Guideline for the construction of buildings in flood hazard areas

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Building Codes Queensland
Department of Housing and Public Works

Queensland Government

Table of contents

Purpose

The purpose of this guideline is to assist homeowners, building professionals and local governments to understand the new part of the Queensland Development Code (QDC) for construction of buildings in flood hazard areas.

Under section 258 of the *Building Act 1975* (the Act) the chief executive may make guidelines which help achieve compliance with the the Act. It is recommended that the information contained in this guideline be used to assist with compliance of the new QDC for construction of buildings in flood hazard areas.

Scope

The guideline covers legislation and standards relating to the construction of buildings in flood hazard areas and the roles and responsibilities of local government, property owners, building designers and building certifiers.

Introduction

Background

The Australian Building Codes Board (ABCB) developed a draft national Standard for the construction of buildings in flood hazard areas (draft Standard) in 2011. The ABCB developed the draft Standard and an accompanying information handbook with the assistance of a reference group comprised of representatives of state and local governments, the building and engineering industries, and flood and hydrology experts. Copies of the draft Standard and information handbook are available online.

The draft Standard provides performance requirements and deemed-to-satisfy provisions for the design and construction of buildings in designated flood hazard areas. In Queensland, flood hazard areas are designated by local governments.

The ABCB released a national regulation impact statement for the draft Standard. It is anticipated that the draft Standard will be included in the 2013 version of the Building Code of Australia (BCA) from 1 May 2013.

Building Codes Queensland (BCQ) sought comment on early adoption of the draft Standard in Queensland during 2011. Following the consultation period, BCQ developed a new part of the QDC (draft QDC) to adopt the draft Standard into building law in Queensland.

Queensland Floods Commission of Inquiry

On 16 March 2012, the Queensland Floods Commission of Inquiry (the Commission) delivered its Final Report into the 2010-11 floods (Final Report). The Final Report contains recommendations covering a broad range of matters including management of Wivenhoe Dam, floodplain management, planning issues, performance of private insurers and management of abandoned and operational mines. It also recommended that further public consultation be conducted on a draft QDC.

On 7 June 2012, the Premier tabled in Parliament the Queensland Government response to the Final Report. As part of its response to the Commission's Final Report, the Queensland Government

formed five groups to implement the recommendations. The Building Implementation Group was established to oversee implementation of recommendations from chapters 9 and 10 of the Final Report and is chaired by the Director-General of the Department of Housing and Public Works.

The Queensland Government's response included a commitment to revise the draft QDC to reflect the Commission's recommendations with a focus on providing practical flexibility in the application of the code. In addition, the Government committed to undertaking community and industry consultation on the revised draft QDC. Consultation on the revised draft QDC occurred from 26 July 2012 to 7 September 2012.

Terms and abbreviations used in this guideline

BCA	Building Code of Australia
the Act	*Building Act 1975*
QDC	Queensland Development Code
QDC MP 3.5	Queensland Development Code Mandatory Part 3.5 for Construction of buildings in flood hazard areas

Legislation

The Act is the primary piece of legislation for regulating building work in Queensland.

Building Regulation 2006

The *Building Regulation 2006* adopts the QDC and allows local government to include information about flood characteristics for the purposes of the QDC in planning schemes, temporary local planning instruments or by resolution. It also includes requirements for building development applications proposing lower flood levels or flow velocities than those declared by local government.

Queensland Development Code

The QDC consolidates Queensland-specific building standards into a single code. The QDC covers Queensland matters outside the scope of, and in addition to the BCA, such as requirements for private health facilities and swimming pool fencing. The QDC prevails over the BCA to the extent of any inconsistency.

New part for construction of buildings in flood hazard areas

The new part of the QDC was developed to help address the immediate needs associated with constructing new buildings and additions to existing buildings in flood affected areas, and to generally improve the flood resilience of communities across Queensland. The new mandatory part of the QDC, Mandatory Part 3.5, commenced on 26 October 2012.

The QDC MP 3.5 has four broad performance requirements including detailed new standards for residential buildings, utilities for most classes of buildings, prevention of sewage reflux and requirements for customer dedicated substations.

The QDC is a building assessment provision under the the Act. It is a requirement for self-assessable and assessable building work to comply with all building assessment provisions. Similar to other

QDC parts, QDC MP 3.5 contains a detailed application section which identifies specific circumstances where compliance with the code is required.

Application

QDC MP 3.5 applies in a practical way to a range of scenarios for buildings that are located in flood hazard areas with a defined flood level. Flood hazard areas are areas that a local government designates as a natural hazard management area (flood) under a planning scheme, temporary local planning instrument or by resolution. A defined flood level is the level declared by a local government for that area.

Where QDC MP 3.5 is triggered, it specifically applies to the construction of new residential buildings (houses, townhouses, units, hospitals and aged care buildings), relocating houses, additions to existing houses where the addition is greater than 50 per cent of the floor area, and additions to other types of residential buildings. The QDC will also partly apply to the construction of other buildings, with requirements for utilities, backflow prevention and customer dedicated electrical network substations.

