



## Part 7 Codes

### Division 3 Constraint Codes

#### Chapter 8 Flood Affected Areas

##### 1.0 Purpose

To ensure that, where premises within flood affected areas are to be developed, adequate measures are taken to:

- ensure that the development does not cause, or have the cumulative potential to cause, real damage (as defined below);
- provide standards for development in these areas that will ensure that the runoff from land and/or premises does not create any adverse environmental impacts.

Key objectives include:

- a) avoiding, if practicable, or otherwise lessening, the adverse impacts of flooding;
- b) maintaining or improving the City's counter disaster response efforts during a flood emergency;
- c) equitably sharing development constraints and development potential within a single river catchment and its sub catchments;
- d) equitably sharing the costs and benefits of flood mitigation infrastructure within a river catchment and its sub-catchments;
- e) protecting the flood storage function of the City's flood plains;
- f) protecting the flood discharge capacity of the City's rivers, streams and canals;
- g) achieving and maintaining a best practice approach to flood plain management;
- h) protecting ocean beaches and the shores and banks of estuaries, lakes, canals, rivers, streams and other waterbodies from erosion.

This code seeks to manage the effects of flooding on flood prone land, where it relates to new and existing development, infrastructure and ecosystems, by requiring:

- certified engineering hydraulic management plans or studies;
- specific design criteria for certain types of land uses.

All such proposals for development will be fully evaluated against the following criteria:

- real damage: whether the development is likely to cause damage that would adversely affect land and/or premises to an extent likely to be actionable;
- cumulative impact: whether the cumulative impact of development is likely to cause real damage;
- flood hazard: whether the development is likely to cause or worsen flood hazard;
- risks: whether the risks associated with the development are fully known, quantifiable and capable of being dealt with to Council's satisfaction, without any uncertainties; and
- flood mitigation: whether flood mitigation works, intended to reduce flood risk, hazard and damage, do so without adversely impacting upon other land and/or premises.

##### 2.0 Application

2.1 This code applies to development that is indicated as self, code or impact assessable in the Table of Development to the domain or Local Area Plan (LAP) within which the development is proposed. In particular, this code applies to any site that is located within a Flood Affected Area\*, defined as follows:

- flood prone land; or
- premises where access would be adversely affected during a range of floods, up to and including the designated flood.

\*Refer to **Overlay Map OM17 – Natural Hazard (Flood) Management Areas** sheets 1-35.

2.2 This code does not apply to Class 1 or Class 10 buildings as defined in the **Building Code of Australia**, except where Council has declared an area to be flood liable under **Section 53** of the **Queensland Building Regulations**. However, this code provides recommendations for minimum floor levels for Class 1 and Class 10 buildings within flood prone land.



- 2.3 Note that where Operational Work is being undertaken within flood affected areas that results in a disturbance to the surface of the land, **Specific Development Code 11 – Changes to Ground Level and Creation of New Waterbodies** and **Constraint Code 14 – Sediment and Erosion Control** are also relevant.
- 2.4 Performance Criteria PC1-PC14 apply to all code and impact assessable development subject to this code. For development identified as self assessable in the relevant domain or LAP, only the acceptable solutions to Performance Criteria PC1-PC4 apply.

