Guidelines for Development within the Koo Wee Rup and Longwarry Flood Protection District - July 2019

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Contents

Get in touch with Melbourne Water - early in the development process

We recommend that permit applicants in the Koo Wee Rup and Longwarry Flood Protection District and surrounding areas contact us early in the planning and design process. This will also enable a timely appreciation of any applicable site-specific requirements.

Development Enquiries:
Melbourne Water
PO Box 4342
Melbourne VIC 3001
Telephone 131 722
Email kooweerup@melbournewater.com.au

Further information on development requirements can be found in:

- Melbourne Water's Planning for Sea Level Rise Guidelines (2017)
- the Department of Environment, Land, Water and Planning's *Guidelines for Development in Flood Affected Areas* (2019)

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Introduction

The area within and surrounding the Koo Wee Rup and Longwarry Flood Protection District forms one of Melbourne's largest and most unique floodplains. A consistent approach to floodplain management in the area is required, given the extent of intensive agricultural activity and associated development.

1.1 Purpose of these guidelines

Melbourne Water has prepared *Guidelines for Development within the Koo Wee Rup and Longwarry Flood Protection District* to set out specific requirements that apply to development proposals in the district and surrounding flood-prone areas (the District). The guidelines supplement the statewide *Guidelines for Development in Flood Affected Areas* (2019) prepared by the Department of Environment, Land, Water and Planning (DELWP).

The aim of Melbourne Water's guidelines is to ensure that proposed subdivision and development is compatible with any flood risk and takes into consideration the unique flooding nature and history of the District. These guidelines were developed to:

- assist property owners, developers, designers and builders to understand the specific requirements that apply in the District
- outline the relevant considerations to be taken into account by Melbourne Water when assessing development proposals in relation to minimising flood damage, limiting offsite impacts, ensuring flood safety, and waterways and floodplain protection
- provide for consistency and transparency in decision making.

These guidelines apply to the District (refer to Figure 1) and detail the approach used by Melbourne Water to determine flood levels for planning purposes. In addition, the guidelines specify appropriate freeboard and minimum floor level requirements for different development types. Melbourne Water will also apply sea level rise guidelines when assessing development in coastal areas in the District.

1.2 Melbourne Water's role within the District

Melbourne Water is the designated caretaker of waterway health for the Port Phillip and Westernport region, and the regional drainage and floodplain management authority. Melbourne Water has floodplain management functions under the *Water Act 1989*, with related functions under the *Planning and Environment Act 1987* and the *Building Regulations 2018*.

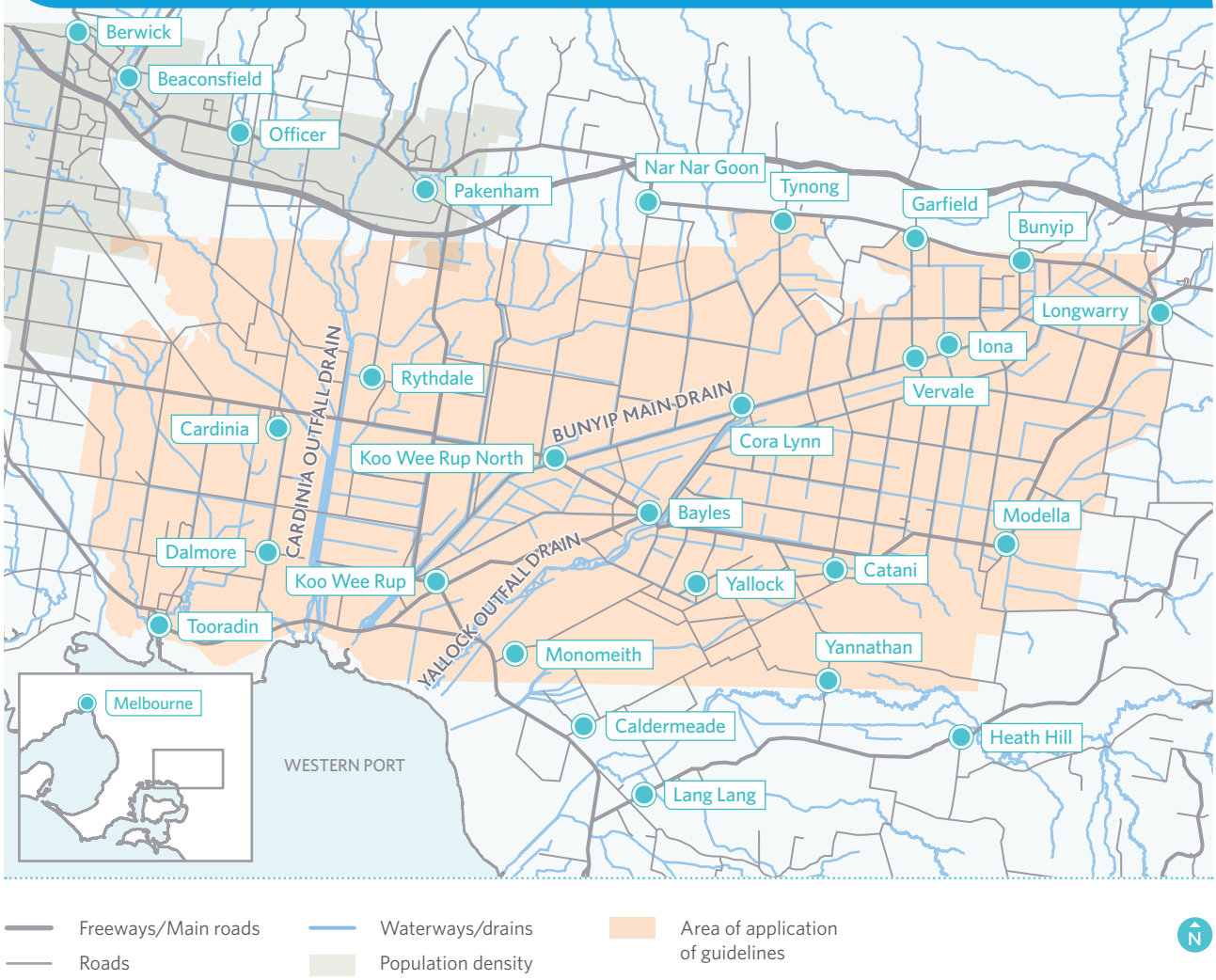
As part of our floodplain management responsibilities, Melbourne Water has prepared these guidelines for development within the District. Development includes the construction, alteration or demolition of a building or works and the subdivision or consolidation of land.

The District is subject to flooding and is largely contained within a Land Subject to Inundation Overlay (LSIO) in the Casey, Cardinia and Baw Baw planning schemes. Parts of the District are also within a Floodway Overlay (FO).

