PLANNING OUR FUTURE

The Gympie Region Planning Scheme

Gympie Regional Council
New Planning Scheme Project

Draft

Flood Hazard Position Paper

16 June 2023

Introduction

Flooding in the Gympie region is varied in nature. The Mary River catchment has a long flood duration and a large floodplain that may experience inundation for 24 to 48 hours and more. In comparison, Banks Creek, Amamoor and Kandanga Creeks are steeper catchments with shorter flood durations, and flood peaks occur much sooner after rain. These catchments may experience flash flooding where warning times are less than six hours.

Much of the land use in the Gympie region is rural in nature, with urban development in centres such as Gympie, Goomeri, Kilkivan, Imbil, Tin Can Bay, Rainbow Beach and Cooloola Cove. These settlements provide high levels of amenity but can be subject to natural hazards such as flooding and bushfire.

Frequent flooding has been recorded in the Gympie region since early European settlement and there can be no doubt that the original inhabitants of the region would have experienced similar events over a much longer timeframe. The historic centre of Gympie as we know it today is the "Fiveways", which is now a roundabout, but once was part of a watercourse known as Nash Gully. Since early settlement, floodwaters of the Mary River have backed up into Nash Gully, inundating Mary Street and damaging low lying parts of town. Flooding in Mary Street becomes apparent when the flood gauge at Kidd Bridge exceeds 17 metres. This has occurred more than eight times in the past 50 years. The February 2022 flood saw the Mary River peak at 22.96m, the highest level since 1893. Flooding was widespread throughout the region, a fatality was recorded, communities were isolated, 291 properties were damaged by floodwaters and 460 people accommodated in emergency evacuation centres.

The February flood followed on the heels of the devastation wrought by ex-tropical cyclone "Seth" which, in January 2022, delivered 24 hour rainfall totals of between 600 and 700mm to the areas of Goomeri, Kilkivan, Woolooga, Booubyjan, and Tansey. The resultant flash flooding caused a loss of life, significant damage to public and private infrastructure and left a substantial number of residents and tourists stranded.

The Mary River peaked above 16m again in May of 2022. Floodwaters cut the Bruce Highway and low-lying businesses were again evacuated. The flooding impacted from Dagun to Gympie and on to Miva.

The hazards presented by flooding in the Gympie region can be severe and are widespread. Floods have the potential to threaten life, property, public infrastructure and business viability. The highest priority for Council is to protect people by taking steps to prevent loss of life and serious injury in a flood event, followed closely by the need to protect property and vital community infrastructure. Flooding imposes significant social and economic costs upon the community. From a planning scheme perspective Council's objectives are to minimise the potential for death or injury and to bolster the overall resilience of the community to flood events by ensuring new development is responsive to the hazard and does not make more complicated the emergency response or recovery phases of a flood event.

The natural hazards, risk and resilience interest in the State Planning Policy (SPP) requires local governments to identify flood hazard areas and undertake a fit-for-purpose risk assessment to identify acceptable and tolerable risk. In addition to the mapping and procedural requirements, the SPP sets out the following policy matters to be incorporated in local planning schemes (of relevance to flood):

- *Development in flood [and other] prone natural hazard areas:*

  (a) avoids the natural hazard area; or

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

- *Development in natural hazard areas:*
  - *(a) supports, and does not hinder disaster management capacity and capabilities*
  - *(b) directly, indirectly and cumulatively avoids an increase in the exposure or severity of the natural hazard and the potential for damage on the site or to other properties*
  - *(c) avoids risks to public safety and the environment from the location of the storage of hazardous materials and the release of these materials as a result of a natural hazard*
  - *(d) maintains or enhances the protective function of landforms and vegetation that can mitigate risks associated with the natural hazard.*
- *Community infrastructure is located and designed to maintain the required level of functionality during and immediately after a natural hazard event.*

The concept of 'tolerability' helps to identify what might be appropriate to manage the flood risk in a particular area. The terms 'acceptable' and 'tolerable' which are used in the SPP are undefined, because the SPP intends that they may be determined in a way that is specific to a particular community. However, guidance in Integrating State Interests in A Planning Scheme Guidance for Local Governments, November 2021 provides the following descriptions:

An ***acceptable risk*** is a risk that is sufficiently low to require no new treatments or actions to reduce the risk as communities can live with this level of risk without further action.

A ***tolerable risk*** is a risk that is low enough to allow the exposure to a natural hazard to continue while at the same time high enough to require new treatments or actions to reduce risk. Communities can live with this level of risk but as much as is reasonably practical should be done to further reduce the risk and may include planning responses for:

- reducing the likelihood of the risk (avoidance), and
- reducing the consequences of the risk (mitigation and hazard management over time).

