



BEAUFORT LOCAL FLOODPLAIN DEVELOPMENT PLAN

Adopted by the Pyrenees Shire Council on [insert date]

**Incorporated into the Pyrenees Planning Scheme
(pursuant to Clause 81)**

August 2012

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1.0 Application

This Local Floodplain Development Plan applies to that part of the floodplain of Yam Holes Creek located north and west of Beaufort Township, and to the floodplains of the tributary local streams within the township-proper (including Cemetery Creek, Cumberland Creek, and Ding Dong Creek). These floodplain areas are within either the Urban Floodway Zone, the Floodway Overlay, or the Land Subject to Inundation Overlay of the Pyrenees Planning Scheme.

These floodplain areas and the extent to which the above controls apply to them are shown on the attached plan.

This Local Floodplain Development Plan has been prepared to provide a performance-based approach to decision making, that reflects local issues and best-practice in floodplain management. It is incorporated in the Pyrenees Planning scheme (pursuant to Clause 81) and must therefore be applied to the assessment of all land use and development proposals that require consent under the Planning Scheme.

2.0 Floodplain Characteristics

Beaufort township is situated within a circle of hills, at the confluence of Ding Dong, Cemetery, Cumberland, and Yam Holes Creeks.

Yam Holes Creek is the main waterway in this system, which rises approximately 9 kilometres north of the township and bypasses the main urban area on its northern edge before discharging into Mount Emu Creek approximately 10 kilometres further to the east. Upstream from Beaufort it has a larger catchment area of approximately 27 square kilometres.

The Ding Dong, Cemetery, and Cumberland Creeks are all tributaries of Yam Holes Creek, and flow from south to north through the town (each having its own confluence with Yam Holes Creek). The catchment areas of these tributaries are relatively small with a combined area of approximately 21.8 square kilometres.

The Beaufort to Ararat railway line (travelling east to west) is located to the south of Yam Holes Creek, and therefore crosses all three tributary streams. The railway line is on an elevated embankment in the vicinity of the Cemetery and Cumberland Creeks crossings. Whilst this embankment assists in containing the southern edge of the Yam Holes Creek floodplain, the culverts provided for the local creek crossings are under-

sized, and serve to obstruct local drainage discharges from the township during major storm events. This causes serious flash flooding conditions within the well-defined valley floors – most of which are within the established urban area.

3.0 Floodplain Modelling Studies

As flooding events in the township occur mainly during and immediately following severe storm events (i.e. high intensity and short duration), only limited records of flooding conditions have been available for hydraulic modelling purposes.

In the 1970's the then-local Council and State Rivers and Water Supply Commission undertook preliminary studies for the purpose of defining probable floodplain boundaries in a number of townships (including Beaufort). The information derived from these studies was used in the preparation of the Pyrenees Planning Scheme (approved in November 1988) to formulate a broad-based Design and Development Overlay control for township areas which were either known or reasonably suspected to be subject to flooding or drainage problems.

In 2007, the Glenelg Hopkins Catchment Management Authority (“GHCMA”) and the Pyrenees Shire Council jointly funded the execution of a detailed floodplain study for Beaufort and its immediate environs. Water Technology Pty Ltd was commissioned to undertake the study, and presented its final report in June 2008.

As part of the Study, a hydraulic model was developed to investigate the extent of flooding, flood height and flood water velocities in Beaufort for a range of flooding scenarios – but with the 100-year Average Recurrence Interval (“ARI”) (i.e. probable 1 in 100 year) flood event being adopted for design and regulatory purposes, in accordance with standard procedure.

Council commissioned Water Technology to prepare the Beaufort Floodplain Management Plan following adoption of the 2008 Flood Study report. The Floodplain Management Plan assessed flood mitigation options and in particular, the effect of increasing the capacity of the railway bridge and culverts.

In the interim, the flood levels determined by the Flood Study were formally declared by the Glenelg Hopkins Catchment Management Authority on 17 June 2010, in accordance with Section 203 of the Water Act 1989.

The 2008 Flood Study mapping is high quality. The flood extents and depths predicted by the Flood Study closely matched those observed in the township during the 1 in 100 year flood event that occurred in January 2011.