Melbourne Water is a determining referral authority under Clause 66.03 of the *Victoria Planning Provisions* (VPP) for planning permit applications to develop land affected by a flood overlay control in a planning scheme. In this capacity, we assess proposals and ensure developments are compatible with any flood risk through the application of appropriate development requirements. Melbourne Water also has a role in recommending minimum floor levels for building permits issued under regulation 153 of the *Building Regulations 2018*.

THESE GUIDELINES ARE TO BE USED IN CONJUNCTION WITH THE PRINCIPLES AND DEVELOPMENT REQUIREMENTS CONTAINED IN DELWP'S STATEWIDE *GUIDELINES FOR DEVELOPMENT IN FLOOD AFFECTED AREAS* (2019) AND MELBOURNE WATER'S *PLANNING FOR SEA LEVEL RISE GUIDELINES* (2017).

Figure 1. Koo Wee Rup and Longwarry Flood Protection District and surrounds



1.3 History of the District

The District lies in what was originally known as the Koo Wee Rup Swamp, formed from a tectonically depressed basin between the Tyabb and Heath Hill faults, and covers an area of approximately 400 square kilometres. The swamp was fed by a 2208-square-kilometre catchment that included the three major drainage basins of Cardinia Creek, Bunyip River and Lang Lang River catchments.

Prior to European settlement, the Yallock Creek formed the only permanent outlet from the swamp into Western Port. In the late 19th century, the swamp was slowly drained with a network of constructed channels and improved outfalls to Western Port. This early drainage system allowed limited agricultural activities within the reclaimed swamp between floods, and passage through the swamp to Gippsland.

Today, the drainage system that includes the two main carrier drains (the Cardinia Outfall Drain and the Bunyip Main Drain) provides a relatively high level of flood protection for a rural area and allows intensive agricultural activities and associated development.

1.4 Flooding within the District

The District has flooded many times. The largest flood on record (approximately a 0.5-0.7 per cent Annual Exceedance Probability (AEP) event) occurred in 1934, when the entire District was inundated and more than 1000 people became temporarily homeless. AEP is the likelihood of the occurrence of a flood of a given size happening in any one year.

Following the 1934 flood and subsequent regular flooding of the District, construction of the Yallock Outfall Drain commenced in the 1950s. The outfall splits the flow of the Bunyip Main Drain at Cora Lynn. The resultant decrease in flows in the Bunyip Main Drain reduces the frequency of overtopping the drain levees and thereby provides flood mitigation benefits to the Koo Wee Rup township.

Flooding in the District results from not only the overtopping of drain levees but also occurs when floodwaters from the local catchments exceed the capacity of the local drainage system.

Due to the extremely flat terrain of the District, even relatively minor floods can inundate large areas. The flat terrain results in slow water movement and, when flooding occurs, it can last for a number of days or even weeks.

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Description of flood zones and flood level determination

Given the unique characteristics of the floodplain and associated drainage, five flood zones have been identified based on different types of flood behaviour.

2.1 Floodplain characteristics and site suitability

Flooding within the District is characterised by large expanses of slow-moving water, with considerable water pondages, concentrated flow paths and localised areas of higher ground scattered throughout the floodplain.

Ponded areas occur where the passage of floodwaters are restricted, blocked or contained due to raised roads, levees, railways or natural depressions.

In locations of flow paths or depressions, flows will be concentrated either along shallow gullies or defined channels, and the velocity and depth of flow will be greater than the surrounding area. Most forms of development should be avoided in these areas due to this hazard.

New dwellings or buildings should be sited on high ground wherever possible. These are areas where the flood depth is lower or the land is not subject to flooding for a 1 per cent AEP event[1].

1. The 1 per cent AEP flood is the current design flood event for land use planning and building systems in Victoria. It is a flood with a 1 per cent chance of occurring in any given year.

2.2 Flood level determination

Generally, Melbourne Water adopts a flood zone approach to determine flood levels within the District. The District has been divided into five flood zones, which are distinguished by similar flood characteristics and flood depths (refer to Figure 2).

Melbourne Water uses a combination of available survey information of ground surface levels and flood depths to determine the applicable flood level to the Australian Height Datum (AHD). The flood level is determined by adding the average flood depth for the applicable flood zone to the average surrounding ground level for the subject site. We require floor levels to be raised above the applicable flood level, as outlined in the next section.

Additionally, flood modelling has been undertaken within some flood zones and a specific flood level may be available from Melbourne Water on request. This includes the Koo Wee Rup township where flood levels have been mapped (refer to Figure 3). Similarly, specific flood levels are available from Melbourne Water for ponded areas.

Where available, specific flood levels will be adopted rather than the more general flood zone approach.

Flood levels are determined either by flood zone or specific flood levels, as follows:

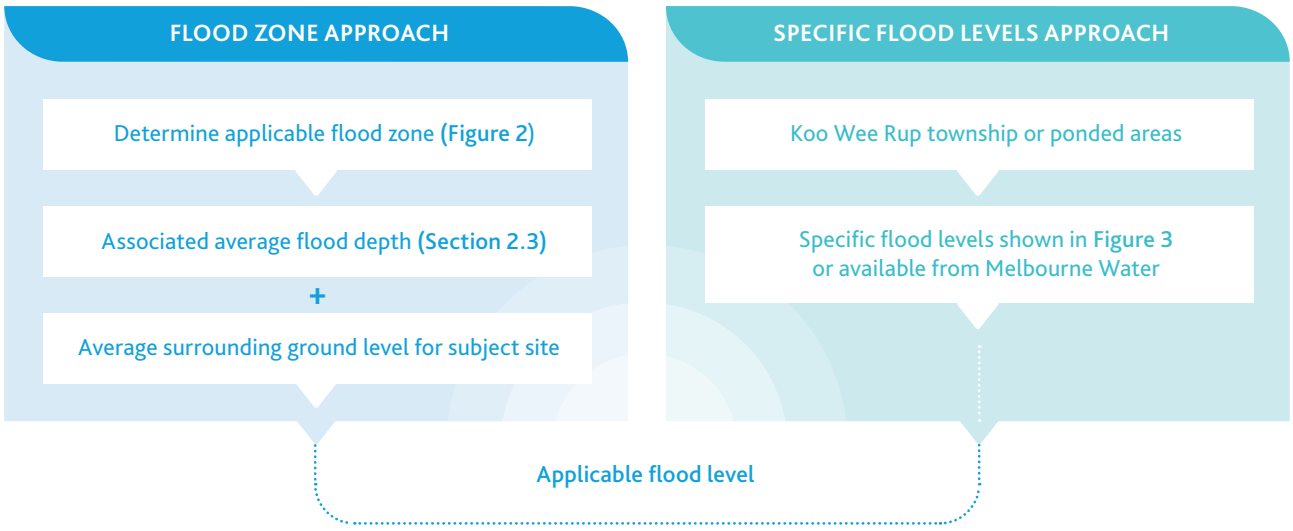


Figure 2. Flood zones within the District

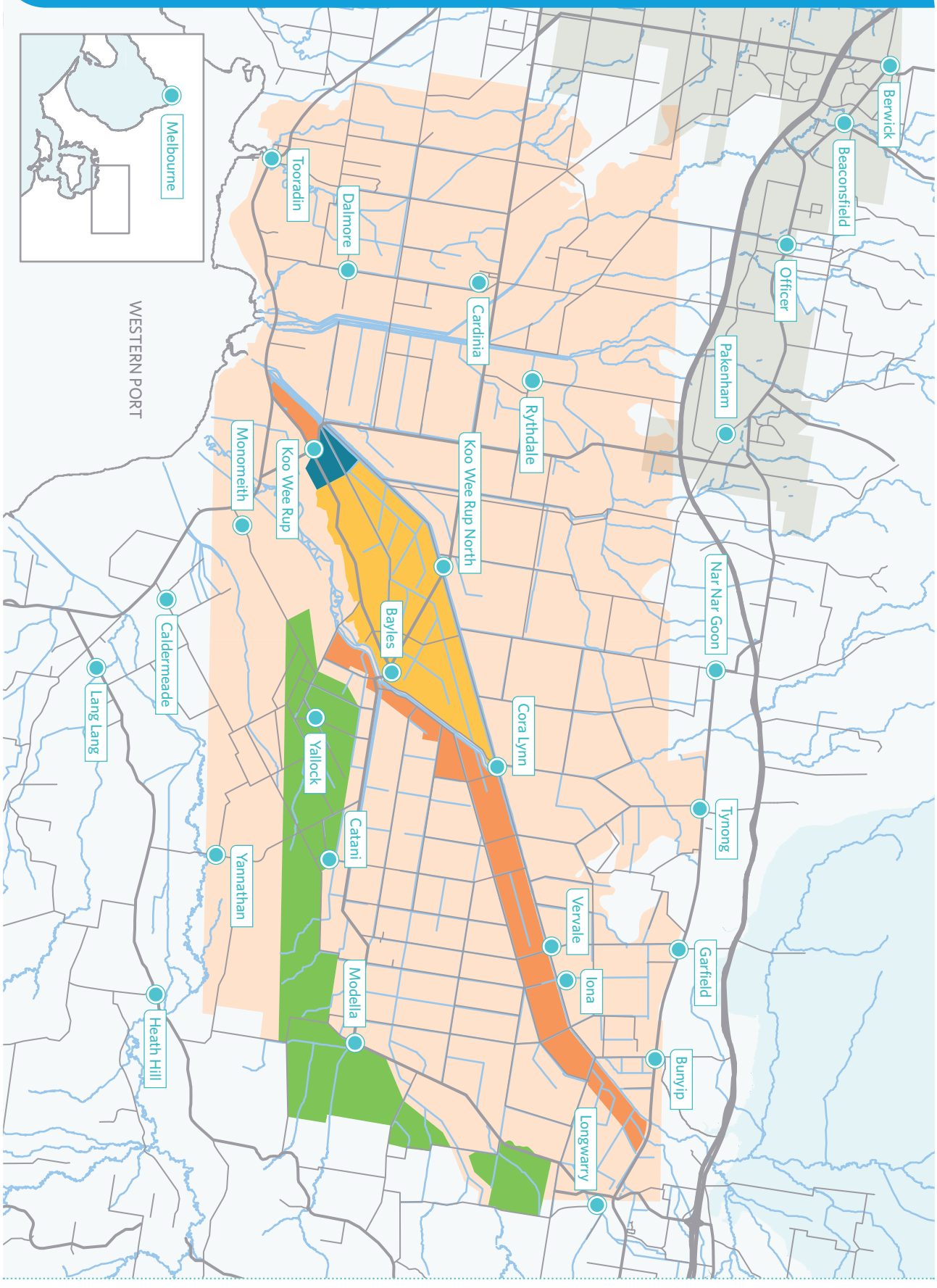
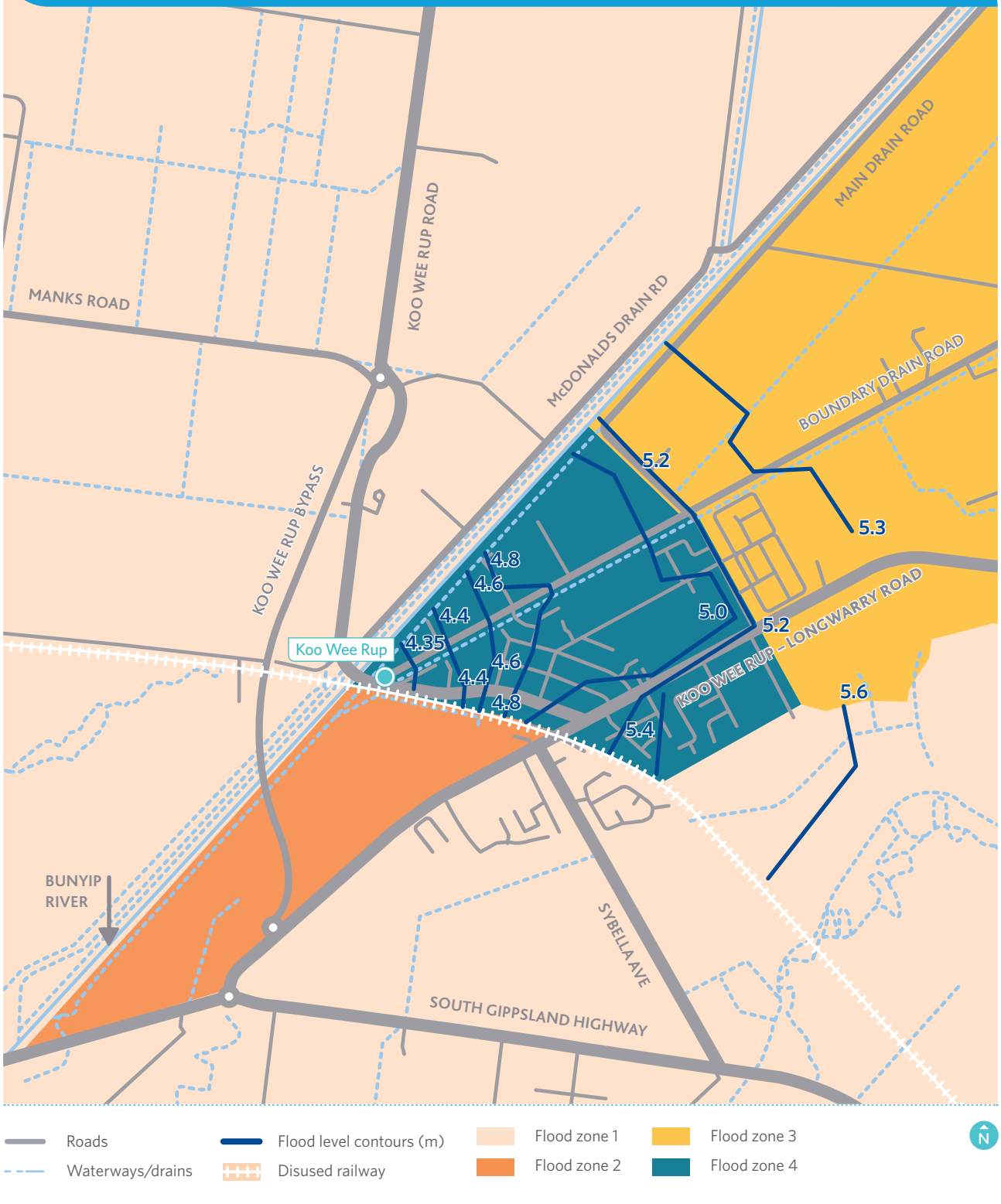