### 3.0 Development Requirements

Performance Criteria	Acceptable Solutions
<b>Development that is Self Assessable, Code Assessable or Impact Assessable</b>	
<b>Flood Storage</b>	
<p>PC1</p> <p>All development activity conducted on land below the designated flood level must not detrimentally affect the flood storage capacity of the catchment and the drainage regime.</p>	<p>AS1</p> <p>The flood storage volume on the site is maintained up to the Designated Flood Level.</p> <p><b>Note:</b> <i>The Designated Flood Level can be obtained from Council's Flood Search.</i></p>
<b>Building Floor Levels</b>	
<p>PC2</p> <p>Building floor levels of habitable rooms must be raised to provide an allowance for the hydraulic gradient above the main floodway, so as to meet the requirements of the Standard Building Regulation and <b>Building Code of Australia</b>.</p> <p><b>Note:</b> <i>Performance criteria for setting building floor levels are set out in the Standard Building Regulation and Building Code of Australia. However, it should be noted that Designated Flood Levels provided by Council relate to mainstream flood flow paths and do not include allowances for the hydraulic gradients from residential areas to the main floodway.</i></p>	<p>AS2.1.1</p> <p>An allowance of at least 300mm is added to the Designated Flood Level for habitable rooms, or other allowance amount specified in a Local Area Plan.</p> <p>OR</p> <p>AS2.1.2</p> <p>Damaged residential buildings are reconstructed to have a Design Floor Level at or above the level that existed prior to the building's damage, provided that the building work is limited to reinstatement.</p> <p>AS2.2</p> <p>Where the building has been destroyed by flood, the reconstructed floor level accords with <b>AS2.1.1</b>.</p>
<p>PC3</p> <p>Building floor levels of garages and non habitable rooms must be constructed at a height that reflects an acceptable flood risk for their purpose.</p> <p><b>Note:</b> <i>PC3 does not apply to:</i></p> <ol style="list-style-type: none"> <li>a) <i>extensions to existing buildings;</i></li> <li>b) <i>structures detached from a dwelling, for which the use is ancillary to that of a dwelling, provided that use is not listed in column 1 of Table to Acceptable Solution AS7.1.</i></li> </ol>	<p>AS3.1</p> <p>Building floor levels of garages and non habitable rooms, constructed at approximately the same level as, and attached to, the main dwelling, is constructed at a height above the Designated Flood Level, except where the dwelling has a suspended floor, constructed one metre or more above ground, or where the building is to be constructed within a Rural Domain.</p> <p>AS3.2</p> <p>Non-habitable rooms and garages, detached from the fabric but within the curtilage of a building, that are not for the storage of goods are constructed above or below the Designated Flood Level.</p>
<b>Overland Flow</b>	
<p>PC4</p> <p>Building work must not provide obstructions to the free passage of stormwater through a property.</p>	<p>AS4</p> <p>Overland flowing stormwater is allowed free passage between the street and any waterway at the rear of the property, in accordance with the provisions of the <b>Building Code of Australia</b>.</p>



Performance Criteria	Acceptable Solutions
<b>Development that is Code Assessable or Impact Assessable</b>	
<b>Flooding Risk</b>	
<p>PC5</p> <p>Development in flood affected areas must not cause, or have the cumulative potential to cause, real damage, must not increase the level of risk to life, or be to the detriment of flood evacuation procedures.</p>	<p>AS5</p> <p>Development does not:</p> <ol style="list-style-type: none"> <li>a) increase the number of people calculated to be at risk from flooding;</li> <li>b) increase the number of people likely to need evacuation;</li> <li>c) shorten flood warning times;</li> <li>d) impact on the ability of traffic to use evacuation routes, or unreasonably increase traffic volumes on evacuation routes, or as identified within Council's Counter Disaster Plan (flooding);</li> <li>e) place additional burdens on Council's resources or emergency services;</li> <li>f) increase the duration of flooding, unless that increase is part of a Council approved flood mitigation strategy.</li> </ol>
<b>Flood Storage and Conveyance</b>	
<p>PC6</p> <p>Development with plans for earthworks in a floodplain on or over a water body or within a flood affected area below the Designated Flood Level must allow for the maintenance of flood storage, and flood conveyance of flood and drainage channels and overland flow paths.</p>	<p>AS6.1</p> <p>Provide flood storage calculations that demonstrate that flood storage volume, over the site below the Designated Flood Level, is maintained or increased.</p> <p>AS6.2</p> <p>A certified hydraulic study (and, if necessary, a hydrologic study) is prepared by a suitably qualified and experienced engineer to investigate the hydraulic characteristics of both the undeveloped and developed site and make comparisons between them. Proposed developments in, on or over a water body, or within a flood affected area, must be tested for:</p> <ol style="list-style-type: none"> <li>a) the 50%, 20%, 10%, 5%, 2% and 1% Annual Exceedance Probability (AEP) for local flood events;</li> <li>b) the 5%, 2%, and 1% AEP floods and the designated flood and design flood AEP (as specified in <b>Table to Acceptable Solution AS7.1</b>) for riverine flood events,</li> <li>c) any resultant afflux or increase in flood velocities sufficient to cause real damage to premises. The Assessment Manager may also require the development to be assessed against rarer floods.</li> </ol> <p>AS6.3</p> <p>The Assessment Manager may decide that a hydraulic and/or hydrological study is not necessary if in the Assessment Manager's opinion:</p> <ol style="list-style-type: none"> <li>a) a relevant study, that is not outdated, demonstrates there are no significant flooding impacts that were not covered in the relevant study; or</li> <li>b) the flooding impact of the approval, in relation to the development, is minor,</li> <li>c) in which event the Assessment Manager must provide a written notice to that effect to the applicant.</li> </ol>