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

The range of flood risk factors considered in this position paper include flood frequency, flood depth and isolation. This information is used to influence land use planning decisions to ensure new developments are designed and situated away from flood risk areas or take appropriate mitigation measures to ensure risk is appropriate for the intended use of the site.

Once adopted this position paper will inform the drafting of the new planning scheme and, where relevant, Council's subsequent development assessment decisions. It should be noted that the insurance industry typically relies upon its own research to determine insurance risk.

This position paper is based the best available data at the time of writing. It is important to note that flood modelling outputs will change overtime as new data becomes available and is introduced to the modelling process. For example, the current planning scheme depicts the flooding situation as it was understood in 2012. The new planning scheme will be based on flood modelling undertaken during 2020 and 2021 with updated rainfall, terrain and climate change assumptions.

This position paper is one of 13 position papers addressing key aspects of the future land use and development policy for the Gympie region. The paper has been prepared as part of Stage 2 of the Gympie Regional Council Planning Scheme project and is intended to inform the planning scheme drafting process to occur in Stage 3, other position papers to be prepared as Stage 2 are as follows:

- Housing
- Retail and Commercial Development
- Industrial land
- Rural Land
- Open Space and Recreation
- Heritage
- Bruce Highway Upgrade Response Strategy
- Biodiversity Conservation
- Scenic Amenity
- Bushfire
- Coastal Hazards
- Land Stability.

