Planning Scheme Policy – Natural hazards

1. Purpose of the planning scheme policy

(1) The purpose of this planning scheme policy is to:
- (a) Support the CairnsPlan 2016 planning scheme;
- (b) Provide guidance on natural hazard areas;
- (c) Provide guidance on the preparation of technical reports required to assist in the assessment of proposed development on land within an identified natural hazard area;
- (d) Identify information Council may request to support a development application where on land within an identified natural hazard area.

2. Interpretation

(1) Terms used within this planning scheme policy are defined within Schedule 1 of the CairnsPlan 2016 planning scheme. Where a term is not defined in Schedule 1, section 1.3 Interpretation of the CairnsPlan 2016 planning scheme applies.

3. Natural hazards

(1) A natural hazard is a naturally occurring event that may cause harm to people, or damage to property and infrastructure.

(2) Natural hazards and natural hazard risk areas identified within the CairnsPlan 2016 planning scheme are:
- (a) Bushfire hazard areas are identified on the Bushfire hazard overlay maps contained within Schedule 2 of the CairnsPlan 2016 planning scheme as:
  - (i) Potential impact buffer area;
  - (ii) Medium potential bushfire intensity area;
  - (iii) High potential bushfire intensity area;
  - (iv) Very high potential bushfire intensity area.
- (b) Flood hazard areas are identified on the Flood and inundation hazard overlay maps contained within Schedule 2 of the CairnsPlan 2016 planning scheme as:
  - (i) Designated flood hazard area – Flood inundation trigger area;
  - (ii) Designated flood hazard area – Floodplain assessment trigger area;
  - (iii) Inundation hazard area;
  - (iv) Precinct 2 – Mount Peter Sub-precinct 2a Low-medium hazard area;
  - (v) Precinct 2 – Mount Peter Sub-precinct 2b High extreme hazard area
- (c) The landslip hazard area is identified as Potential landslip hazard area on the Potential landslip hazard overlay maps contained within Schedule 2 of the CairnsPlan 2016 planning scheme;
- (d) The storm tide hazard area is identified as Storm tide inundation hazard area on the Flood and inundation hazard overlay maps contained within Schedule 2 of the CairnsPlan2016 planning scheme.

4. Guidance on meeting planning scheme outcomes

4.1 Planning scheme intent

(1) The planning scheme seeks to avoid the risk and impacts of natural hazards on people and property. In meeting this intent, development needs to respond to the presence of natural hazards in the Cairns region. The form of response for development will vary from site to site based on the severity and impact of a hazard and the type of development proposed.

4.2 Modelling and studies background

(1) Modelling of catchment based flood events has been undertaken for some catchments within the Cairns local government area. These areas are mapped as Inundation hazard area, Designated flood hazard area – Flood inundation trigger area, Sub-precinct 2a – Low-medium hazard area and Sub-precinct 2b – Medium-high hazard area on the Flood and inundation hazards overlay within Schedule 2 of the CairnsPlan 2016 planning scheme.

(2) Broad flood plain mapping is provided for the balance of the Cairns local government area. These areas are identified on the Flood and inundation hazard overlay maps contained within schedule 2 of the CairnsPlan 2016 Planning Scheme as Designated flood hazard area – Floodplain assessment trigger area. In these areas the proponent of development is required to undertake an assessment of the potential flood hazard to reduce the risk to people and property to an acceptable or tolerable level. 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 local government area within the Cairns Region Storm Tide Inundation Study (January 2013). The study built on the previous Cairns Region Storm Tide Study (2009) and was prepared in accordance with the Coastal Hazard Guidelines (Queensland Government, 2012) and incorporated a sea level rise of 0.8 metres at 2100. The areas modelled as being subject to storm tide inundation (the 1% AEP event at 2100) have been mapped within the Flood and inundation hazards overlay within Schedule 2 of the CairnsPlan 2016 planning scheme as Storm tide inundation hazard area.

(4) Bushfire hazard mapping has been sourced from the State Planning Policy interactive mapping (as at August 2020). The areas identified as being subject to Bushfire hazard are mapped within the Bushfire hazard overlay within Schedule 2 of the CairnsPlan 2016 planning scheme.

(5) Potential landslip areas (medium and high) are identified within the Potential landslip hazard overlay contained within Schedule 2 of the CairnsPlan 2016 planning scheme. 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.