QDC MP 3.5 does not apply to minor alterations to an existing home, such as adding a bedroom or ensuite bathroom, or moving an internal wall.

It may be impractical to apply QDC MP 3.5 requirements for utilities to all new commercial buildings. For this reason, the QDC allows building certifiers to specify on the building's certificate of classification that the building does not comply with the utilities requirements of the QDC because the building is not intended to be occupied during a flood event or in the aftermath of a flood event (i.e. in the period following a flood event until the building is repaired or assessed to be in a suitable state to be re-occupied). However, a building certifier will not be able to use this 'exemption' where a local government has set contrary requirements in a planning scheme, temporary local planning instrument or by resolution.

Limitation

The deemed-to-satisfy provisions of the draft Standard only apply to residential buildings in flood hazard areas that are subject to a maximum flow velocity of water not greater than 1.5 metres per second or inactive flow or backwater areas. This limitation is applied to acceptable solution 1 of QDC MP 3.5.

Definitions

The definitions contained in QDC MP 3.5 are also used for interpreting the draft Standard. Some of the key definitions include:

Term	Definition
Defined flood level	The defined flood level in the QDC refers to various sections of the *Building Regulation 2006*. The defined flood level is the level to which flood water is expected to rise during a flood event. A defined flood level needs to be declared by local government in a planning scheme, temporary local planning instrument or by resolution. However, a building development application may include a lower flood level provided that the application is accompanied by a report by an expert that allows local government, as a concurrence agency, to determine whether the lower level is appropriate.
Maximum flow velocity of water	The definition of maximum flow velocity of water refers to various sections of the *Building Regulation 2006*. The maximum flow velocity of water is the reasonably expected flow velocity of water during a flood event. It may be: • declared by a local government under section 13 of the *Building Regulation 2006,* or • proposed by a relevant expert, or • proposed using historical records or local knowledge. If a local government has declared a maximum flow velocity of water and a building development application proposes a lower flow velocity, the local government will be a concurrence agency to determine whether the lower flow velocity is appropriate. If a local government has not declared a maximum flow velocity of water, it will be up to the assessment manager to consider whether the maximum flow velocity of water stated in a building development application is appropriate. This is similar to the way a competent person can be used.

Performance requirements and acceptable solutions

The first performance requirement and associated acceptable solution provides requirements for buildings to resist flotation, collapse and significant permanent movement resulting from flood waters. These requirements generally relate to residential buildings and the acceptable solution is also limited to one metre inundation and 1.5 metres per second flow velocity (refer to 'Limitations' section). While this performance requirement does not apply to class 5, 6, 7, 8 or 9b buildings, the BCA will continue to apply to these buildings and they should still be designed to resist flood actions. Acceptable solution one also permits a local government to set a finished floor level that is different to the requirements under the draft Standard.

QDC MP 3.5 also sets standards for utilities, such as lift motors and lift motor rooms for emergency lifts, sprinkler alarm rooms, back-up power supplies for essential services, electrical switchboards and meters, hot water systems and fire indicator panels, to be raised above the flood level or designed to resist flood actions in all buildings except sheds and garages. This will assist with the safe occupation of buildings during a flood event and with re-occupation after the event.

QDC MP 3.5 will also require new buildings to be protected from sewage backflow by fitting a reflux valve as part of the sewerage system between the connection point or on-site sewage facility and the building.

High rise buildings that require an electricity network substation under section 59 of the *Electricity Regulation 2006* will need to ensure that the substation is protected against flood waters. The acceptable solution requires the substation to be raised above the flood level.

Concurrence agency

During the building approval process, a concurrence agency response from local government may also be triggered where flood information, such as a defined flood level or maximum flow velocity, is used that is lower than the information specified by the local government. Local governments will be able to decide whether the information is suitable for use for the application.

Roles and responsibilities

Local government

The role of local government will remain largely unchanged. Local government will continue to be responsible for approving development of land through planning processes. In this respect, local government will continue to assess the risk of development occurring in a flood hazard area. Through this process, local government generally assess the level of flooding which is expected to occur over a property and may look at access and egress requirements for the property.

Under the *Sustainable Planning Act 2009*, local governments are not able to include provisions in local planning instruments to the extent they are covered under building assessment provisions, unless otherwise permitted under the Act. This includes structural requirements and floor height requirements. However, this does not prevent a local government from including provisions in a local planning scheme that are related to matters such as the aesthetics of a building or heritage requirements.

One of the fundamental requirements for designing buildings to withstand flood actions and loads is to understand the reasonably expected flood characteristics for the area. To assist with complying with the building assessment provisions, new powers have been included in the *Building Regulation 2006* to allow local government to set flood levels, flow velocities and areas of expected low flow, which are referred to as inactive flow or backwater areas. While these matters are useful for the assessment of building work, they may also be particularly relevant during assessment at the planning stage. Where these characteristics are included in local planning instruments the information may be used for both the planning and building stages of development. Local government may also have a concurrence agency role for some building development applications.