Issue 1: Determining Flood Risk Categories

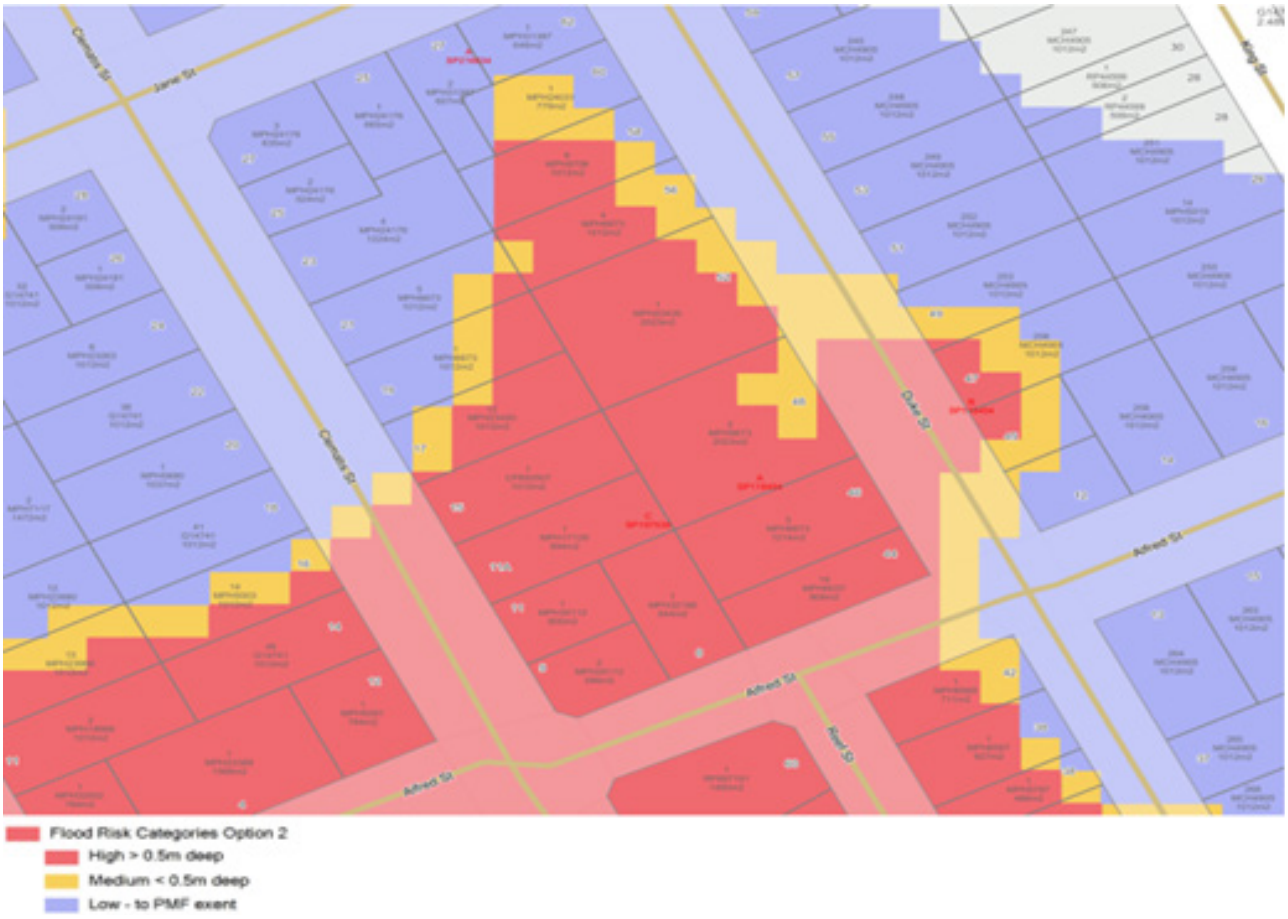
Discussion

- The risk-based planning requirements within the State Planning Policy (SPP), involve a change in practice for both council planners and the private sector.
- To support the new risk-based approach to the planning scheme, flood models were prepared across the Gympie region for a range of flood events up to and including the Probable Maximum Flood (PMF). A PMF is the largest flood that could conceivably occur. Flood modelling simulates flood events in each catchment utilising topographic data, waterway data, land use, and rainfall data. The models also include an allowance for climate change.
- The existing planning scheme relies on the 1% AEP event as the default flood hazard and planning response line. The likelihood of flood risk is expressed as the flood event's Annual Exceedance Probability (AEP). The AEP represents the probability that a given flood level be exceeded in any one year. For example, a 1 in 20 AEP represents a flood level that has a five per cent chance of occurring in any one calendar year. A 1 in 100 AEP represents a flood level that has a 1% chance of occurring in any one calendar year. However, with the 1% AEP flood line, it is hard to be clear on the seriousness of a flood in a risk-based planning sense. For example, the simple delineation of the extent of a 1% AEP flood event gives no indication of how deep or fast moving flood water might be, that is, there is no information as to the level of risk that exists. There is no way to determine whether or not the risk is acceptable, tolerable or intolerable.
- In the new planning scheme, therefore, council will use a new approach based on the 1% AEP and flood depths and will map flood risk categories (see Table 2 below). This means that the new planning scheme will take a risk-based approach and corresponding assessment benchmarks will differentiate between high, medium and low risk locations and risk compatible land uses.
- Flood Risk Category 1 – High Risk (FRC1) refers to those areas located within the 1% AEP flood extent and where floodwater depth at the peak of the 1% AEP flood is greater than 0.5m.
- Flood Risk Category 2 – Medium Risk (FRC2) refers to those areas located within the 1% AEP flood extent and where floodwater depth at the peak of the 1% AEP flood is up to 0.5m.
- Flood Risk Category 3 – Low (FRC3) refers to those areas located below the 1% AEP flood out to the PMF.
- It is important to note that the new approach will ascribe a "low flood risk" to areas sited above the 1% AEP – under the current planning scheme provisions these areas are regarded as being "not affected" by flooding which is misleading. All land out to the extent of the PMF (probable maximum flood) has some exposure to flood risk. It might be a reduced risk but the risk remains, nevertheless.
- The overland flow of stormwater has the potential to cause flooding problems, particularly in urban areas. Overland flow is the movement of stormwater, usually the product of localised rainfall, over the surface of the land. Overland flow differs from flooding in that flooding is concentrated in creeks and waterways, while overland flow is the surface runoff following localised rainfall events, concentrated in lower lying areas and swales.
- It is proposed to include as a risk category overland flow "corridors" where the risk of overland flow is high. This matter is further discussed under Issue 5 of this paper.

- An approach to "Flood Islands" also forms part of the planning schemes response to flood risk. Flood islands are defined as those areas where the access roads are flooded in the 1 in 50 storm event (2% AEP).
- Figure 1 shows land in Duke Street. Figure 2 is an indication of land effected by Flood Risk Category 1 – High Risk (FRC1) which includes those areas located within the 1% AEP flood extent and where floodwater depth at the peak of the 1% AEP flood is higher than 0.5m, land effected by Flood Risk Category 2 – Medium Risk (FRC2) which includes those areas located within the 1% AEP flood extent and where floodwater depth at the peak of the 1% AEP flood is up to 0.5m and Flood Risk Category 3 – Low (FRC3) which refers to those areas located below the 1% AEP flood out to the PMF. Figure 2 illustrates graduation of flood depths and risk across the floodplain.

Figure 1: Existing zoning, Duke Street (Part)

Figure 2: Duke Street (Part), land effected by Flood Risk Categories



Desired outcomes

- The flood risk hazard mapping defines the likely flood risk/hazard.
- Exposure of new development to flood hazard is reduced.

Policy position

- New planning scheme maps and assessment benchmarks move from reliance on the 1% AEP event towards risk-based mapping over the entire flood plain.