Figure 3. Koo Wee Rup township flood levels



2.3 Flood zone descriptions and flood depths

The five flood zones shown in Figure 2 are described below.

Flood zone 1

This flood zone contains the majority of the District (areas bordering the District are similar in nature). Flood zone 1 is subject to overland flooding due to overflows from drains. The 1 per cent AEP flood depth is approximately 300 millimetres above the average surrounding ground level.

Flood zone 2

Flood zone 2 is liable to deep flooding as a result of concentrated overflows from a major drain. The 1 per cent AEP flood depth is approximately 700 millimetres above the average surrounding ground level. Buildings are generally discouraged in flood zone 2, as building at a proposed site may be unsafe where flood depths are greater than 500 millimetres. Site-specific advice should be sought from Melbourne Water.

Note: Some flood modelling has been undertaken within flood zones 1 and 2 and a specific flood level may be available from Melbourne Water on request.

Flood zone 3

This area has a high level of protection from the Bunyip floodwaters because of the Yallock Outfall and the Bunyip Main Drain levee banks. Flood zone 3 is liable to flooding from the local drainage system and minor overflows of the main levee bank system. The 1 per cent AEP flood depth is approximately 150 millimetres above the average surrounding ground level.

Flood zone 4: the Koo Wee Rup township

The township of Koo Wee Rup is liable to flooding from local floodwaters and minor overflows of the Bunyip Main Drain. Flood levels are shown in Figure 3.

Flood zone 5

This area is not affected by overflows from any of the main waterways. Parts of the area are liable to shallow overland flows from local catchments and need to be considered in the site layout. The 1 per cent AEP flood depth is approximately 150 millimetres above the average surrounding ground level.

3

Development requirements

There are specific development requirements for each flood zone in the District and for different development types.

3.1 Freeboard and fill pad requirements

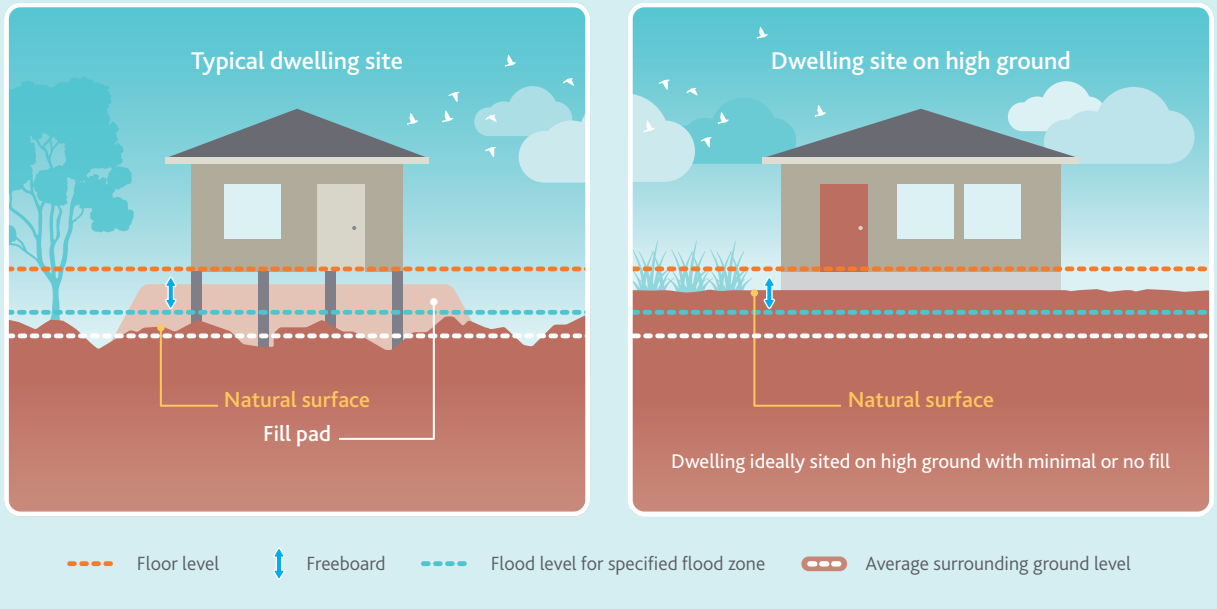
Freeboard is the height above a defined flood level that is required to provide a factor of safety when setting floor levels for developments. It allows for factors such as wave action, settlement of levees and the possibility of events greater than the adopted standard.

The Victorian *Building Regulations 2018* specify a minimum general freeboard requirement of 300 millimetres above the 1 per cent AEP flood level, or as otherwise determined by the floodplain management authority. However, Melbourne Water considers a higher freeboard requirement is applicable for development in the majority of the District. This is due to the large expanses of water that will occur during a flood event and the increased risk of higher levels due to wave action.

Due to the nature of the flooding within the District (that is, the extent of flooding and possible duration of floodwaters), Melbourne Water requires fill pads for all new dwellings (with the exception of flood zones 3 and 5 where flooding is shallow, and where dwellings are built on stumps). For non-urban areas, fill pads provide an area around a dwelling that may act as a place of refuge for livestock and storage for machinery (refer to Figure 4).

Maintenance of flood storage across the District is important to ensure flooding is not increased. Therefore, the size of fill pads should be limited to the size necessary for a particular development including providing refuge during a flood, as detailed in section 3.2. Furthermore, the placement of fill pads should not obstruct overland flow paths.

Figure 4. Dwelling and fill pad cross-sections relative to average surrounding ground level



3.2 Minimum floor level and fill level requirements

This section details the freeboard requirements for different development types. The freeboard is added to the applicable flood level to establish the minimum floor level requirements for development and the minimum fill levels for subdivision.

