) The report/s include a statement of methodology regarding the testing procedures adopted, the scope of the report and the tests undertaken to ensure the findings of the report are representative of the site.
  - (e) Development proposals in the identified Hillslopes overlay areas provide a detailed visual assessment of the proposed stability works to ensure visual impact of the works can be validated.

**SC6.10.2.2.2 Natural hazard assessment – Bushfire management plan (BMP)**

- (1) A Bushfire management plan (BMP) will be prepared by a suitably qualified person and references naming other similar reports prepared by the consultant or consultants should also be included.

- (2) A BMP is required where development proposes to materially increase the number of people living or working (except for single dwellings on existing lots) in a High severity bushfire hazard area, or that involve hazardous materials that are manufactured or stored in bulk in a High or Medium severity bushfire hazard area. A BMP may also be required for certain types of community infrastructure in either a Very high, High or Medium bushfire hazard area.
- (3) In preparing a BMP the local government, responsible Rural and/or Urban fire brigade, and managers of adjacent parks or reserves should be consulted. It is also desirable to consult other agencies or individuals, such as previous owners of the site or neighbours, who may have local knowledge of the severity and nature of the bushfire hazard.
- (4) A comprehensive BMP should include the following:
  - (a) An assessment of the nature and severity of the bushfire hazard affecting the site. The key factors to be considered are vegetation type, slope and aspect and are an existing Bushfire hazard assessment. The assessment should also address other site-specific factors that are important in devising suitable bushfire mitigation strategies. These factors could include matters such as: likely direction of bushfire attack, environmental values that may limit mitigation options, location of evacuation routes and/or safety zones.
  - (b) An assessment of the specific risk factors associated with the development proposal, including matters such as the nature of activities and materials to be conducted/stored on the site, numbers and types of persons likely to be present, particular warning and/or evacuation requirements.
  - (c) A plan for mitigating the bushfire risk identified in (a) and (b). The plan should address all of the matters raised and recommend specific mitigation actions for the proposed development including:
    - (i) road and lot layout and land use allocations;
    - (ii) firebreaks and buffers;
    - (iii) building locations or building envelopes;
    - (iv) landscaping treatments;
    - (v) warning and evacuation procedures and routes;
    - (vi) fire fighting requirements including infrastructure;
    - (vii) any other specific measures such as external sprinkler systems and alarms;
    - (viii) purchaser/resident education and awareness programs;
    - (ix) ongoing maintenance and response awareness programs.
- (5) The level of detail required will vary with the nature of the development proposal and site, and with the type of development application.
  - (a) If the application must be followed by another application before works can commence (e.g. a Material change of use application that must be followed by a Reconfiguration of a lot application), then matters of detail could be dealt with at the later application stage;
  - (b) The level of detail required to accompany a particular application should be determined in consultation with the assessment manager. However, it is recommended that, at a minimum, items (a), (b) and (c) (i) – (iii) outlined above in (4) should be addressed in any BMP.

#### SC6.10.2.2.3 Natural hazard assessment – Flood and inundation hazards

- (1) A detailed hydrologic and hydraulic study is required to demonstrate that the proposed development will not create adverse flooding or storm tide impacts directly or cumulatively upon external properties during design flood and storm tide events ranging

from 50% AEP to 0.2% AEP (in terms of peak water level, discharge or velocity). Modelling shall also demonstrate that immunity consistent with the requirements of Planning scheme policy – FNQROC Regional Development Manual will be provided.

- (2) The study will be prepared by a suitably qualified person and references naming other similar reports prepared by the consultant or consultants should also be included.
- (3) The study will contain the following elements and matters:

#### Modelling

- (a) Development of detailed hydrologic and hydraulic models is required. These models may be based upon those previously developed and accepted by Council.