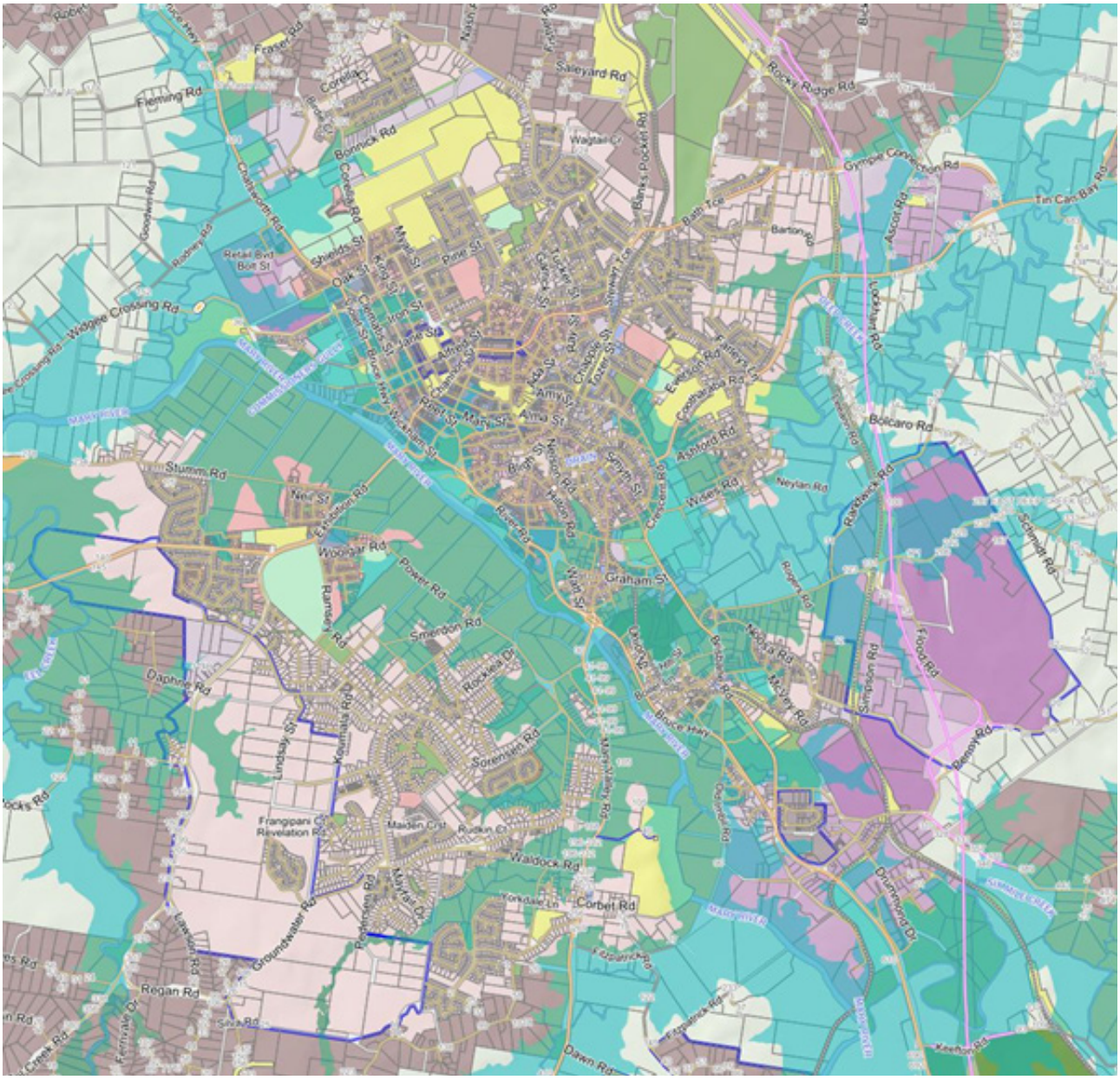
Actions

- Within the framework of the planning scheme review:
  - Develop the planning scheme overlay maps to ensure flood risk and overland flow is mapped.
  - Land is included in flood risk categories as shown in Table 1.
  - Prepare an overlay code to ensure development is responsive to flood risk.

