

West Gippsland Catchment Management Authority



Flood Guidelines

Guidelines for development in flood prone areas

Feedback

We welcome feedback on these Guidelines at any time. Comments in writing should be addressed to:

The Statutory Planning Manager

West Gippsland Catchment Management Authority
PO Box 1374
Traralgon VIC 3844
or emailed to planning@wgcm.vic.gov.au

Enquiries

If you would like to develop in a flood prone area, we encourage you to get our advice before you submit a planning permit. To contact a member of our planning team please phone 1300 094 262 or email planning@wgcm.vic.gov.au.

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Introduction

These guidelines aim to promote safe and appropriate development in flood-prone areas within West Gippsland. If you are a property owner, developer, designer or builder who is seeking approval for a development in the West Gippsland region, then these guidelines are for you. We encourage you to read these guidelines and contact a member of our Statutory Planning Team on 1300 094 262, before you submit an application for a planning permit.

The *Victorian Flood Management Strategy 1998* identifies appropriate land use planning controls in municipal planning schemes as the most effective way of reducing the risk of future flood damage. The key principles of these guidelines are:

- > To reduce risk to people and property;
- > To identify and stop negative impacts on waterways and floodplains;
- > To ensure that development is designed appropriately for a flood-prone area;
- > To reduce the reliance on emergency services, and
- > To ensure developments maintain or improve waterway condition.

To do this, we have established seven objectives for developments in flood prone areas.

Objective 1: Flood flow

Works or structures must not affect floodwater flow capacity or the physical form of a waterway.

Objective 2: Flood storage

Works or structures must not reduce floodwater storage capacity.

Objective 3: Site safety

Development must not be allowed where the depth and flow of floodwaters is hazardous.

Objective 4: Site access

Development must not be allowed where the depth and flow of floodwaters along the access to or from the property is hazardous.

Objective 5: Flood damage

Development must be designed to minimise the potential damage to property due to flooding.

Objective 6: Waterway condition

Development must ensure the maintenance or improvement of waterway condition including vegetation (in-stream and terrestrial), physical form (bed and banks), water quality and water quantity.

Objective 7: Water quality

Development must maintain or improve the quality of stormwater and catchment run-off in rural and urban areas.

Background

2.1 About flooding

Floods happen for one of three main reasons

- Riverine flooding, that is when high rainfall causes water to overflow from a river, creek or other watercourse
- Overland flows, that is when underground drainage systems can't cope with the amount of rainfall or runoff; or
- Coastal inundation, that is when high sea levels or waves reach infrastructure or properties.

A key value of floodplains is to store floodwaters and also contribute to waterway condition and quality. In more natural settings - including urban waterways - floodplains add to our natural environment by providing a home to native vegetation, fish, frogs and other creatures.

Floods including coastal inundation and overland flows are classified by the frequency at which they are likely to occur. *Average Recurrence Interval (ARI)* is the estimated number of years between a flood of a given size. For example, floods as large as the 100 year ARI flood event will occur on average once every 100 years.

The 100 year ARI is the generally accepted basis for guidelines and standards for new development in Victoria.

Rainfall varies in length and intensity. A storm of a certain length and intensity will have different effects in different areas. For example, a 100-year rainfall for a small urban drain can occur following a rain storm that lasts an hour but has a very high intensity. On the other hand, low intensity rainfall which lasts for days can generate a 100-year flooding in a major waterway like the Latrobe River.

2.2 Types of flooding

These guidelines address riverine flooding and coastal inundation. Overland flow is also described below but is the responsibility of local government and is generally unmapped in the Gippsland region.

Riverine flooding

Riverine flooding is caused when a river or creek can't cope with the runoff from a major storm and water overflows onto surrounding areas. These areas are called floodplains. This form of flooding is relatively predictable and can be known hours or even days in advance.

Floodplains on most of the larger waterways are set aside for farming or as open space. This helps to reduce the cost of damage and threat to public safety. Areas affected by riverine flooding are generally identified by selecting the 1 in 100 year flood level and identifying land lower than this as subject to flooding.

Coastal inundation

Ocean tides can affect normal sea levels and cause flooding along the coast, along the lower reaches of tidal rivers and within the Gippsland Lakes. Persistent strong wind and large waves can cause storm surges which can also affect water levels along the coast and within the Lakes. The likelihood of extreme rain and an extreme storm surge happening at the same time as a high tide is not considered high.