Performance Criteria	Acceptable Solutions
<b>Development for Certain Purposes</b>	
<p>PC7 Development listed in <b>Table to Acceptable Solution AS7.1</b> must allow for flood events and be constructed at a level above most floods.</p>	<p>AS7.1 Development is designed for the Design Flood AEP, as specified in <b>Table to Acceptable Solution AS7.1</b>. <b>Note:</b> <i>The designated flood level for residential buildings in general is a 1% flood level except for:</i></p> <ul style="list-style-type: none"> <li>a) <i>Broadwater – the 1% AEP storm surge level, plus an allowance of 0.27 metres, to account for sea level rise resulting from climate change;</i></li> <li>b) <i>Logan and Albert Rivers – the designated flood is based, in part, on rainfall that occurred during the January 1974 flood and assumptions made regarding the ultimate level of development, in accordance with the relevant local planning instruments; and</i></li> <li>c) <i>Historical flood level is the only information available to be specified designated flood level.</i></li> </ul> <p>AS7.2 Development is constructed at or above the Design Flood Reclamation Level, shown in the <b>Table to Acceptable Solution AS7.1</b>, where the Designated Flood is the 1% AEP flood event, except as follows:</p> <ul style="list-style-type: none"> <li>a) Broadwater: the 1% AEP storm surge level, plus an allowance of 0.27 metres, to account for sea level rise resulting from climate change;</li> <li>b) Logan and Albert Rivers: the designated flood is based, in part, on rainfall that occurred during the January 1974 flood and assumptions made regarding the ultimate level of development, in accordance with the relevant local planning instruments; and</li> <li>c) Coomera River: the designated flood is based on the modelled 1% AEP flood event or historic levels, whichever is the higher.</li> </ul>
<p>PC8 Development must consider hydrologic and hydraulic impacts of development in flood affected areas with regard to future climate change.</p>	<p>AS8 No acceptable solution provided. <b>Note:</b> <i>As part of a Hydrologic and hydraulic impact assessment, investigation has been undertaken to determine the impacts of future climate change. The findings of the investigation may be used to modify modelling parameters and boundary conditions used in modelling the hydrologic and hydraulic impacts of development in flood affected areas.</i></p>

**Table to Acceptable Solution AS7.1**

Land Use	Design Flood
Disaster management facilities	0.2% AEP
Hospitals	0.2% AEP
Major electrical switchyards, power stations, water treatment plants	0.2% AEP
Fire/police stations	0.5% AEP
Places of refuge	0.5% AEP
Electricity substations	0.5% AEP
Sewage treatment plants	0.5% AEP



Land Use	Design Flood
Homes for the aged, hospice	0.5% AEP
Regional fuel storage	0.5% AEP
Food storage warehouses	0.5% AEP
Hotel residential	Designated flood
Educational facilities	Designated flood
Residential buildings	Designated flood
Camping grounds, caravan parks and relocatable homes reclamation levels	Designated flood
Commercial	Designated flood
Light industrial/warehousing	Designated flood
Theme parks	Not specified, but users should not be subjected to any more than high hazard conditions in the designated flood, as specified in <b>AS10.1</b>
Clubs/non-habitable buildings associated with enjoyment of public open space	Not specified, but users should not be subjected to any more than high hazard conditions in the designated flood, as specified in <b>AS10.1</b>
Car parking below buildings	Not specified, but users should not be subjected to any more than high hazard conditions in the designated flood, as specified in <b>AS10.1</b>
Open space	Not specified, but ancillary structures are subject to appropriate hazard conditions in the designated flood, as specified in <b>AS10.1</b>
Rural	Not specified