Table 1: Planning scheme flood risk categories and definitions

	Overlay map to include the Flood Risk Categories and Overland Flow, as defined below.				**Not included in the overlay map.** **Defined by the risk that roads to the flood islands are flooded in the 1 in 50 event (2% AEP).**
Flood Risk Category	Flood Risk Category 1 (FRC1)	Flood Risk Category 2 (FRC2)	Flood Risk Category 3 (FRC3)	Overland Flow	Flood Islands: "High" (FH) "Low" (FL)
Risk/impact	High risk. High impact from flooding. Intolerable Risk. People and property at immediate risk with no viable mitigation methods.	Medium risk. Medium impact from flooding. Potentially intolerable. People and property at immediate risk which is not acceptable to community, but can be mitigated to a tolerable level with some effort.	Low risk. Low impact from flooding. Potentially tolerable. Able to be mitigated to acceptable through more detailed investigations or economically viable mitigation methods.	High Risk. High impact from flooding. Intolerable Risk. People and property at immediate risk with no viable mitigation methods.	Can be intolerable, if subject to isolation, and requiring evacuation.
Description	Refers to those areas located within the 1% AEP flood extent and where floodwater depth at the peak of the 1% AEP flood is higher than 0.5m.	Refers to those areas located within the 1% AEP flood extent and where floodwater depth at the peak of the 1% AEP flood is up to 0.5m	Refers to those areas located above the 1% AEP flood extent and below the PMF.	Includes land affected by a depth and velocity of greater than 1.2 m2/s.	"High flood islands": Defined by the risk that roads to the island are flooded in the 1 in 50 event (2% AEP). As flood waters rise, a portion of the flood island remains dry and flood free in a 1 in 2000 event (0.05% AEP). "Low flood islands": Land isolated by a 1 in 50 event (2% AEP). As flood waters rise beyond a 1 in 50 event the entire island and the access to it will be submerged.

Issue 2: Existing and Future Land Use Flood Exposure



Discussion

- The map above, an extract from the current planning scheme, depicts the existing urban area of Gympie with Southside and the industrial areas of Monkland and East Deep Creek.
- The blue overlay is the 1% AEP flood extent as it was mapped in 2012 to inform the current planning scheme. It is clear, even without the updated flood mapping discussed at Issue 1 above that substantial areas of land within the urban precincts of Gympie are impacted by flood hazard.
- Flooding has been a major determinant of the physical form of development – the Mary River, Deep Creek and Six Mile Creek flood plains have divided the urban area into a series of precincts and in times of flooding a series of flood islands.

- There is no doubt that flooding throughout the region in general, and in Gympie in particular, is a significant constraint to development, however, given the amount of land impacted by flooding it is important that the planning scheme response to this hazard is measured and appropriate to the level of risk.
- A measured approach will ensure that areas of high or intolerable risk are avoided whilst areas of lesser risk, where mitigation strategies can be applied, are available to make a contribution to the economy of the region.

Desired outcome

- The planning scheme response to flood hazard is balanced and measured.

Policy position

- Development of high flood risk areas will be avoided. Development will be permitted where risk can be mitigated without adverse impacts upon the performance of the floodplain.

Action

- The new planning scheme be drafted to reflect the above policy position.

Issue 3: Land Use Policy

Discussion

- Set out below is a land use policy response to various levels of flood risk so that it is clearer what level of flood affectation would preclude different forms of development.

Flood Risk Category 1 – High Risk (FRC1)

- Flood Risk Category 1 – High Risk (FRC1) refers to those areas located within the 1% AEP flood extent and where floodwater depth at the peak of the 1% AEP flood is higher than 0.5m.
  - Avoid new residential or rural residential development, avoid any intensification of existing residential use, including rural residential development.
  - Avoid new or any expansion/intensification of industrial activities.
  - Avoid new commercial or retail development.
  - Expansion of existing commercial or retail activity may occur if appropriate hazard mitigation is economically viable and where the use is consistent with the zoning of the subject land.
  - The land is suitable for recreation, however structures should be avoided.
  - The land is suitable for rural use but new dwellings and infrastructure should be avoided.
  - No new vulnerable uses should be established (Refer to issue 4 for definition). Where existing facilities require expansion or modification, there should be no increase of residential, visitor or user capacity or any worsening of the exposure of people to flood risk.
  - New development in high risk flood areas should improve flood resilience and not create any worsening of flood hazard for the subject land or any adjacent land.
  - Essential community infrastructure will be permitted where there is an overriding need and there is no flood free alternative location. (Refer to issue 4 for definition).

Flood Risk Category 2 – Medium Risk (FRC2)

- Flood Risk Category 2 – Medium Risk (FRC2) refers to those areas located within the 1% AEP flood extent and where floodwater depth at the peak of the 1% AEP flood is up to 0.5m.
- New residential development may occur as intended by the zone with no limitation on dwelling yield, provided the subject land can be filled to achieve a level equal to, or above, the 1% AEP level without an adverse impact on the floodplain. The habitable areas of dwellings will be required to achieve a minimum freeboard of 300mm to the 1% AEP flood level.
- The additional habitable floorspace in any expansion of an existing residential use will be required to achieve a 300mm freeboard to the 1% AEP flood level.
- Where consistent with the zoning industrial and commercial or retail development may occur where risk can be mitigated, without an adverse effect on the floodplain.