There are currently no specific controls which deal specifically with rising sea levels. However, State Planning Policy requires that planning take account of a predicted sea level rise of 0.8m by 2100.

The Victorian Government has released *Guidelines for Coastal Catchment Management Authorities: Assessing development in relation to sea level rise - June 2012*. These Coastal Guidelines provide benchmark flood levels for certain types of development that are likely to be affected by rising sea levels. They apply to:

- Areas next to the coastline;
- Estuaries, such as the Gippsland Lakes; and
- The tidal reaches of rivers, drains and other waterways.

Overland flows

Overland flows happen when underground drainage systems can't cope with the amount of rainfall or runoff after or during a storm. Water travels overland finding the lowest path to the closest waterway. Overland flooding usually happens with little or no warning after heavy rainfall. They are often described as 'flash floods'. This type of flooding occurs mainly in urban areas developed before the 1970s when subdivision drainage standards in many parts of Victoria were not adequate.

2.3 Planning controls

Planning scheme

The main laws to control planning decisions under the *Planning and Environment Act 1987* (Vic) are planning schemes. They set out the types of land use or developments which are or are not allowed and for which a permit is required. Planning schemes apply to every part of Victoria. They can be viewed at local council offices and are available on the Department of Planning and Community Development website <http://dpcd.vic.gov.au>.

Responsible authority

Local councils are generally the responsible authority under the *Planning and Environment Act 1987* (Vic). They are responsible for issuing planning permits and ensuring that planning schemes and permits are complied with.

Referral authority

Planning schemes sometimes require a permit to be referred to a specific authority or government department, known as a referral authority, for advice. All permits for development in the West Gippsland region where there is an identified flood risk are referred to WGCMA .

Flooding controls

The planning scheme identifies areas that are affected by flooding and places controls on these areas through four zones or overlays which relate to the type of flooding and their level of risk. The flooding controls are:

- Urban Floodway Zone (UFZ);
- Floodway Overlay (FO);
- Land Subject to Inundation Overlay (LSIO), and
- Special Building Overlay (SBO) - identifies overland flow or 'flash flood' paths and is only applicable to urban areas. This is applied in limited areas within Gippsland due to a lack of mapping of these paths.

These controls are based on different flood types and their potential risk levels. The controls aim to reduce flood risk, by ensuring developments are protected from flooding, while allowing for the free movement and temporary storage of floodwaters.

Most proposals to subdivide land, construct a building, or undertake works in an area covered by a flood control will require a planning permit. The relevant council must refer applications for a permit to the West Gippsland Catchment Management Authority. As a referral authority, the CMA can direct council to refuse a permit, or it can specify conditions to be included in the permit.

Urban Floodway Zone (Clause 37.03 of the Planning Scheme)

The UFZ applies to riverine flooding in urban areas. Unlike the overlays, the UFZ controls land use as well as development, with land use being restricted to low intensity uses such as recreation and agriculture. Development is generally not encouraged in the UFZ.

Floodway Overlay (Clause 44.03 of the Planning Scheme)

The FO applies to riverine flooding in both rural and urban areas where there is a flood risk and there is less need to control land use. Particular types of development are not encouraged but buildings and works associated with low intensity uses such as agriculture may be permitted. Key considerations are whether the development will obstruct flood flows or increase flood risk.

Land Subject to Inundation (Clause 44.04 of the Planning Scheme)

The LSIO applies to riverine flooding in both rural and urban areas. Areas covered by the LSIO can have a similar flood risk to the UFZ or FO areas but the extent of this risk may not as yet have been mapped precisely.

Special Building Overlay (Clause 44.05 of the Planning Scheme)

The SBO applies to overland or flash flooding in urban areas. The purpose of the SBO is to ensure that flood waters are not obstructed or diverted by development. The SBO is only used in limited areas in Gippsland due to a lack of mapping of overland flow paths.

The Planning Scheme allows the consideration of flood issues for all planning applications regardless of whether a site is affected by a relevant zone or overlay.

Application of overlays

Where an area has been through the formal declaration process of the *Water Act 1989* or where more detailed investigations have been completed, the Floodway Overlay and Urban Floodway Zone are applied. Where flood levels and the level of risk have not been established the Land Subject to Inundation Overlay or Special Building Overlay applies.