The Floodplain Management Plan report was finalised in May 2011.

4.0 Flood Mitigation Initiatives

In June 2012, the Victorian State Government committed substantial funding assistance to provide for an upgrading of the railway culverts which provide conduit for Cemetery Creek and Cumberland Creek. These works are designed to provide for a more efficient passage of floodwater from the township area, and thus to reduce the extent and severity of flooding incidents within certain areas of the township. They are to be implemented in the short-term.

Planning Scheme controls for the floodplain areas of the township and its environs are therefore based on the original 2008 Flood Study modelling results for the 100-year ARI flood event, with subsequent adjustments that take account of the benefits that will result from the culvert upgrade works.

5.0 Basis of the New Planning Controls

The floodplain management planning controls introduced in Amendment C31 to the Pyrenees Planning Scheme are derived from the above studies. The nature of these controls is as follows:

- (a) The Urban Floodway Zone (“UFZ”) is applied to that section of Cemetery Creek immediately downstream from the dam wall of the Beaufort Lake. This is an area where there is no formal stream Reserve, and in which extreme hazards are posed to life and property during major flooding events.
- (b) The Floodway Overlay (“FO”) is applied to active floodplains and flood fringe areas where flood waters are either deep, or of such a velocity as to pose a significant risk to public safety.
- (c) The Land Subject to Inundation Overlay (“LSIO”) is applied to remaining floodplain areas as a means of regulating new development in a way that reduces risks of property damage.

These new controls replace the original Design and Development Overlay controls.

6.0 Application Requirements

6.1 Every Application for primary or secondary consent to construct a building, to carry out work, or to subdivide land under Clause 37.03 (UFZ), Clause 44.03 (FO), or Clause 44.04 (LSIO) of the Pyrenees Planning Scheme must be consistent with this Local Floodplain Development Plan.

6.2 All applications must be accompanied by plans and supporting documents that contain, to the extent that in the opinion of the responsible authority is relevant, the following information:

- (a) The boundaries, dimensions, orientation, and slope of the site.
- (b) The use of surrounding properties and buildings.
- (c) Adjoining roads, internal driveways, and access tracks.
- (d) Relevant existing and proposed ground levels of the site, to Australian Height Datum, and the difference in levels between the site and surrounding properties.
- (e) Notable features or characteristics of the site.
- (f) Location, layout, size and use of existing buildings and works on the site and on surrounding properties, and existing non-functional site features (excluding landscaping).
- (g) In proposals involving cut-and-fill earthworks, plans showing as appropriate, all fill and borrow areas, depths of cut and height of fill, and calculations showing the net effect of the development on the depth and velocity of flood waters on adjacent properties during a 100-year ARI flood event.
- (h) Floor levels of all existing and proposed buildings on the site, to Australian Height Datum.
- (i) Elevations of all proposed buildings
- (j) The layout and dimensions of all proposed development.
- (k) The layout and relevant provisions of any proposed subdivision, including a plan indicating the location of existing buildings.
- (l) Construction details of all proposed fences, works and driveways.

- (m) Details of existing and proposed internal driveways and pathways and their height in relation to the nominated flood level for the site.

7.0 General Development Requirements

The following provisions apply to all land in the Zone and Overlays affected by this Floodplain Development Plan.

7.1 Fencing

- (a) Other than on land in an LSIO, a fence (of any type) may not be constructed so that it directly crosses a primary drainage line.
- (b) Fencing should be designed and constructed to respond to the likely effects of flooding and inundation. Fences should allow for the passage of floodwater, and not divert the flow of floodwater. Fences should not act as a partial or continuous barrier to the floodwaters or trap debris in floodwaters.
- (c) When considering an application for a fence in the floodplain, the Responsible Authority will give consideration to flood depth and flow velocity, as appropriate.
- (d) The following fencing types are generally satisfactory in all areas:
 - Flood proof (drop) fencing designed to collapse automatically under the pressure of floodwaters, without causing damage to the fence. Once the floodwaters have receded it may be simply re-erected. Use of wire mesh or wire grid is acceptable.
 - Post & Wire (single strand – wide spacing), post spacing no less than 3 metres apart, single wires spaced no more than one horizontal strand per 200 millimetres.
- (e) The following fencing types are generally satisfactory in LSIO areas:
 - Post & Wire (single strand narrow spacing), post spacing no less than 2 metres apart, single wires spaced no more than one horizontal strand per 150 millimetres.
 - Single Rail or Post & Rail, post spacing no less than 3 metres apart, rails no more than 150 millimetres wide, rails spaced no less than 200 millimetres apart, bottom rail no less than 150 millimetres off the ground.