- The land is suitable for recreation, however structures should be avoided unless the flood risk to the structures can be mitigated without adverse impacts upon the floodplain.
- The land is suitable for rural development where the flood risk to the structures can be mitigated without adverse impacts upon the floodplain.
- No new vulnerable uses should be established (Refer to issue 4 for definition). Where existing facilities require expansion or modification, there should be no increase of residential, visitor or user capacity or any worsening of the exposure of people to flood risk.
- Essential community infrastructure will be permitted where there is an overriding need and there is no flood free alternative location. (Refer to issue 4 for definition).

Flood Risk Category 3 - Low (FRC3)

- Flood Risk Category 3 – Low Medium (FRC3) refers to those areas located above the 1% AEP flood extent and below the PMF.
- It is not proposed to restrict development, other than vulnerable or essential community infrastructure on land within the low flood risk category.

Limited Development Zone (LDZ) and Flood Risk Categories

- The LDZ as mapped under the current planning scheme represents the extent of the 1% AEP on land that would otherwise be zoned rural residential, residential living, character residential, or residential choice. The intent of the LDZ was to clearly exclude any flood prone areas from the residential zones.
- The land use policy settings discussed above will necessitate a change to the application of the LDZ. Under the new planning scheme it is proposed to apply the LDZ to all urban areas that fall within the "high risk" flood category, i.e. to commercial and industrial and in addition to residential land.

Desired outcome

- The planning scheme clearly communicates Council's response to flood hazard.

Policy position

- As set out in the discussion above.

Action

- Drafting of the new planning scheme to reflect the discussion above.

Issue 4: Vulnerable Uses, Essential Community Infrastructure

Discussion

- Vulnerable land uses involve people who require assistance with daily activities or who may be infrequent visitors to an area. Natural hazard events such floods, bushfires or severe storms typically add to the vulnerability of these people. Examples vulnerable uses include childcare centres, community residences, schools, hospitals, residential care facilities, retirement villages, prisons, tourist parks, resorts and rooming accommodation.
- Essential community infrastructure makes up those facilities upon which the community depends on a daily basis; such uses are critical in the recovery phase of a natural disaster event. Essential community infrastructure includes police, fire and ambulance stations, evacuation shelters, power stations, electricity substations, sewage treatment plants, water treatment plants and telecommunications installations.
- The objective from a land use planning perspective is that the exposure to flood risk for both vulnerable land uses and essential community infrastructure is avoided in the first instance and minimised where this is not possible. Accordingly, the new planning scheme will state clearly that any proposal for a new or expanded vulnerable use or essential community infrastructure should only occur on land above the PMF. Where this is not possible, or impractical for service delivery reasons, or in the case of an expansion of an existing facility, a site specific flood hazard risk assessment and an impact assessment development application will be required.
- The issue of flood islands in the context of vulnerable land uses and essential community infrastructure facilities will be discussed at issue 7 of this policy position paper.

Desired outcome

- Vulnerable uses, and essential community infrastructure are not exposed to flood hazard.

Policy position

- As set out above council will seek to ensure that vulnerable land uses and essential community infrastructure are located above the PMF wherever possible.

Action

- Drafting of the new planning scheme reflects the discussion above.

Issue 5: Managing Impacts of Overland Flow

Discussion

- Overland flow is the movement of stormwater, usually the product of localised rainfall, over the surface of the land.
- The difference between flooding and overland flow is that flooding is concentrated in creeks and waterways, while overland flow is the surface runoff following localised rainfall events concentrated in lower lying areas and swales.
- Overland flow can be hazardous because it can involve high velocities and flash flooding, however it is usually of short duration.
- Minor or low risk overland flow paths can often be "engineered out" via the land subdivision and development process with earthworks and piped drainage systems, noting that the engineering design will always have to allow for storm events exceeding the design capacity of piped drainage systems.
- The current planning scheme requires the impacts of the redirection of overland flow paths be considered. Drainage calculations and catchment plans are required demonstrating that proposed works will not compromise established overland flow paths or redirect stormwater flows onto adjoining properties.
- Any obstruction or filling of overland flow paths is likely to result in redirection of stormwater flows. Development within overland flow paths should be avoided unless an appropriate engineering solution is delivered to allow unimpeded conveyance of stormwater. Council may require bank stabilisation/erosion control measures within overland flow paths to be included in development design.
- The risks arising from overland flow are a product of the water's depth and velocity. Council's flood modelling has identified the risk level attributable to identified overland flow paths. Table 3 below sets out the Australian Institute for Disaster Resilience (AIDR) hazard category definitions.
- High risk overland flow has been defined as those areas where the depth and velocity product exceeds 1.0 m2/s. It should be noted however that safety concerns arise even at what is defined as a "moderate hazard". For example, a depth/velocity product of 0.6 m^2/s is regarded as "unsafe for small vehicles".
- It is apparent that the relevant threshold of hazard will vary depending on the nature and usage of the proposed development. As a starting point it is considered reasonable to require that development identified as being within a moderate or higher overland flow hazard area be subject to a more rigorous examination of potential hydraulic impact.
- Development within high hazard areas should be avoided. Where development cannot be avoided the development must include a design solution to demonstrate the risk is mitigated and that there are no adverse hydraulic or environmental impacts.
- The current planning scheme does not identify overland flow paths. The new planning scheme will include an overlay to identify overland flow paths and supported by an overlay code and planning scheme policy provisions.