Making a decision

The flooding controls for the Floodway Overlay and Land Subject to Inundation Overlay have their own decision guidelines which must be considered. They include:

- Whether the proposal could be located on flood-free land or land with a lesser flood risk;
- Susceptibility of the development to flooding and flood damage;
- Potential risk to life, health and safety associated with the development. Flood risk factors include:
 - Frequency, duration, extent, depth and velocity of flooding;

- Warning time available; and
- Danger to occupants, other residents and emergency personnel if flooding occurs.
- Effect of the development on redirecting or obstructing floodwaters, reducing flood storage, and increasing flood levels and flow velocities.

2.4 Submitting a proposal

Before making an application for a planning permit, please contact the WGCMA Statutory Planning Team for advice on flood risk and the applicable flood overlay.

The Team can provide free advice on flood levels and preliminary development proposals before you formally apply for a planning permit from the relevant council. Seeking pre planning permit application advice will significantly speed up the planning permit process as expensive redesign and document resubmission can be avoided.

Please contact the Statutory Planning Team on 1300 094 262 or email planning@wgcma.vic.gov.au

After seeking initial advice from the WGCMA applicants are encouraged to submit fully documented applications so that they can be processed quickly. The following documents are needed to properly consider your application:

- The boundaries and dimensions of the site;
- Surface ground levels to Australian Height Datum (AHD) taken by a licensed Land Surveyor;
- The layout, size and use of the existing and proposed buildings and works;
- Floor levels of any existing and proposed buildings to AHD, and
- Cross section details for accessways to any basements to AHD.

WGCMA checks all applications when they are received to ensure that all the necessary information is included. It has 21 days in which to ask for any further information, but if no further information is required then it must respond to the relevant council within 28 days.

3 THE GUIDELINES

3.1 Principles

Zone and overlay controls for flood prone areas require councils to refer planning applications to the West Gippsland Catchment Management Authority so that it can provide specialist advice. This requirement can only be waived if the council believes the proposal satisfies requirements or conditions previously agreed to in writing.

When providing advice on applications referred to it, the West Gippsland Catchment Management Authority will be guided by the following key principles:

- To reduce risk to people and property;
- To identify and stop negative impacts on waterways and floodplains;
- To ensure that development is designed appropriately for a flood-prone area;
- To reduce the reliance on emergency services, and
- To ensure developments maintain or improve waterway condition.

3.2 Objectives

Applications will be assessed against these seven objectives. These objectives reflect the decision guidelines associated with the Planning Scheme's flood provisions as shown in Section 3.3 below and are mapped in detail in Appendix 2 .

Objective 1 Flood flow: Works or structures must not affect floodwater flow capacity or the physical form of the waterway

This objective ensures existing flood risks are not made worse by changes to the flow characteristics of a floodplain, or overland flow path. A decrease in the available flow area may cause a restriction that increases flood levels upstream and increases flow speed downstream or concentrates flood flows into waterways resulting in erosion of bed or banks. An increase in flow speed can create safety hazards and cause erosion across the floodplain or within a waterway.

Objective 2 Flood storage: Works or structures must not reduce floodwater storage capacity

Flood storage is the area available to temporarily store water during a flood. If this area is filled or developed it may displace floodwater causing higher flood levels elsewhere. The aim is to prevent higher flood levels on adjoining properties.

Objective 3 Site safety: Development must not be allowed where the depth and flow of floodwaters is hazardous

People moving about during a flood should not be endangered by deep or fast flowing water.

Objective 4 Site access: Development must not be allowed where the depth and flow of floodwaters along the access to or from the property is hazardous

People trying to enter or leave a property during a flood should not be endangered by deep or fast-flowing water. This objective considers driveways, roads and footpaths that link a property to a refuge area and aims to safeguard emergency workers as well as residents and visitors.

Objective 5 Flood Damage: Development must be designed to minimise the potential damage to property due to flooding

Developments should be built to reduce the chances of water entering and damaging properties. Developments should also take into account likely flood flow patterns to avoid creating obstructions which would cause floodwater to build up and overflow.