4.3 Specific matters to be addressed

(1) Council may request additional information to demonstrate compliance with an applicable assessment benchmark.

(2) In responding to information requests, development may need to have regard to the relevant background information, studies and / or models for each type of natural hazard.

4.3.1 Natural hazard assessment – Site specific geotechnical assessment

(1) A geotechnical report and Natural hazard assessment – Site specific geotechnical assessment must be prepared by a suitably qualified and experienced geotechnical engineer with references that identify other similar reports prepared by the consultant or consultants.

(2) This report/s must be prepared in accordance with Australian Geomechanics Society Practice Notice Guidance for Landslide Risk Management 2007 (AGS 2007) and must demonstrate that the site is suitable for development and achieves a low or very low risk for landslide from hazards both internal to the site and from sloping land around the site. The report shall include, but not be limited to 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.

4.3.2 Natural hazard assessment – Bushfire management plan (BMP)

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

(2) A BMP is required where development is proposed in a bushfire hazard area, or that involve hazardous materials that are manufactured or stored in bulk in a 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/severity and specific risk factors of the bushfire hazard affecting the site. The key factors to be considered are vegetation type, slope and aspect and any 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 but not limited to:
- (i) road and lot layout and land use allocations;
- (ii) firebreaks and buffers or separation areas;
- (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 may vary with the nature of the development proposal, site, and with the type of development application.

4.3.3 Natural hazard assessment – Flood and inundation hazards assessment

(1) A Flood and inundation hazards assessment must be prepared by a suitably qualified and experienced person with references that identify other similar reports prepared by the consultant or consultants.

(2) A Flood and inundation hazards assessment must be prepared where within a Designated flood hazard area – Floodplain assessment trigger area or where required to demonstrate compliance with an assessment benchmark.

(3) The flood and inundation hazard assessment must:
- (a) Include a detailed hydrologic and hydraulic study of the site and surrounding area to demonstrate the extent of hazard over the site, and that the proposed development will not create adverse flood and / or storm tide hazard impacts (in terms of peak water level, discharge or velocity) upon external properties during flood and / or storm tide hazard events ranging from a 50% AEP to a 0.2%AEP event;
- (b) Assess the potential impacts of the development on flood and/or storm tide hazard;
- (c) Assess the potential impacts of flood and / or storm tide hazard on the development;

(4) Recommend strategies to be incorporated into the proposed development to satisfy the outcomes of an assessment benchmark;

(5) The Flood and inundation hazard assessment will contain the following elements and matters:

Modelling

(a) Development of detailed hydrologic and hydraulic model/s. It may be appropriate to base the model/s on those previously developed and accepted by Council.

Sensitivity Testing

(b) A sensitivity test shall be undertaken using both the hydrologic and hydraulic models to investigate the impact of model parameters upon predictions. Parameters shall be varied within generally accepted ranges. Parameters to be varied include the storage lag parameter (∝) 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 (∝ 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 inundation event;
  (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 (∝ 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 a relevant assessment benchmark. Fill level and floor level requirements shall be determined assuming median model parameter values (∝ 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.

(6) 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 for 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.

5. 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 and any associated guidance material;
- (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.

6. Schedule of amendments

Table 6.a – Schedule of amendments

Amendment title	Version number	Description	Dates
CairnsPlan 2016 Amendment 1 of 2017 - Administrative	1.1	The amendment integrates the Cairns Local Government Infrastructure Plan and corrects formatting, numbering, outdated terms and factual matters incorrectly stated in the planning scheme.	Adopted 28 June 2017 Commenced 1 July 2017
Planning Scheme Policy – Natural hazards Amendment 1 of 2017 - Administrative	1.2	The amendment corrects formatting and numbering to remove the Planning Scheme Policy from Schedule 6 of the CairnsPlan 2016 and includes a schedule of amendments.	Adopted 6 December 2017 Commenced 11 December 2017
Planning Scheme Policy – Natural hazards Amendment 1 of 2021 - Amendment	2.0	This amendment updates terminology, provides a description of natural hazards, provides information about background modelling and studies, and further guidance on meeting the outcomes within the planning scheme.	Adopted 13 October 2021 Commenced 26 October 2021