#### Sensitivity Testing

- (b) In recognition of the sparsity of calibration information, a sensitivity test shall be undertaken using both the hydrologic and hydraulic models to investigate the impact of model parameters upon peak water level predictions. Parameters shall be varied within generally accepted ranges. Parameters to be varied include the storage lag parameter ( $\alpha$ ) within URBS and the hydraulic roughness coefficient ( $n$ ) within MIKE11. Simulations shall be undertaken assuming upper bound, lower bound and median values as discussed further below.

#### Existing Case Simulations

- (c) Existing case model results shall be produced for the waterway flood events ranging from 50% AEP to 0.2% AEP, assuming model parameters determined from the sensitivity tests. A range of tailwater levels shall be investigated (with reference to the Drainage Management Plan as available) to confirm any impact upon peak water levels at the site. The existing case simulations shall assume that current and already approved development is in place. The adopted existing case flood level predictions shall assume median values for the model parameters ( $\alpha$  and  $n$ ).

#### Developed Case Simulations

- (d) Developed case hydrologic and hydraulic models shall be produced. The proposed development shall be represented in the hydrologic and hydraulic models, considering:
  - (i) any earthworks within the extent of 1% AEP flood event inundation;
  - (ii) urbanisation of the site.

Design event simulations consistent with the existing case shall be undertaken using the developed case models.

#### Impact Assessment

- (e) Comparisons of the developed case results and existing case results shall be used to demonstrate that proposed development would not adversely impact properties external to the site under waterway flood events of the magnitudes specified. Impacts shall be calculated assuming median and upper bound model parameter values ( $\alpha$  and  $n$ ).

Particular locations where this should be demonstrated, shall be agreed to by the applicant/owner and Council prior to finalising the study, and shown on a plan.

## Flood Immunity

- (f) Model results from the developed case simulations must demonstrate that flood immunity consistent with the requirements of Planning scheme policy – FNQROC Regional Development Manual. Fill level and floor level requirements shall be determined assuming median model parameter values ( $\alpha$  and  $n$ ). Additionally, floor levels shall be checked against upper bound water levels.

## Deliverables

- (g) A Hydraulic report shall be submitted to Council to describe the methodologies used, assumptions made and present the modelling results. The report shall include figures to illustrate models details and results. Sufficient information shall be provided in the report to facilitate independent review of the assessment. Electronic copies of the final models shall be provided to Council for independent review.
- (4) The planning scheme outlines the strategic intent and outcomes for development within the Barron river delta, in particular its importance for the floodplain. It is intended that the findings of the Barron delta study will guide development proposals with regard to flooding, in particular:
- (a) The documents “Barron river delta flood study – Development in the Delta” Parts A and B are a guide by which potential developers, consultants and other technical users can gain an understanding of the function of the Barron river delta floodplain for the protection of existing properties.

The “Barron river delta flood study – Development in the Delta” Parts A and B (Revision A October 94) includes the following components:

## Part A – Technical Guide

Part A explains the aims and results of the study and describes the computer model, which was developed as part of the study. Various drawings are included to provide information on design flows and flood levels.

## Part B – Policy

This document sets out the rationale Council’s policy on development in the Barron river delta. Included with this document are details of the procedure to be followed in using the model in association with any development application or when undertaking detailed design.

- (b) Cairns Regional Council has adopted the numerical hydraulic model developed during the Barron river flood study and subsequently updated as the benchmark by which all development proposals are assessed. The adoption of a single model operated and interpreted by those skilled in its development and use is intended to ensure that all development is assessed and decided in a consistent and objective manner. Individual development applications are to be considered in detail using the Barron delta flood model so that the impacts on flood behaviour and impact can be assessed both in respect to the project itself and to other areas.

### SC6.10.3 Guidance on meeting planning scheme outcomes

#### SC6.10.3.1 Related materials

- (1) Other documents which provide guidance on meeting the purpose of the planning scheme outcomes, but are not subject to a development assessment processes under the planning scheme include:
- (a) State planning policy;

- (b) Cairns Regional Council Natural hazards study May 2013;
- (c) Drainage management plans;
- (d) Cairns region storm tide inundation study 2013;
- (e) Planning scheme policy – FNQROC Regional Development Manual.