In addition, buildings in flood prone areas should be built from materials which can withstand flooding, and should be designed and located so as to minimise any flood damage. This is particularly important if there are likely to be significant flood velocities or water depths. A report by a suitably qualified person should accompany an application in these circumstances.

Objective 6 Waterway Condition: Development must maintain or improve waterway condition

Waterway condition is assessed by the quality and quantity of vegetation (both in-stream and on land), the physical form of the bed and banks, the quality and quantity of water within the waterway and the level of connection to floodplain areas. Applications will be assessed against their contribution to the maintenance or improvement of waterway condition including demonstrating such things as

- Protecting vegetation - both in-stream and on land;
- Reducing the concentration of flows into waterways;
- Incorporating self-sustaining systems that minimise the costs of maintenance.

Objective 7 Water Quality: Development must maintain or improve the quality of stormwater and catchment run-off in rural and urban areas

Applicants should show how they intend to maintain or improve stormwater and run-off quality. Detailed guidance on waterway management planning is available in the references at the end of this document.

3.3 Relationship between objectives and decision guidelines

The objectives reflect the decision guidelines associated with the Planning Scheme's flood provisions as shown in the following table and mapped in detail in Appendix 2.

Objective 1 Flood flow: Works or structures must not affect floodwater flow capacity or the physical form of waterways

The responsible authority must consider, as appropriate, the frequency, duration, extent, depth and velocity of flooding of the site and access way.

The responsible authority must ensure that flood flows are not concentrated back into waterways resulting in bed and bank instability.

A development should be refused if it is likely to raise flood levels or flow velocities to the detriment of other properties. Potentially adverse effects on upstream and downstream areas must be identified and addressed. Development should not transfer flooding problems from one location to another.

Objective 2 Flood storage: Works or structures must not reduce floodwater storage capacity

The responsible authority must consider, as appropriate, the effect of the development on redirecting or obstructing floodwater, stormwater or drainage water. It must also consider the effect of the development on reducing flood storage and increasing flood levels and flow speed.

A development should be refused if it is likely to obstruct flood flows or reduce natural flood storage. The

capacity of land subject to inundation to carry and store floodwater must be maintained. Cumulative effects must also be considered.

Objective 3 Site safety: Development must not be allowed where the resultant depth and flow of floodwaters would create a hazard

The responsible authority must consider, as appropriate, the potential flood risk to life, health and safety associated with the development. It must also consider the flood warning time available and whether the proposed use or development could be located on flood-free land or land with a lesser flood hazard.

A development should be refused if it is likely to result in danger to the life, health and safety of the occupants due to flooding of the site.

Objective 4 Site access: Development must not be allowed where the depth and flow of floodwaters would make access to or from a property hazardous

The responsible authority must consider, as appropriate, the danger to the occupants of the development, other floodplain residents and emergency personnel if the site or accessway is flooded.

A development should be refused if it relies on low-level access to and from the site and/or it is likely to increase the burden on emergency services and the risk to emergency personnel.

Objective 5 Flood damage: Development must be designed to minimise the potential damage to property due to flooding

The responsible authority must consider, as appropriate, the susceptibility of the development to flooding and flood damage.

A development should be refused if it is likely to increase the amount of flood damage to public or private assets. It should also be refused if any subdivision, development or redevelopment is likely to increase the number of buildings located in a floodway area.

Objective 6 Waterway condition: Development must ensure the maintenance or improvement of waterway condition

The responsible authority must consider, as appropriate, the effect of the development on environmental values such as natural habitat, stream stability, erosion and sites of scientific significance.

A development should be refused if it is likely to be detrimental to natural habitat particularly vegetation, waterway stability, erosion, sites of significance, etc.

Objective 7: Water quality: Development must maintain or improve the quality of stormwater and catchment run-off in rural and urban areas

The responsible authority must consider, as appropriate, the effect of the development on environmental values such as water quality. A development should be refused if it is likely to be detrimental to water quality.

More information is available in the VPP Practice Note “Applying for a Planning Permit under the Flood Provisions - A Guide for Councils, Referral Authorities and Applicants” (DoI, 2000). A second practice note (“Applying the Flood Provisions in Planning Schemes – A Guide for Councils”, DoI, 2000)” provides guidance about applying the flood provisions in planning schemes.