3.2.1 Dwelling requirements

Requirements for dwellings in each flood zone are described below (a summary table of the development requirements can be found in Appendix 1).

Note: Where development can be sited on high ground and outside areas subject to flooding in a 1 per cent AEP event, minimum floor level requirements for the surrounding flood zone will still apply.

FREEBOARD REQUIREMENT

Applicable flood level

+

Freeboard

=

Minimum floor level for development/
fill level for subdivision

Flood zone 1 requirements – dwellings

- Flood zone 1 contains the majority of the District and the 1 per cent AEP flood depth is approximately 300 millimetres above the average surrounding ground level.
- Floor levels of any new dwelling are to be a minimum of 600 millimetres above the applicable flood level.
- For dwellings on stumps, a fill pad is to be a minimum of 150 millimetres above the applicable flood level. For slabs on ground, a fill pad is to be a minimum of 450 millimetres above the applicable flood level.
- Fill pad area:
  - for dwellings on lots less than 800 square metres, a fill pad is to cover the building envelope (unless otherwise filled at subdivision stage)
  - for dwellings on lots greater than 800 square metres, a fill pad is to extend at least 5 metres beyond the building (unless otherwise filled at subdivision stage).

Flood zone 2 requirements – dwellings

- Flood zone 2 is liable to deep flooding and the 1 per cent AEP flood depth is approximately 700 millimetres above the average surrounding ground level.
- Floor levels of any new dwelling are to be a minimum of 600 millimetres above the applicable flood level. Where flood depths exceed 500 millimetres, Melbourne Water may determine that a new building is inappropriate and filling or building may be refused.
- Fill pad requirements as for flood zone 1.

Flood zone 3 requirements – dwellings

- Flood zone 3 is liable to flooding from the local drainage system and the 1 per cent AEP flood depth is approximately 150 millimetres above the average surrounding ground level.
- Floor levels are to be a minimum of 450 millimetres above the natural ground surface or 300 millimetres above the applicable flood level, whichever is greater.
- For dwellings on stumps, no fill pads are required. For slabs on ground, a fill pad is to be a minimum of 150 millimetres above the applicable flood level.
- Fill pad area for slabs on ground:
  - for dwellings on lots less than 800 square metres, a fill pad is to cover the building envelope (unless otherwise filled at subdivision stage)
  - for dwellings on lots greater than 800 square metres, a fill pad is to extend at least 5 metres beyond the building (unless otherwise filled at subdivision stage).

Flood zone 4 requirements – dwellings

- Flood zone 4 is the Koo Wee Rup township. Flood levels are shown in Figure 3.
- Floor levels of any new dwelling are to be a minimum of 600 millimetres above the applicable flood level.
- A fill pad is required at a minimum of 150 millimetres above the applicable flood level.
- Fill pad area:
  - for lots less than 800 square metres, a fill pad is required to cover the building envelope (unless otherwise filled at subdivision stage)
  - for lots greater than 800 square metres, a fill pad is required that extends at least 5 metres beyond the building (unless otherwise filled at subdivision stage).

Flood zone 5 requirements – dwellings

- Flood zone 5 is liable to shallow overland flows and the 1 per cent AEP flood depth is approximately 150 millimetres above the average surrounding ground level.
- Floor levels of any new dwelling are to be a minimum of 450 millimetres above the natural ground surface or 300 millimetres above the applicable flood level, whichever is greater.
- Fill pad requirements as for flood zone 3.

3.2.2 Non-habitable outbuilding requirements

For any non-habitable outbuilding constructed within the District, floor levels should be a minimum of 300 millimetres above the applicable flood level for a building with a concrete floor or 150 millimetres above the applicable flood level for an earthen floor. Some concessions may be made for open-sided structures, such as carports or hay sheds.

3.2.3 Special cases and requirements

Extensions to existing buildings

Melbourne Water aims to achieve floor level and freeboard requirements set out above for extensions to existing buildings, but acknowledges that some concessions may need to be made considering the location and size of any extension, access and design.

Floor level requirements for extensions to dwellings as specified in the statewide *Guidelines for Development in Flood Affected Areas* (2019) also need to be considered.

Milking sheds

Milking sheds are to be constructed in consultation with Environment Protection Authority (EPA) Victoria and DELWP. Sheds are to be constructed at or above the applicable flood level and adequate waste treatment must be provided on site to ensure that no material from the milking operations is discharged into the drainage system for up to a 1 per cent AEP event.

Poultry farms

Victorian Code for Broiler Farms (2009) with 2018 amendments[2] provides "a framework for the economically and environmentally sustainable development and operation of the broiler farming industry in Victoria, recognising the needs of the industry and the community". The code was incorporated into the VPP and all planning schemes in Victoria in 2009. Compliance with the code is mandatory for the establishment of all new broiler farms and expansions in Victoria with a capacity of more than 10,000 birds.

Melbourne Water requirements for broiler or poultry farms include the following criteria:

1. Sheds are to be constructed on a clay fill pad that is a minimum of 600 millimetres above the applicable flood level. Some consideration may be given to reduced freeboard requirements if flood-proofing measures are undertaken to the satisfaction of Melbourne Water.
2. All developments must incorporate an on-site stormwater detention dam that controls runoff from only the impervious surfaces within the development. The requirements of this detention are:
   a. 900 cubic metres of storage in a dam above full supply level per hectare of impervious catchment area (including the dam area).
   b. Storage above full supply level to be no more than 450 millimetres deep.
   c. Outlet works to discharge no more than 3 litres per second per hectare of catchment (including dam area).
   d. The dam should be lined with an impervious lining and the freeboard provision should be above the natural surface to avoid possible groundwater problems.
3. Material other than stormwater must not be discharged into the drainage system (including the site detention dam). Adequate waste treatment must be provided on site to cater for this requirement.
4. All buildings or dams associated with the poultry farm are to be appropriately set back from waterways to avoid adverse impacts, to the satisfaction of Melbourne Water.
5. Dead birds, litter, shavings, etc. arising from the use of the poultry farm must not be spread or stored on site.
6. Design drawings and details of the site layout must be submitted to Melbourne Water for comment and approval prior to commencement of any works on site.

Other intensive land uses and larger developments

Additional intensive land uses, such as cattle feedlots, piggeries and intensive animal industries, and larger developments that significantly increase impervious surfaces, such as airports, need to be consistent with the floodplain development principles detailed in the statewide *Guidelines for Development in Flood Affected Areas* (2019).

These land uses and developments also have the potential to adversely impact waterways, and stormwater quality and quantity leaving the development site. All developments must incorporate on-site stormwater detention and treatment to control runoff from impervious surfaces, to the satisfaction of Melbourne Water. Other intensive land uses will have similar flood detention requirements to poultry farms.