- Timber cross, minimum 3 metre post spacing, minimum 150 millimetre clearance off the ground.
- Tubular Steel, vertical or horizontal rails spaced no less than 150 millimetres apart, bottom rail no less than 150 millimetres off the ground.
- Double railing or double paling, vertical or horizontal rails or palings alternating on both sides of the posts/stringers, 150 millimetres maximum width of rails or palings, minimum 200 millimetres spacing between alternate rails or palings, minimum 150 millimetre clearance off the ground.
- Paling, picket, and gap brick, minimum of 50 millimetres spacing between pickets or palings, pickets or palings spaced a minimum 150 millimetres clearance off the ground, minimum of 2200 millimetres between brick piers, minimum of every third brick omitted per course.

7.2 Buildings and Works

On land within either an FO or an LSIO, buildings and works should meet the following measures and standards, to the extent that in the opinion of the Responsible Authority is practicable and reasonable to do so:

- (a) Be located on the highest available natural ground, but in any event be on land which in its existing condition has a 100-year ARI flood depth less than 500 millimetres.
- (b) Be aligned with their longitudinal axis parallel to the predicted predominant direction of flood flow.
- (c) Include flood-proofing measures that minimise the effects of flooding on the building structure and its contents (e.g. the use of water resistant building materials for footings, and floors).
- (d) Limit the size of building (fill) pads to as near as practical to the building exterior.
- (e) Have foundation and footing systems that are compatible with the type of flood risk (i.e. using post-and-bearer construction techniques).
- (f) Maximise permeable surfaces to minimise run-off.
- (g) In the construction of a swimming pool, dam or other depression, excavated material must be removed from the flood prone area and there must be no

increase in the surface level of land surrounding such features (including any embankments or retaining walls).

- (h) On active floodplains, provide offset earthwork excavation as compensatory storage for intrusions caused by new buildings and works.
- (i) Cut and fill works may be undertaken only where a balanced outcome in terms of flood plain storage capacity will be achieved. All such works must be designed to accord with “Guidelines for Floodplain Cut and Fill within the Glenelg Hopkins CMA Region” (Glenelg Hopkins CMA, July 2008).

7.3 Subdivision

- (a) Subdivision applications for land that is partly within an LSIO or an FO, must not create lots with land wholly in the Overlay areas, unless it can be demonstrated that:-
 - There is an adequate building envelope on each lot (which must be formally defined) where the inundation depth is determined to be less than 500 millimetres.
 - Access to the building envelope does not traverse land where the inundation depth is determined to be more than 500 millimetres.
- (b) Each new lot must be comprised of contiguous parcels of land.
- (c) Neither the building envelope or the defined access route to it may be subject to a hazard rating (the product of depth (in metres) and velocity of flow (in metres per second) of floodwaters) of no more than 0.4 square metres per second.

7.4 Chemical Storage

Containers to be used for the storage of chemicals should be kept at a height of at least 1.0 metre above the 100-year ARI flood level.

7.5 Water Tanks

- (a) Water tanks should ideally be located outside of the relevant Overlay area, or raised above the 100-year ARI flood level. If located in the Overlay area:-
 - Water tanks should not be located in a continual line – i.e. water tanks should allow for the movement of water around them.
 - Fill/pads should be restricted to the footprint of the water tank.

- Tanks over 4,500 litres in capacity within the FO should be located where they will pose a minimal impact on the free conveyance of floodwaters.
- (b) Within the FO water tanks should be installed on post-and bearer tank stands and above the 100-year ARI flood level.