3.4 Summary table

Objective	Minimum requirement	Comments
Flood flow	Works or buildings must not affect floodwater flow capacity – no reduction in flood flow capacity	Very important for all works in flow paths
Flood storage	Works or buildings must not reduce floodwater storage capacity	May not be a restriction on minor fringes of large floodplains
Site safety	Developments should not be allowed where the depth and flow of floodwater on a property will be hazardous, as determined by the following conditions: <ul style="list-style-type: none"> • Depth > 0.3m • Velocity > 1.5m/s • Depth x Velocity > 0.3m²/s 	Important for building entrances and surrounds, and other key outdoor access areas (eg. outbuildings, car parking areas), ingress and egress routes
Access safety	Developments should not be allowed where the depth and flow of floodwater affecting the access route will be hazardous, as determined by the following conditions: <ul style="list-style-type: none"> • Depth > 0.3m • Velocity > 1.5m/s • Depth x Velocity > 0.3m²/s 	Important for connecting roads, driveways, footpaths, ingress, and egress routes (eg. connecting routes to higher ground / refuge areas)
Flood damage	Works or buildings should not be allowed where flood damage costs are likely to be increased	Must consider cumulative impacts as well as direct and indirect costs such as loss of business due to inaccessibility and disruption during a flood
Waterway condition	Development should not be allowed where it is likely to detrimentally impact natural habitat, vegetation, waterway stability, erosion, sites of significance, etc	A Waterway Management Plan will be required to demonstrate how waterway condition will be improved and managed long term
Water quality	Development should not be allowed where it is likely to detrimentally impact water quality	A Stormwater Management Plan will be required to demonstrate how stormwater from the site will be improved and managed long term

What is freeboard?

Freeboard is the space above a certain flood level and is used to provide some safety in setting floor levels. The minimum freeboard requirements allow for wave action and water movement resulting from variations in land form. Freeboard also gives more protection from flooding which is marginally above the defined flood level. The West Gippsland Catchment Management Authority has adopted the 100-year flood level with a minimum 300 mm freeboard requirement.

A greater freeboard may be required on occasions, for instance where buildings contain valuable equipment or potentially hazardous substances.

Freeboard requirements for areas impacted by climate change and sea level rise will be established in line with normal floodplain management best practice and consistent with direction on appropriate flood levels in such areas.

What is Velocity/Depth Ratio?

The velocity/depth ratio defines the level of safety/risk in terms of the depth and velocity of water. Minimum floor levels provide protection for a property and its contents, but separate provisions are needed to protect people moving about or attempting to enter or leave a property so that they are not at risk from deep or fast-flowing water. This is particularly important if access areas around the main building are below the 100-year flood level. Key areas to be assessed include:

- Building entrance and exit points and their surrounds;
- Connecting routes to outbuildings or car parking areas; and
- Connecting routes to higher ground.

Areas of low risk are where:

- The depth of water is no more than 0.3m
- The velocity of water flow is no more than 1.5m/s
- The product of depth (in metres) and velocity of flow (in metres/second) is no more than $0.3\text{m}^2/\text{s}$

In general terms this means that:

- Low hazard areas should pose no significant evacuation problems.
- In medium hazard areas, most adults and children should be able to wade safely to safety.
- In high hazard areas children, the elderly or disabled may have trouble wading to safety and evacuation by vehicles will not be possible.
- In extreme hazard areas evacuation other than by boat or helicopter is not possible.

Flood depth and velocity are the key determinates of flood hazard. However, when assessing a planning application in existing urban areas, the following additional factors will also be considered:

- The speed at which flood levels will rise
- Duration of the flood
- Debris such as branches in the water
- Turbidity of the water
- Distance to safety
- Type of land use (ie. residential areas are a greater hazard than industrial or rural areas)
- Flood awareness
- Warning time
- The size of the population at risk
- Whether large numbers of people will be evacuated over the same pathway and at night or in the rain
- For applications for new dwellings outside of existing urban areas where the rate of rise is slow, the warning time is long, the size of the population is small, the distance to safety is short and a formal flood awareness program such as recognised flood wardens exist a larger depth by velocity ratio may be considered. This will be considered only if a flood risk report is submitted with the application and the maximum depth along the access route does not exceed 0.8m. In West Gippsland this criteria only applies to:
 - The Macalister River downstream of Glenmaggie Weir
 - The Thomson/ Rainbow downstream of Cowwarr Weir
 - The Latrobe River downstream of Lake Narracan

Appendix one - examples

The following are examples for particular development types. Note that if the proposal is for:

- A large multi-lot or staged sub-division in a new development area or similar, a **detailed flood study** (most likely involving 2-D hydraulic modelling) will be required by the Authority;
- Infill development (small, within existing zoning), shed, garage, carport, etc, a **flood risk report** (refer to “*Applying for a Planning Permit Under the Flood Provisions: A guide for councils, referral authorities and applicants*”) may be required by the Authority.