Performance Criteria	Acceptable Solutions
<b>Hazard Considerations for Development</b>	
<p>PC9 Development listed in the <b>Table to Acceptable Solution AS9</b> below must be designed and constructed to avoid causing exposure to undue flood hazard.</p>	<p>AS9 Development is to be designed and constructed so that users are not exposed to a greater degree of hazard than shown in <b>Table to Acceptable Solution AS9</b> for the range of flows specified in <b>AS7.1</b>.</p>

**Table to Acceptable Solution AS9**

Land-Use	Appropriate Degree of Hazard				
	Nil	Low	Medium	High	Extreme
Public open space/recreation	✓	✓	✓	✓	✓
Theme parks	✓	✓	✓	✓	
Clubs/non-habitable buildings associated with enjoyment of public open space	✓	✓	✓	✓	
Commercial/industrial	✓	✓	✓		
Residential	✓	✓	✓		
Public institutions	✓	✓	✓		
Car parking below buildings	✓	✓	✓	✓	
Caravan parks	✓	✓	✓		
Council offices	✓	✓			
Schools	✓	✓			
Homes for the elderly	✓	✓			
Hospitals	✓	✓			
SES	✓	✓			
Police/fire stations	✓	✓			
Museums/libraries/archives/ infrastructure plan repositories	✓				
Telephone exchanges	✓				

**Note:** ✓ Indicates an appropriate land use.

*The above table examines the appropriateness of land use decisions from the aspect of flood hazard only. As such, it does not confer any land use rights or provide any indication that Council will reject or favourably consider various uses in particular areas. Such consideration will be dealt with appropriately, in the context of the Planning Scheme, and based upon full consideration of all relevant issues.*



Performance Criteria	Acceptable Solutions
<b>Access Criteria with Respect to Hazard</b>	
<p>PC10 All proposed development must demonstrate that sufficient access or egress will be available to enable evacuation during a range of floods, up to and including the designated flood.</p>	<p>AS10.1 Development, not including underground car parks, must ensure that evacuation opportunities exist in accordance with the minimum levels of exposure outlined in <b>Table to Acceptable Solution AS10.1</b>, where means of access or egress may be:</p> <ol style="list-style-type: none"> <li>an access route that is below the level of the designated flood, provided that route is classed as a low hazard, as defined in <b>Table to Acceptable Solution AS10.1</b>; or</li> <li>an access route that is not the main access route. However, it must remain effective for the duration of a range of flood events, up to and including the designated flood; or</li> <li>a temporary access arrangement, provided that access can be gained without significant preparation time being required;</li> </ol> <p>The access or egress must:</p> <ol style="list-style-type: none"> <li>in the event of a designated flood: <ul style="list-style-type: none"> <li>▪ not expose users to undue risk;</li> <li>▪ not cause, or have the cumulative potential to cause, real damage to land and/or premises;</li> <li>▪ not interrupt or materially change the surface water drainage from or onto adjoining land;</li> </ul> </li> <li>not create, in the event of a flood, a sudden change in flow distributions, flood level or velocity that could result in: <ul style="list-style-type: none"> <li>▪ the breaking of a levee; or</li> <li>▪ the establishment of blockage of a breakout; or</li> <li>▪ excessive scour; or</li> <li>▪ sedimentation; or</li> <li>▪ increased flood hazard.</li> </ul> </li> </ol>

**Table to Acceptable Solution AS10.1**

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

**Note:** *The evacuation times for various facilities or areas would (but not necessarily) be included in the Counter Disaster Plan (flooding).  
Generally, safe wading conditions assume even walking surfaces with no obstructions, steps, soft underfoot, etc.*