8.0 Development Requirements for Land in the UFZ

8.1 Buildings

- (a) A new building should be aligned with its longitudinal axis parallel to the predicted dominant direction of flow.
- (b) A dwelling may be constructed on land in this zone, only if it is to replace a dwelling which has an existing use right, and will not (in the opinion of the responsible authority) pose an unacceptable threat to:
- the orderly flow of flood waters across the subject land and either upstream or downstream land.
 - the safety of persons who are resident on the land (having regard to flood depth, the velocity of flood waters, and the means of access available to the dwelling from non-flood prone land).

Any such dwelling must have its lowest floor level set at least 300 millimetres above the 100-year ARI flood level, or any other level that may have been specifically prescribed for that site by the responsible authority (having regard to relevant flood risk reduction considerations).

- (c) If not more than 50% of an existing building (including a non-habitable out-building) has been damaged or destroyed, the construction of a replacement ground floor area may be up to 20 square metres greater than the damaged or destroyed ground floor area of the original building, and may have a floor level which matches that of the existing building.
- (d) An existing dwelling may be extended provided that the floor area of the extension does not exceed 40 square metres, and the floor level of the extension is set at least 300 millimetres above the 100-year ARI flood level. If however, the floor level of the existing dwelling is below that level, an extension with a floor

area of up to 20 square metres may be constructed with a floor level matching that of the existing building.

- (e) Unless other-wise approved by the Responsible Authority, all new dwellings or dwelling extensions must be founded using post-and-bearer construction techniques.

8.2 Works

- (a) New earthworks must not obstruct normal flow paths or drainage lines on land within the zone.
- (b) Land may not be re-levelled so as to create a difference to the natural topography of more than 250 millimetres for cut and/or fill works.

9.0 **Development Requirements for land within either an FO, or an LSIO**

9.1 Development Requirements in the Residential 1 Zone, Business 2 Zone, Industrial 2 Zone, Public Use Zone, and Public Park and Recreation Zone

(a) New Dwellings

- The floor level of a new dwelling must be set at least 300 millimetres above the 100-year ARI flood level or any higher level set by the responsible authority.
- The site for the new dwelling should be at a level that is no more than 0.5 metre below the 100-Year ARI flood level. The finished surface level along the defined access route to a new dwelling site should preferably be above the 100-year ARI flood level, but in any event be no more than 0.5 metre below that level and subject to a hazard rating (the product of depth (in metres) and velocity of flow (in metres per second) of floodwaters) of no more than 0.4 square metres per second.
- A permit may be granted if, in the opinion of the responsible authority, the above requirements cannot be reasonably met. Any application in this regard within the FO must be accompanied by a flood risk report prepared by a suitably qualified person, which can demonstrate to the satisfaction of the responsible authority that the proposal will not pose an unacceptable flood risk to the life, health, or safety of the occupants of the dwelling, having regard to:-

- The frequency, duration, extent, depth and velocity of flooding of the site and accessway.
- The flood warning time available.
- Any potential increase the level of flood impact on neighbouring properties.
- The danger to the occupants of the development, other floodplain residents and emergency personnel if the site or accessway is flooded.

(b) Dwelling Extensions

The floor level of the extension must be set at least 300 millimetres above the 100-year ARI flood level except that, if an existing dwelling has a ground floor level below the nominated flood protection level (i.e. 300 millimetres above the 100-year ARI flood level), it may be extended, provided that:

- Within the LSIO, not more than 40 square metres of the extended floor area is below the nominated flood protection level.
- Within the FO, not more than 20 square metres of the extended floor area is below the nominated flood protection level.
- Water resistant materials are used in the construction of those portions of the building that are below the nominated flood protection level.
- Only one permit for the extension of the dwelling may be granted under this provision. The responsible authority may require the landowner to give a Formal undertaking to this effect by way of an agreement under Section 173 of the Planning and Environment Act 1987.

(c) Industrial, Retail, or Office Buildings

- The floor levels of new industrial, retail or office buildings (including replacement buildings), must be set as follows:
 - at least 300 millimetres above the 100-year ARI flood level for retail buildings, office buildings, and office and associated administration areas in industrial buildings.