Note also that where applicable, flood reports must have regard for factors associated with predicted sea level rise.

1 Residential development *eg replacement dwellings, extensions, unit development, accommodation*

Objective	Target outcome	Other relevant considerations
<p>Objective 1: Flood flow - Works or structures must not affect floodwater flow capacity</p> <p>Objective 2: Flood storage - Works or structures must not reduce floodwater storage capacity</p>	<p>New buildings should be located outside the active flow area.</p> <p>Ground floor building envelope should not be bigger than the original if flood storage is an issue.</p> <p>Extensions should preferably be upper storey additions.</p> <p>If storage capacity is lost, the ground floor footprint of a replacement building must be no larger than the one it is replacing and must meet floor level as well as site access and safety requirements.</p>	<p>Flow to adjacent property boundaries must be 0mm or less and change in speed at site must be 0m/s or less.</p> <p>Cut-fill balance of 1.3:1.0 required unless flood study demonstrates otherwise and cut area must be fully active during a flood.</p> <p>Long term cumulative impacts.</p> <p>Type and alignment of fences.</p> <p>Site drainage.</p>
<p>Objective 3: Site safety - Development must not be allowed where depth and flow of floodwaters would be hazardous</p> <p>Objective 4: Site access - Development must not be allowed where the depth and flow of floodwaters would make access to or from a development hazardous</p>	<p>Approval is unlikely if along the access route and at site:</p> <ul style="list-style-type: none"> • depth > 0.3m or • velocity > 1.5m/s or • vxd > 0.3m²/s <p>Replacement buildings that cannot meet these requirements should be located in a less hazardous position.</p> <p>Access to basements with finished floor levels below the 100-year flood level must meet site safety requirements.</p>	<p>Fill pads to minimum of 100-year flood level may be used to achieve site safety requirements in coastal areas and in the farm zone, provided local drainage, flood flow and flood storage considerations are addressed to the Authority’s satisfaction.</p> <p>Acceptable flood hazard for proposed use.</p> <p>Shrinking islands.</p> <p>Site is building footprint plus 2m.</p>

Objective	Target outcome	Other relevant considerations
Objective 5: Flood damage- Development must be designed to minimise the potential damage to property due to flooding	<p>Extensions with a combined floor area greater than 20m² should have floor levels at least 300mm above the 100-year flood level.</p> <p>Floor level extensions substantially below the 100-year flood level should be avoided.</p> <p>Flood-resistant materials should be used for extensions with floor levels lower than the 100-year flood level.</p> <p>Flow should not penetrate sub-floor areas below the 100-year flood level.</p> <p>No garage, only open sided buildings and small garden sheds at natural surface if land above 100-year flood level not available.</p>	<p>Building height restrictions may apply. This may be overcome by reducing floor to ceiling height.</p> <p>If raising the floor level will result in a demonstrated impractical outcome, an extension floor level no lower than the existing floor may be considered, subject to an assessment of site safety and access safety and construction using flood resistant materials.</p> <p>Any non-residential building extension marginally below the 100-year flood level may be feasible for low sensitivity uses.</p> <p>Development may be supported if flood flow and flood storage requirements are fully achieved and there is substantial reduction in overall risk in terms of freeboard, site safety and access safety.</p> <p>Wet flood proofing of residential buildings is generally not supported.</p>
Objective 6: Waterway condition- Development must ensure the maintenance or improvement of the stream habitat, wildlife corridors and landscape values Objective 7: Water quality - Development must maintain or improve the quality of stormwater and catchment run-off in rural and urban areas	<p>Environmental impacts of cut and fill proposals need to be considered carefully, particularly in relation to the excavated areas where revegetation and future management will be important issues.</p>	