2. See: http://agriculture.vic.gov.au/agriculture/livestock/poultry-and-eggs/poultry-legislation-regulations-and-standards/the-victorian-code-for-broiler-farms

3.2.4 Subdivision referrals and requirements

To ensure that new allotments provide a suitable area for the construction of new buildings, fill pads may be required for subdivisions within the District where siting a development on high ground is not possible. Potential adverse impacts on adjacent, upstream or downstream areas resulting from the introduction of fill in the floodplain will be considered. Fill pad requirements include those mentioned below (unless otherwise agreed to in writing by Melbourne Water).

For subdivision into lots:

Less than 800 m² in built up areas

- filling will be required to cover the building envelope and flood impacts need to be considered
- the fill level is the applicable flood level plus the relevant freeboard
- the building envelope is to be shown on a Plan of Subdivision.

Less than 800 m² in greenfield areas

- filling of all residential lots to the lot boundary is required
- the fill level is the applicable flood level plus the relevant freeboard
- filling is to be in accordance with a plan showing the drainage strategy for the subdivision. Roads can provide for overland flows.

Greater than 800 m² and less than 1 hectare

- a fill pad is required that covers the entire building envelope
- the fill level is the applicable flood level plus the relevant freeboard
- the building envelope is to be shown on a Plan of Subdivision.

Greater than 1 hectare

- a fill pad of at least 1000 square metres is required
- the fill level is the applicable flood level plus the relevant freeboard
- a Plan of Subdivision should specify a building envelope covering the fill pad.

For flood zones 3 and 5

- no fill pad is required at the subdivision stage
- a fill pad may be required to construct a dwelling depending on the foundation type (see 3.2.1 Dwelling requirements).

3.2.5 Sea level rise

Coastal, tidal and storm surge flooding is becoming an increasing concern in the face of a changing climate. Sea levels are predicted to rise and extreme coastal events are projected to increase in intensity and frequency.

In 2017, Melbourne Water released its *Planning for Sea Level Rise Guidelines*, detailing specific requirements that apply to development proposals in areas that will be affected by tidal inundation (including storm surge and wave action) as a result of predicted sea level rise. These guidelines aim to ensure that proposed development is compatible with any flood risk.

Some parts of the District have been identified as land predicted to be affected by tidal inundation as a result of predicted sea level rise. Flood levels for Western Port vary around the bay. Contact Melbourne Water for site-specific flood levels.

Sea level rise requirements

Where a development proposal is located in an area that will be affected by tidal inundation as a result of predicted sea level rise (see Appendix 2), floors are to be a minimum of 600 millimetres above the relevant predicted future flood level in accordance with Melbourne Water's *Planning for Sea Level Rise Guidelines*[3], or above the minimum floor level requirements detailed in these guidelines, whichever is greater.

3. See: https://www.melbournewater.com.au/sites/default/files/Planning-for-sea-levels.pdf

3.3 Flood safety and access

Proposed developments need to consider the extent, velocity and duration of any flood and issues associated with flood safety, access and isolation to meet the statewide *Guidelines for Development in Flood Affected Areas* (2019) objective "to protect human life and health, and provide safety from flood hazard".

To address the potential flood risk to life, health and safety associated with any development, flood risk factors considered with any proposed development include:

- the frequency, duration, extent, depth and velocity of flooding of the site and access way
- the flood warning time available
- the danger to the occupants of the development, other floodplain residents and emergency personnel if the site or access way is flooded.

Impacts from isolation are also considered, as the prolonged loss of critical services, such as electricity, water and sewerage, can place a greater burden on households and emergency services.

3.4 Waterway and floodplain protection

The natural environment of the former Koo Wee Rup Swamp has changed significantly since the drainage of the swamp and the clearance of large areas of native vegetation for agriculture and urban development. However, there are remnant populations of threatened species, such as the Southern Brown Bandicoot, and it is important to protect and enhance the environmental features of waterways and the floodplain.

To address waterway and flood protection, Melbourne Water considers the effect of any proposed development on river health values, including wetlands, natural habitat, stream stability, erosion, environmental flows, water quality and sites of environmental significance. How a development may enhance habitat connectivity and ensure sediment management is of particular importance.

Safety and access requirements

All developments should aim to provide access to the property where the depth of floodwater is no more than 500 millimetres and the product of velocity and depth is no more than 0.35 metres squared per second, and which otherwise complies with the requirements of Melbourne Water's floodway safety criteria guidelines[4] *in the Land Development Manual*.

4. See: https://www.melbournewater.com.au/planning-and-building/developer-guides-and-resources/standards-and-specifications/floodway-safety

Waterway and floodplain protection requirements

All developments must consider how they will maintain or improve waterway and floodplain condition and maintain or improve water quality.

Note: Any proposed development needs to consider the requirements of the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* and the protection of threatened species and habitat, such as the Southern Brown Bandicoot.

Glossary

Term	Definition
Annual exceedance probability	The likelihood of a flood of a given size happening in any one year. AEP is usually expressed as a percentage; for example, if a flood of a particular size (volume of water) has an AEP of 5 per cent, that means there is a 5 per cent (or 1 in 20) chance of a flood of that size happening in any given year.
Flood level	The maximum level that would be reached by floodwaters during a particular flood event. For example, a 1 per cent AEP flood level is the maximum level that would be reached by floodwaters during a 1 per cent AEP event.
Floodplain	An area of low-lying land adjacent to a waterway. It is normally dry, but is subject to flooding during periods of high rainfall.
Fill pad	An area of land that is filled to a level above flood level. In a rural setting it may act as a place of refuge for livestock and storage for machinery.
Freeboard	The height above the design flood level. It is a factor of safety typically used in relation to the setting of floor levels, apex of underground carpark entrances and so on. Freeboard compensates for a range of factors, including wave action and localised flow effects. It can also compensate for uncertainties in the accuracy of the 1 per cent AEP flood level estimate.
Outbuilding	A building subordinate to but separate from a main building.
Subdivision	The division of land into two or more parts which can be disposed of separately (*Subdivision Act 1988*).

Appendix 1

Summary development requirements for the District

Flood zone	Avg. flood depths	Remarks	Building applications		
			Dwellings	Outbuildings	Extensions
1	Approx. 300 mm	Liable to overland flooding due to overflows from drains.	• Floor levels to be a minimum of 600 mm above the applicable flood level. • For dwellings on stumps, a fill pad is to be a minimum of 150 mm above the applicable flood level. For slabs on ground, a fill pad is to be a minimum of 450 mm above the applicable flood level. • Fill pad area (unless otherwise filled at subdivision stage): - for dwellings on lots less than 800 m^2, a fill pad is to cover the building envelope. - for dwellings on lots greater than 800 m^2, a fill pad is to extend at least 5 m beyond the building.	Outbuildings to be constructed with floor levels a minimum of 300 mm above the applicable flood level for concrete floors and 150 mm above applicable flood levels for earthen floors. Some concessions may be accepted for open-sided structures, such as carports or hay sheds.	As per dwellings and outbuildings. Some concessions may be applied considering location and size of extension, access and design.
2	Approx. 700 mm	Liable to deep flooding as a result of concentrated overflows from a major drain – **filling/building may be refused.**	• Floor levels to be a minimum of 600 mm above the applicable flood level; where depths exceed 500 mm, Melbourne Water may determine that a new building is inappropriate. • Fill pad requirements as for flood zone 1.	As for flood zone 1.	As for flood zone 1.