- At least 150 millimetres above the 100-year ARI flood level for all other types and components of industrial buildings.
- The responsible authority may consent to a reduction in the above nominated flood protection levels however, if the applicant can demonstrate to the satisfaction of the responsible authority and the floodplain management authority that this requirement is either unreasonable or cannot be practically achieved. A written design response statement must accompany the application to justify a proposed floor level below the nominated flood protection level. Where relevant, the design response statement must include:
 - the relationship of the proposed building flood level to the floor levels of adjoining buildings, access-ways (vehicle and pedestrian) and street footpaths levels.
 - plans and elevation drawings of the building and surrounding areas showing maximum allowable ramping grades to meet relevant Australian Standards and Building Regulation and Codes, which achieve the highest possible floor level.
 - plans showing and specifying flood proofing arrangements up to the nominated flood protection level for retail or office buildings.
 - plans showing and specifying that electrical fittings are to be located above the nominated flood protection level.
 - plans showing adequate storage capacity for valuable goods and hazardous materials above the nominated flood protection level.
 - a flood response action plan which sets out procedures and actions to minimise flood damage, risk to occupants, and demands on emergency services.
- In deciding to grant a permit for a development which has a floor level below the nominated flood protection level, the responsible authority may require the landowner to enter into an agreement under Section 173 of the Planning and Environment Act 1987 which gives effect to any arrangements or undertakings that result from the design response statement and its assessment, and which indemnifies the Responsible Authority and any relevant referral authority against claims for liability in respect of costs or losses incurred or suffered as a result of future flood inundation.

(d) Out-buildings and Sheds

- The floor level of a non-habitable out-building or non-industrial shed should be set not more than 150 millimetres above existing ground level, unless the responsible authority is satisfied that a higher level may be established, where the land is in a flood fringe area and the proposed development (including access provision) will not reasonably impact on flood storage and conveyance.

9.2 Development Requirements in the Low Density Residential Zone, Rural Living Zone, and Farming Zone

(a) New Dwellings (including replacement dwellings on or in the near vicinity of an existing dwelling site)

- The site for a new dwelling should be at a level that is no more than 0.5 metre below the 100-Year ARI flood level. The finished surface level along the defined access route to a new dwelling site should be no more than 0.5 metre below the 100-year ARI flood level, and subject to a hazard rating (the product of depth (in metres) and velocity of flow (in metres per second) of floodwaters) of no more than 0.4 square metres per second.
- The construction of any new dwelling, including a replacement dwelling must be sited on the highest available ground unless the applicant can demonstrate to the satisfaction of the responsible authority and floodplain management authority that an alternative site is more suitable.
- The floor level of a new dwelling must be set at least 300 millimetres above the 100-year ARI flood level, or any higher level set by the responsible authority.

(b) Dwelling Extensions

The floor level of all habitable space in a proposed extension to an existing dwelling must be set at least 300 millimetres above the 100-year ARI flood level.