2 Commercial or industrial development

Objectives	Target outcome	Other relevant considerations
<p>Objective 1: Flood flow - Works or structures must not affect floodwater flow capacity</p> <p>Objective 2: Flood storage - Works or structures must not reduce floodwater storage capacity</p>	<p>New buildings should be located outside the active flow area.</p> <p>Ground floor building envelope should not be bigger than the original if flood storage is an issue.</p> <p>Extensions should be upper storey additions.</p> <p>If storage capacity is lost, the ground floor footprint of a replacement building must be no larger than the one it is replacing and must meet floor level as well as site access and safety requirements.</p> <p>If storage capacity is lost only open sided shed allowed.</p>	<p>Flow to adjacent property boundaries must be 0mm or less and change in speed at site must be 0m/s or less.</p> <p>Cut-fill balance of 1.3:1.0 required unless flood study demonstrates otherwise and cut area must be fully active during a flood.</p> <p>Long term cumulative impacts.</p> <p>Type and alignment of fences.</p> <p>Site drainage.</p>

Objectives	Target outcome	Other relevant considerations
<p>Objective 3: Site safety - Development must not be allowed where the depth and flow of floodwaters would be hazardous</p> <p>Objective 4: Site access - Development must not be allowed where the depth and flow of floodwaters would make access or egress hazardous</p>	<p>Approval is unlikely if along the access route and at site:</p> <ul style="list-style-type: none"> • depth > 0.3m or • velocity > 1.5m/s or • $v \times d > 0.3m^2/s$ <p>Replacement buildings that cannot meet these requirements should be located in a less hazardous position.</p> <p>Access to basements with finished floor levels below the 100-year flood level must meet site safety requirements.</p>	<p>Fill pads to minimum of 100-year flood level may be used to achieve site safety requirements in coastal areas provided local drainage, flood flow and flood storage considerations are addressed to the Authority's satisfaction.</p> <p>Acceptable flood hazard for proposed use.</p> <p>Shrinking islands.</p> <p>Site is building footprint plus 2m.</p>
<p>Objective 5: Flood damage - Development must be designed to minimise the potential damage to property due to flooding</p>	<p>Extensions with a combined floor area greater than 20m² should have floor levels at least 300mm above the 100-year flood level.</p> <p>Floor level extensions substantially below the 100-year flood level should be avoided.</p> <p>Flood-resistant materials should be used for extensions with floor levels lower than the 100-year flood level.</p> <p>Flow should not penetrate sub-floor areas below the 100-year flood level.</p> <p>Materials that could become pollutants in the event of inundation should be relocated outside the floodplain.</p>	<p>Building height restrictions may apply. This may be overcome by reducing floor to ceiling height.</p> <p>If raising the floor level will result in a demonstrated impractical outcome, an extension floor level no lower than the existing floor may be considered, subject to an assessment of site safety and access safety and construction using flood resistant materials.</p> <p>Any non-residential building extension marginally below the 100-year flood level may be feasible for low sensitivity uses.</p> <p>Development may be supported if flood flow and flood storage requirements are fully achieved and there is substantial reduction in overall risk in terms of freeboard, site safety and access safety.</p> <p>The building should be sited so:</p> <ul style="list-style-type: none"> • Flow depths and velocity are less hazardous than at existing location. • The distance between the replacement building and land above the 100-year flood level is minimised. • Access at street frontage is to the highest available point. • Wet flood proofing of buildings may be supported in cases where minimum freeboard requirements cannot be met. • Additional freeboard may be required for high hazard / highly sensitive premises.
<p>Objective 6: Waterway condition - Development must ensure the maintenance or improvement of the stream habitat, wildlife corridors and landscape values</p> <p>Objective 7: Water quality - Development must maintain or improve the quality of stormwater and catchment run-off in rural and urban areas</p>	<p>Environmental impacts of cut and fill proposals need to be managed carefully, particularly in relation to the excavated areas where revegetation and future management will be important issues.</p>	