Designations and declarations

Local governments may make designations and declarations for QDC MP 3.5 under planning schemes, temporary local planning instruments or by resolution for the following matters:

- flood hazard areas
- defined flood levels
- maximum flow velocity of water
- inactive flow or backwater areas
- freeboard

- finished floor levels of class 1 buildings

To determine flood characteristics, local government may wish to engage specialists to undertake a flood study. However, local government may also decide to rely on historical records or local knowledge rather than commissioning expensive flood modelling analysis. Local government may therefore use a risk based approach to decide flood characteristics such as expected flood levels and inactive flow or backwater areas. Local government may decide to designate or declare this information in accordance with section 13 of the *Building Regulation 2006*.

Housing costs may be less where an applicant is able to rely on information from a local government for the reasonably expected flood characteristics in a designated flood hazard area. Where local government does not provide this information, the property owner may be required to obtain this information from a suitably qualified person, such as an engineer, to accompany a building development application. There is also the ability for a building applicant to use local knowledge, historical records or information obtained from a suitably qualified person. If this information is lower than information declared by a local government, for example the flood height or maximum flow velocity, the local government will become a concurrence agency to assess the suitability of the information being used.

Flood hazard area

The designation of a flood hazard area has not changed from previous requirements under the *Building Regulation 2006* and it is expected that a designation for planning purposes should be sufficient for building purposes. The BR allows a local government to determine a designation for a natural hazard management area (flood) in accordance with State Planning Policy 1/03. This becomes a flood hazard area for the purposes of QDC MP 3.5.

Defined flood level

To trigger the QDC, local government must designate a flood hazard area and a defined flood level. A defined flood level is the level to which it is reasonably expected flood waters may rise. Local government may decide to use a range of information, such as flood studies, historical records and local knowledge in setting a defined flood level.

Maximum flow velocity of water

Local governments have the ability under the *Building Regulation 2006* to declare flow velocities for an area for the purposes of QDC MP 3.5. Many local governments have significant knowledge of local flooding characteristics, which is often developed through flood studies, records of past flood events and experiences in community response to flooding events. For example, pictorial records and the performance of surviving buildings and structures may reasonably provide adequate evidence of areas of low flow.

Inactive flow and backwater areas

Inactive flow or backwater areas can also be declared under the *Building Regulation 2006*. This is an area that can reasonably be expected that the maximum flow rate is not likely to exceed 1.5 metres per second. Local governments can designate areas without needing to specify a flow velocity for the area and therefore not necessitating the requirement for a flood study. This may apply to areas where the water rises and falls slowly, such as from stormwater drains.

For local governments seeking to rely on hazard mapping, there may be some low hazard areas where an inactive flow or backwater area declaration is appropriate. However, local governments

should consider the limitations of the draft Standard (refer to 'Limitations' section) when considering declaring a low hazard area as an inactive flow backwater area.

Freeboard

The *Building Regulation 2006* sets a minimum freeboard of 300 millimetres. However, a local government may declare a freeboard greater than 300 millimetres to take account of matters such as localised hydraulic behaviour.

Finished floor levels for class 1 buildings

While QDC MP 3.5 includes floor level requirements, local government may decide to lower the finished floor levels in class 1 buildings to deal with issues such as amenity or existing development commitments. However, local governments should be aware that lower floor levels may increase the risk to buildings and occupants. In setting a lower floor level, local governments should consider the limitations of the draft Standard which is designed for inundation of a building up to one metre.

Concurrence agency

Local government will have concurrence agency jurisdiction where an applicant proposes a lower defined flood level or maximum flow velocity of water than that declared by the local government under section 13 of the *Building Regulation 2006*. Building applicants will be required to provide sufficient information in the form of a report by a relevant expert to justify the lower level. The local government will need to decide whether the information contained in the application is appropriate having regard to any flood modelling carried out, historical information or any other matter the local government considers appropriate. Further information about the local government's concurrence agency jurisdiction can be found in Schedule 7 of the *Sustainable Planning Regulation 2009*.

Building certifiers

Building certifiers continue to be responsible for building assessment work. To achieve this, building certifiers will need to understand the forces to which a building may be subjected in a flood event. This requires knowledge of defined flood levels and the maximum flow velocity of water. In many cases, this information will be determined by local government, either through a declaration in accordance with section 13 of the *Building Regulation 2006* or through a concurrence agency response. However, where a local government does not declare a maximum flow velocity of water or an inactive flow or backwater area, the assessment manager may need to make a determination about the maximum flow velocity of water. They may rely on competent persons or relevant experts to assist them in this process.

Property owners and building designers

The BCA requires buildings and structures to withstand reasonably expected loads and actions. Property owners and building designers have previously had limited guidance about what is reasonable to expect with regards to flood actions. QDC MP 3.5 addresses these issues by providing property owners and building designers with guidance on how to build in these areas. In many cases, local governments will provide information about the flood hazards that building work will be required to resist. In cases where local government does not provide information on flood characteristics (i.e. maximum flow velocity) in a flood hazard area, there will need to be sufficient information to enable an assessment manager (i.e. a private building certifier) to determine whether the information is appropriate.