(c) Out-buildings and Sheds

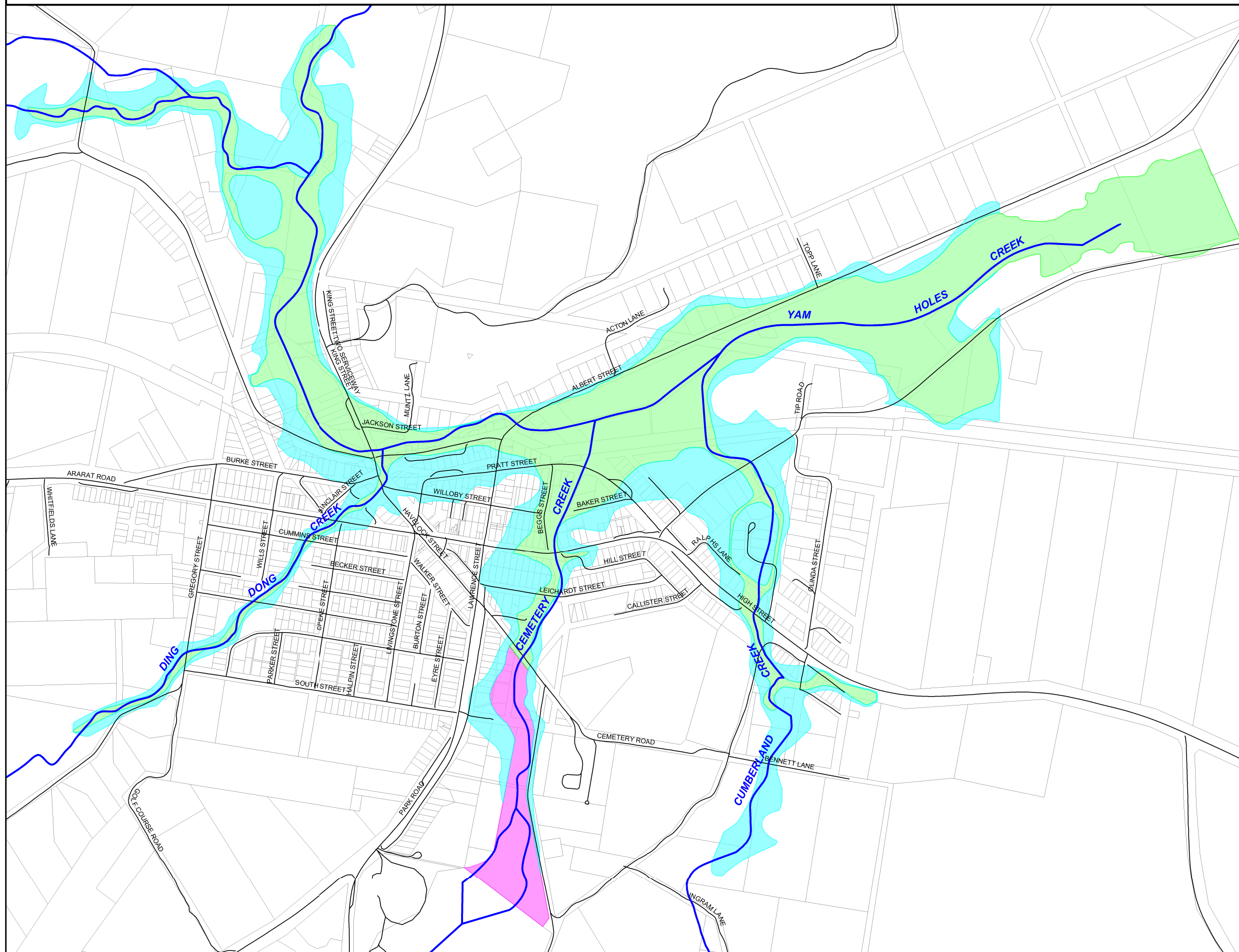
- The construction of any new non-habitable building must be sited on the highest available ground unless the applicant can demonstrate to the satisfaction of the responsible authority and floodplain management authority that an alternative site is more suitable.

- Any non-habitable building must be aligned so that its longitudinal axis is parallel to the predicted direction of flood flow.
- Sheds or outbuildings with enclosed sides and doorways/entries should be constructed with a floor level at least 150 millimetres above the 100-Year ARI flood level.

(d) Works

- Earthworks must not obstruct natural flow paths or drainage lines on land located within the overlay or exacerbate the likely flooding effects on adjoining land.
- Any earthen land fill at the site of a new or extended building should protrude no more than 2 metres beyond the building footprint.
- Any works that are designed to protect the immediate surrounds of existing habitable dwellings, where the floor level is below the 100-year ARI flood level, may not enclose an area of more than 1,000 square metres (including the footprint area of works).

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Proposed Zone:

Urban Floodway Zone



Proposed Overlays:

Floodway Overlay



Land Subject to Inundation
Overlay



Creeks

Revision: 11
Plan No: 1
Date: 07/09/2012
Prepared By: Geoff Pearce
Contact: Chris Hall
Contact No: (03) 5349 1100

Metadata:
Zone and Overlay boundaries are based on
Max_100y-Design_02.TAB dataset representing
flooding in a 1 in 100 year ARI event.
Dataset provided by Water Technology Pty Ltd.



0 0.24 0.48 0.72

Kilometres

Scale: 1:12,000 at A3