Table 3: AIDR Hazard Category Definitions

Hazard	Description (as per AIDR)	Depth Velocity Classification	Depth	Hazard Category Benchmark
H1	Generally safe for vehicles.	D*V $\leq$ 0.3m^2/sec	$\leq$ 0.3m	Low hazard
H2	Unsafe for small vehicles.	D*V $\leq$ 0.6m^2/sec	0.3m - 0.5m	Moderate hazard
H3	Unsafe for vehicles, children and the elderly.	D*V $\leq$ 0.6m^2/sec	0.5m - 1.2m	Moderate hazard
H4	Unsafe for vehicles and people.	D*V $\leq$ 1.0m^2/sec	1.2m - 2.0m	High hazard
H5	Unsafe for vehicles and people. All building types vulnerable to structural damage. Some less robust building types vulnerable to failure.	D*V $\leq$ 4.0m^2/sec	2.0m - 4.0m	High hazard
H6	Unsafe for vehicles and people. All building types considered vulnerable to failure.	D*V $\leq$ 4.0m^2/sec	<4.0m	High hazard

Desired outcomes

- Development does not result in storm water/flood water being diverted onto upstream or downstream properties.
- Overland flow paths should be maintained free from encroachments to ensure development does not increase exposure or severity of flood hazard.
- Where practical established overland flow paths are retained in a natural condition to maintain stream ecosystem values.

Policy position

- Overland flow paths are considered in the design of development so as to achieve the above desired outcomes.

Actions

- Within the framework of the planning scheme review:
  - Develop the planning scheme maps to ensure overland flow flood risk is mapped.
  - Prepare subdivision code and policy measures ensuring that subdivision design deals with overland flow ensuring it is not diverted into other properties.

Issue 6: Filling in the Floodplain

Discussion

- Filling of land can be used to raise the level of the land to improve flood immunity. Typically, land is filled to achieve immunity to a specified flood event – to the 1% AEP level for example. The land might still be susceptible to flooding resulting from storm events of a greater magnitude.
- Filling is not without consequences. Filling in flood conveyance areas will result in a diversion of potentially high energy flood waters onto land that might otherwise not be impacted. Similarly filling in flood storage areas reduces the capacity of the defined flood plain to accommodate flood waters. The loss of flood storage can only be made up by the flooding of additional land.
- It is important therefore that filling is balanced with cutting or excavation within the flood plain, particularly in those areas more regularly subject to flooding.
- The current planning scheme aims to limit any alteration to the floodplain that reduces either the conveyance of flood flows or flood storage capacity. In the planning scheme:
  - the current strategic framework aims to ensure filling in floodplains is minimised and natural drainage patterns are retained or restored where practical,
  - there are limits on the amount of filling, and,
  - the Infrastructure and Operational Work Code states:
    "Development is established where the impacts of natural hazards are avoided or safely managed" and "Development directly, indirectly and cumulatively avoids any significant increase in water flow, velocity or flood level and does not increase the potential for flood damage on site or on other properties".
- Under the current planning scheme, filling beyond a certain volume of material needs to be assessed and subject to a hydraulic model demonstrating that the filling can be undertaken without adverse impacts upon the performance of the flood plain. The assessment triggers of the current scheme are at present the subject of an amendment to the planning scheme – Amendment Package 3. Should this amendment package proceed to adoption the scheme will set thresholds of 100m3 and 50m^3 for filling and or excavation (other than for a dam) within the rural and non-rural zones respectively. Earthworks beyond these thresholds will be impact assessable development.

Desired outcome

- Filling of land does not result in adverse impacts on flood conveyance or flood storage.

Policy position

- The new planning scheme will adopt the filling/excavation thresholds proposed under Amendment Package 3 to the current planning scheme.