Performance Criteria	Acceptable Solutions
<b>Filling, Excavation and Contouring</b>	
<p>PC11 Any change to ground level, by way of filling, excavation or contouring, must not result in real damage, flood hazard or impediment to any Counter Disaster Plan, measure or create unreasonable change in the exposure to flood hazard.</p>	<p>AS11.1.1 Changes to ground level, by way of filling, excavating or contouring, comply with a hydraulic master plan approved by Council. OR AS11.1.2 A flood study is prepared in accordance with the requirements set out in <b>AS6.1</b> and <b>AS6.2</b>, is approved by Council, and it is established that the development complies with, or does not impede, any Counter Disaster Plan measure.</p>
<p>PC12 Filling, excavation or contouring must not cause sedimentation, erosion or adverse impact on the City's drainage network.</p>	<p>AS12 No acceptable solution provided. For guidance, please refer to <b>Constraint Code 14 – Sediment and Erosion Control</b>.</p>
<b>Landscaping</b>	
<p>PC13 Landscaping must not impede a natural watercourse, a flood channel or an overland flow path.</p>	<p>AS13.1.1 Landscaping complies with a hydraulics master plan approved by Council. OR AS13.1.2 A flood study, allowing for the landscaping, is prepared in accordance with the requirements of <b>AS6.2</b>, and is approved by the Assessment Manager.</p>
<b>Building Floor Levels</b>	
<p>PC14 Buildings that are to be constructed on flood prone land shall not be inundated by floodwaters during a designated flood event.</p>	<p>AS14.1 Development is constructed at or above the Specified Minimum Flood AEP plus the Minimum Design Freeboard, as set out in column 2 of the <b>Table to Acceptable Solution AS14.1</b>. AS14.2 Where a proposed land use does not reasonable apply to any land use listed in the <b>Table to Acceptable Solution AS14.1</b>, the applicant is to submit: a) the proposed minimum flood AEP for building floor levels; b) the proposed design freeboard above the specified flood level; and c) a flood hazard and flood risk assessment for the proposed development, assessing the effects on costs, safety, access and potential losses. AS14.3 It is noted that <b>PC14</b> does not apply to: a) garages below residential buildings; b) garages below commercial premises; and c) garages below industrial premises, provided there are suitable means to restrict motor vehicles being washed away during a flood event.</p>



**Table to Acceptable Solution 14.1**

<b>Land Use</b>	<b>Specified Minimum Flood AEP Plus Minimum Design Freeboard</b>
Disaster management facilities	0.2% AEP + 500mm
Hospitals	0.2% AEP + 500mm
Major electrical switchyards, Power stations, Water treatment plants <sup>1</sup>	0.2% AEP + 500mm
Fire and Police stations <sup>2</sup>	0.5% AEP + 400mm
Places of refuge	0.5% AEP + 400mm
Electricity Substations <sup>1</sup>	0.5% AEP + 400mm
Sewage Treatment Plants <sup>3</sup>	0.5% AEP + 400mm
Homes for the aged, Hospice <sup>4</sup>	0.5% AEP + 400mm
Regional fuel storage	0.5% AEP + 400mm
Food storage warehouses	0.5% AEP + 400mm
Hotel residential	Designated flood + 300mm
Educational facilities <sup>5</sup>	Designated flood + 300mm
Residential buildings	Designated flood + 300mm
Camping grounds, Caravan parks and Relocatable homes reclamation levels	Designated flood + 300mm
Commercial <sup>6</sup>	Designated flood
Light Industrial / Warehousing <sup>6</sup>	Designated flood
Theme Parks	Not specified, but ancillary structures are subject to medium hazard considerations at the designated flood.
Clubs/ Non-habitable buildings associated with enjoyment of public open space	Not specified, but ancillary structures are subject to medium hazard considerations at the designated flood.
Car parking below buildings	Not specified, but ancillary structures are subject to medium hazard considerations at the designated flood.
Open space	Not specified, but ancillary structures are subject to appropriate hazard considerations at the designated flood.
Rural	Not specified

**Note:** AEP is the Annual Accedence Probability

**Notes for Table of AS14.1**

1. **Applies to switchyard components necessary for the operation of the facility during a flood emergency. This shall be determined by Powerlink.**
2. **Excludes 'shop front' facilities and those not likely to be utilised during a flood emergency.**
3. **Specifically, bunds, electrical and mechanical equipment necessary for the continued operation of a sewage treatment plant shall not be at risk of inundation during a flood emergency.**
4. **The flood immunity specified is to meet the objective of not adding to the burden of flood emergency services.**
5. **It is not necessary that all rooms within an education facility be above the 1% AEP level. However, there should be sufficient space to accommodate the whole of the school population during a flood event.**
6. **Freeboard is not specified, as it is considered that commercial risk provisions should apply. If such land is developed to a flood immunity less than 1% AEP (as may be permitted by any local planning instrument), Council may endorse rates notices accordingly.**