Flood zone	Avg. flood depths	Remarks	Building applications		
			Dwellings	Outbuildings	Extensions
3	Approx. 150 mm	This area has a high level of protection because of the Yallock Outfall and the Bunyip River levee banks – liable to flooding from local drainage and from minor overflows of the main levee bank system.	• Floor levels to be a minimum of 450 mm above the natural ground surface or 300 mm above the applicable flood level, whichever is greater. • For dwellings on stumps, no fill pads are required. For slabs on ground, a fill pad is to be a minimum of 150 mm above the applicable flood level. • Fill pad area for slabs on ground (unless otherwise filled at subdivision stage): - for dwellings on lots less than 800 m^2, a fill pad is to cover the building envelope. - for dwellings on lots greater than 800 m^2, a fill pad is to extend at least 5 m beyond the building.	As for flood zone 1.	As for flood zone 1.
4	Variable	The Koo Wee Rup township is liable to flooding from local floodwaters and minor overflows of Bunyip River Drain.	• Dwellings to be constructed with floor levels a minimum of 600 mm above the applicable flood level. • A fill pad is required a minimum of 150 mm above the applicable flood level. • Fill pad area (unless otherwise filled at subdivision stage): - for lots less than 800 m^2, a fill pad is required to cover the building envelope. - for lots greater than 800 m^2, a fill pad is required that extends at least 5 m beyond the building.	As for flood zone 1.	As for flood zone 1.
5	Approx. 150 mm	This area is not affected by overflows from any of the main creeks – parts of the area are liable to flooding from local catchments.	• Floors to be a minimum of 450 mm above the natural ground surface or 300 mm above the applicable flood level, whichever is greater. • Fill pad requirements as for flood zone 3.	As for flood zone 1.	As for flood zone 1.

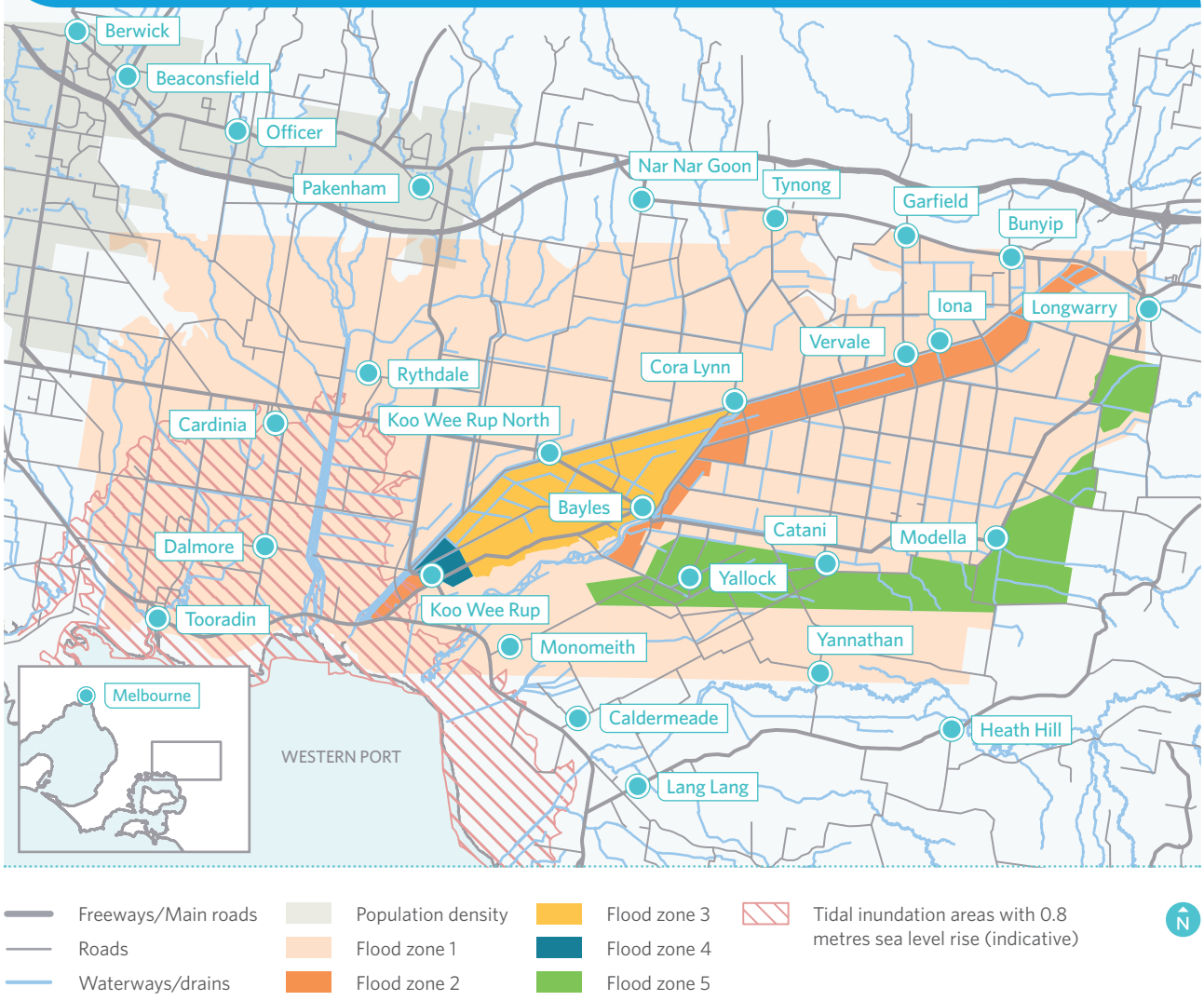
a. Sea level rise may further increase flood depth and minimum floor level requirements – refer to Melbourne Water's *Planning for Sea Level Rise Guidelines*.
b. As well as floor level and fill pad requirements, consider safety and access, and waterway and floodplain protection requirements.
c. For all flood zones, please see specific requirements for milking sheds, poultry farms and other intensive land uses and larger developments.
d. Also refer to floor level requirements for extensions to dwellings as specified in the statewide *Guidelines for Development in Flood Affected Areas* (2019).