Action

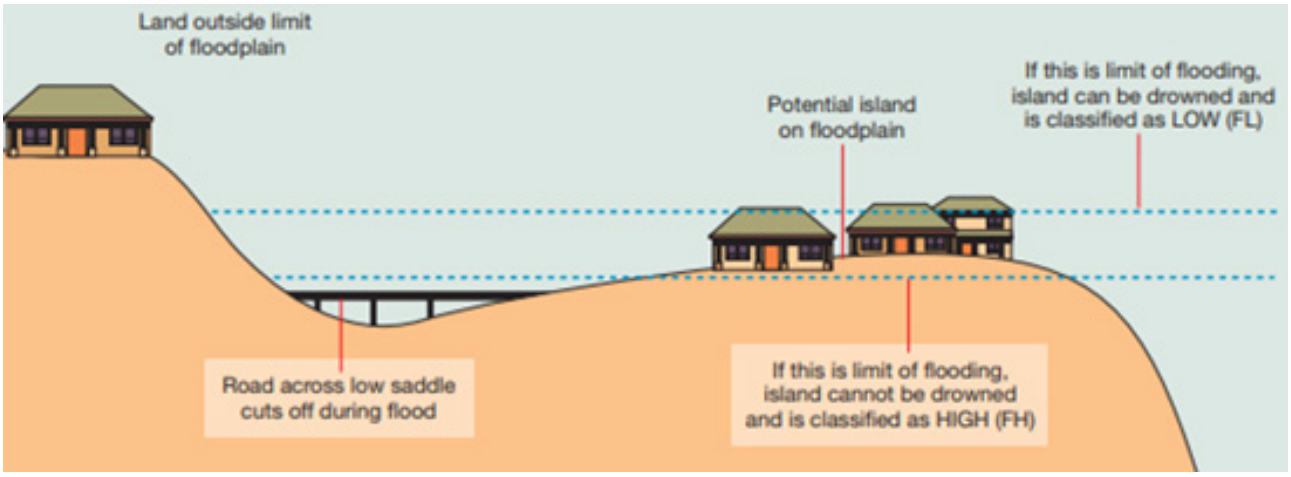
- As discussed above the provisions with respect to filling or excavation proposed under Amendment Package 3, if adopted, are carried forward to the new planning scheme.

Issue 7: Isolation Caused by Flood Waters

Discussion

- Isolation caused by flood waters can be a major problem, as access to food, clean water and critical services can be cut off. The duration of isolation is a determining factor in the severity of the impact of isolation and whether or not the evacuation of isolated people will be required.
- "Flood islands" is a term used to describe areas that can become surrounded by water in a flood event. Council has identified areas that are surrounded by flood water and at risk of isolation using the 1 in 50 storm event as "flood islands".
- Unless the residents of, or visitors to, site within a flood island are sufficiently prepared, they will need to be evacuated should the duration of isolation be more than 24 hours. Isolated people will have no external access to fresh food or water, no electrical power or reticulated water and sewerage – these challenges are further compounded in the case of elderly or vulnerable residents where access to care services will also be cut.
- Council has defined two types of flood islands – low flood islands and high flood islands.
- Low flood islands are those areas that will become isolated by reason of the access roads to them being cut by floodwaters in a 1 in 50 storm event (2% AEP). Should floodwaters continue to rise higher than the 1 in 50 event, the entire island may be submerged.
- High flood islands are those areas where the roads to the area are beginning to flood in the 1 in 50 event (2% AEP) but some roads are still trafficable allowing residents to self evacuate by road. Should floodwaters continue to rise above the 1 in 50 event (2% AEP) some parts of the flood island will remain flood free up to an including the 1 in 2000 (0.05%AEP) allowing time for the most appropriate emergency response plan to be formulated.
- The policy settings discussed under Issues 3, 4 and 5 above suggest that it is reasonable to expect that no new urban development will occur on the low flood islands. There is however a significant number of existing developed properties directly impacted by the 2% AEP (1 in 50) flood levels or are located such that they would be isolated by a 2% AEP event. Properties within some of the high flood islands may have flood immunity well beyond the 2% AEP event, however the flood immunity of the access roads they depend on might be much lower.
- The objective of the new planning scheme will be to avoid increasing the number of people isolated on flood islands so as not to complicate the flood emergency response. In this regard no development likely to increase resident or visitor numbers should occur on low flood islands and no vulnerable development should occur on high flood islands.

Figure 3. Flood Islands



Desired outcome

- Development does not result in an increase in the number of people needing to be evacuated from flood islands.

Policy position

- Development likely to increase resident or visitor numbers should not occur on low flood islands and no vulnerable development should occur on high flood islands.

Action

- The new planning scheme be drafted to reflect the above discussion.