Subdivision area or flood zone	Requirements
For subdivision into lots less than 800 m^2 in built up areas	• Filling will be required to cover the building envelope and flood impacts need to be considered • The fill level is the applicable flood level plus the relevant freeboard • The building envelope is to be shown on a Plan of Subdivision.
For subdivision into lots less than 800 m^2 in greenfield areas	• Filling of all residential lots to the lot boundary is required • The fill level is the applicable flood level plus the relevant freeboard • Filling is to be in accordance with a plan showing the drainage strategy for the subdivision. Roads can provide for overland flows.
For subdivision into lots greater than 800 m^2 and less than 1 ha	• A fill pad is required that covers the entire building envelope • The fill level is the applicable flood level plus the relevant freeboard • The building envelope is to be shown on a Plan of Subdivision.
For subdivision into lots greater than 1 ha	• A fill pad is required of at least 1000 m^2 • The fill level is the applicable flood level plus the relevant freeboard • A Plan of Subdivision should specify a building envelope covering the fill pad.
For flood zones 3 and 5	• No fill pad is required at the subdivision stage • A fill pad may be required to construct a dwelling depending on the foundation type – see 3.2.1 Dwelling requirements.

Appendix 2

Tidal inundation areas as a result of sea level rise

Figure 5. Tidal inundation areas as a result of sea level rise



Appendix 3

Floodplain management information

Legislation, strategies and guidelines relevant to the District and floodplain management are briefly outlined below.

Water Act 1989 (Victoria)	Part 10 of the *Water Act 1989* enables floodplain management authorities, such as Melbourne Water, to have waterway, regional drainage and floodplain management functions. A key floodplain management function is to provide advice about flooding and controls on development to councils, the Secretary to the Department and the community.
Planning and Environment Act 1987 (Victoria)	Victoria's statutory land use planning system operates through planning schemes that are subordinate instruments under the *Planning and Environment Act 1987.* Section 62(e) of the Act enables planning schemes to 'regulate or prohibit any use or development in hazardous areas, or areas likely to become hazardous'. As a result, planning schemes contain land use and development controls to enable flood risk to be managed. Floodplain management authorities are referral authorities for development on land covered by the flood planning controls in planning schemes. Development includes the construction, alteration or demolition of a building or works and the subdivision or consolidation of land.
Environment Protection and Biodiversity Conservation Act 1999 (Commonwealth)	The *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) provides a legal framework to protect and manage nationally and internationally important flora, fauna, ecological communities and heritage places. Listed threatened species and ecological communities are matters of national environmental significance under the Act. For example, any proposed development within the District which may impact on a population, or part of a population (as defined under the EPBC Act), of Southern Brown Bandicoots, would require referral to the Commonwealth before commencement.
State Government strategies	The *Victorian Floodplain Management Strategy* (2016)[5]– sets out a systematic approach to evaluating Victoria's flood risks. It also provides a systematic approach to sharing information between individuals, communities, government agencies and other organisations responsible for managing the various aspects of flood risk. Most importantly, it clarifies which agency is accountable for each aspect of floodplain management. The *Victorian Waterway Management Strategy* (2013)[6] provides the framework for government, in partnership with the community, to maintain or improve the condition of rivers, estuaries and wetlands so that they can continue to provide environmental, social, cultural and economic values for all Victorians. The framework is based on regional planning processes and decision making within the broader system of integrated catchment management in Victoria. The *Victorian Rural Drainage Strategy* (Draft)[7] proposes a series of policies and actions to enable landholders to choose how to manage their drainage and drainage systems into the future. The *Victorian Coastal Strategy* (2014)[8] provides guidance for agencies and statutory decision making along the coast and in marine and estuarine environments, provides a framework for related regional plans, strategies and management plans for coastal Crown land, and engages the community to continue to value the coast and marine environments and to participate in its planning and management.

State guidelines	The *Guidelines for Development in Flood Affected Areas* (2019)[9] provide a clear, consistent and transparent process for facilitating development in flood-affected areas in Victoria. Consistency and transparency are established by applying relevant development standards against four defined objectives relating to: flood safety, flood damage, offsite impacts, and waterway and floodplain protection. This document explains that floodplain management authorities, such as Melbourne Water, have discretion to vary from the State guidelines when considering local circumstances. The *Guidelines for Development within the Koo Wee Rup and Longwarry Flood Protection District* do this for the District.
Melbourne Water strategies and guidelines	The *Flood Management Strategy for Port Phillip and Westernport* (2015)[10] sets out how Melbourne Water will continue to work with other agencies and the community to understand, avoid and better manage flood risks. It also outlines how Melbourne Water can support flood emergency preparation and response across the Port Phillip and Westernport region. The *Land Development Manual*[11] provides details of processes and procedures to be followed by land developers and their technical consultants in relation to drainage and flood protection requirements in the Port Phillip and Westernport region. *Planning for Sea Level Rise Guidelines* (2017)[12] sets out the specific requirements that apply to development proposals in areas that will be affected by tidal inundation (including storm surge and wave action) as a result of predicted sea level rise. The aim of these guidelines is to ensure that proposed development is compatible with any flood risk. The *Koo Wee Rup and Longwarry Flood Protection District Customer Service Charter* (2014)[13] outlines landowner rights and obligations as a user of Melbourne Water's flood protection and drainage services, and sets out the minimum standards of customer service.
Assessments	The South East Councils Climate Change Alliance (SECCCA) *Western Port Local Coastal Hazard Assessment*[14] is a detailed and comprehensive hazard assessment, with a focus on inundation and erosion hazards around all shorelines of Western Port and French Island, as well as the northern shorelines of Phillip Island. Information developed by the project will assist to better understand, plan for and manage coastal hazards.

5. See: https://www.water.vic.gov.au/managing-floodplains/new-victorian-floodplain-management-strategy
6. See: https://www.water.vic.gov.au/waterways-and-catchments/rivers-estuaries-and-waterways/strategies-and-planning
7. See: https://engage.vic.gov.au/ruraldrainage
8. See:https://www.coastsandmarine.vic.gov.au/coastal-management/victorian-coastal-strategy
9. See https://www.water.vic.gov.au/__data/assets/pdf_file/0025/409570/Guidelines-for-Development-in-Flood_finalAA.pdf
10 See: https://www.melbournewater.com.au/sites/default/files/2017-10/Flood-Management-Strategy-2015.pdf
11. See: https://www.melbournewater.com.au/planning-and-building/developer-guides-and-resources/ldm-index
12. See: https://www.melbournewater.com.au/sites/default/files/Planning-for-sea-levels.pdf
13. See: https://www.melbournewater.com.au/sites/default/files/KWRL%20Customer%20Charter.pdf
14. See: http://www.seccca.org.au/project/western-port-local-coastal-hazard-assessment/

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