3 Vehicle related structures *eg carports, garages, driveways, parking areas, accessways*

Objectives	Target outcome	Other relevant considerations
<p>Objective 1: Flood flow - Works or structures must not affect floodwater flow capacity</p> <p>Objective 2: Flood storage - Works or structures must not reduce floodwater storage capacity</p>	<p>Structures should be located away from active flow areas.</p> <p>Causeways/accessways must not prejudice flood flow or storage requirements</p>	<p>Open structures, such as carports, need only meet site safety and site access requirements.</p>
<p>Objective 3: Site safety - Development must not be allowed where the depth and flow of floodwaters would create a hazard</p> <p>Objective 4: Site access - Development must not be allowed where the depth and flow of floodwaters would make access to or from development hazardous</p>	<p>Locate away from active flow areas.</p> <p>Accessways should be no lower than 100-year flood level.</p> <p>Entrance requirements for underground car parks</p> <p>Access to basements (eg. car parks) must meet site safety requirements and include an entry/exit route that incorporates a continuous apex that is a minimum of 300mm above the 100-year flood level.</p> <p>The area between a garage and/or carport and a main building must meet site and access safety requirements.</p> <p>No garage, only open sided buildings and small garden sheds at natural surface if land above 100-year flood level not available.</p>	<p>Driveways can be used as overland flow paths as long as basic safety requirements are met.</p> <p>Consideration should be given to guideposts along potentially submerged causeways.</p> <p>Mechanisms aimed at preventing inundation of basement car parks may be considered provided such mechanisms are supported by a Flood Response Plan that includes a routine test and fault fix maintenance schedule but only after the applicant has explored all other alternatives and these have been fully documented and costed to the satisfaction of the Authority.</p>
<p>Objective 5: Flood damage- Development must be designed to minimise the potential damage to property due to flooding</p>	<p>The finished floor level of garages, carports and car parks may be up to 300mm below the 100-year flood level.</p> <p>The finished floor level of garden and other small sheds (less than 20m²) may be at natural surface if no alternative (ie. higher ground) available</p> <p>The finished floor level of hay/machinery shed may be at natural surface if no alternative (ie. higher ground) available.</p> <p>The finished floor level of a serviced shed (eg. with power, offices, etc) must be a minimum of 300mm above the 100-year flood level.</p> <p>Extensions with a combined floor area greater than 20m² must satisfy the above minimum floor level requirements.</p> <p>Lower finished floor levels may be considered if flood proofing measures such as water proof materials and raising of electrical and other high damage potential items are raised above the flood protection level.</p>	

Objectives	Target outcome	Other relevant considerations
<p>Objective 6: Waterway condition- Development must ensure the maintenance or improvement of the stream habitat, wildlife corridors and landscape values</p> <p>Objective 7: Water quality - Development must maintain or improve the quality of stormwater and catchment run-off in rural and urban areas</p>	<p>Environmental impacts of cut and fill proposals need to be managed carefully, particularly in relation to the excavated areas where revegetation and future management will be important issues.</p>	

4 Miscellaneous other structures *Eg cut and fill, fences, fill pads, landscaping etc*

Objective	Target Outcome	Other Relevant Considerations
<p>Objective 1: Flood flow - Works or structures must not affect floodwater flow capacity</p> <p>Objective 2: Flood Storage - Works or structures must not reduce floodwater storage capacity</p>	<p>Fill pads - Fill pads must not impede flood flows or reduce flood storage capacity.</p> <p>Cut and fill - Preserve flood storage capacity in areas below the 100-year flood level by matching any filled area with an excavated area of 1.3 times the volume, also below the 100-year flood level, freely draining, and in the immediate vicinity.</p> <p>Works should not result in flows being directed onto other properties.</p> <p>Landscaping - Designs must ensure that flood storage and flow behaviour is not compromised.</p> <p>The type and alignment of fences must minimise the obstruction to flood flows.</p>	<p>Ornamental water bodies are sometimes proposed in the bottom of excavated areas, but the volume occupied by the water body when full does not count towards the flood storage requirements.</p> <p>Cut and fill proposals must seek to manage impacts within the developing land, otherwise agreement must be obtained from other land owners where works are proposed.</p> <p>Vegetation that impedes flood flows will be unacceptable in active flow paths.</p> <p>Avoid fencing that will trap debris – the build-up may increase flood levels upstream, divert flows onto more valuable assets, increase downstream flood levels and velocities when the fence collapses. Solid fences (eg. brick, timber paling, corrugated iron, etc) will not be approved. New or replacement fences must be open style, contain break-away panels or include gaps to 100-year flood level at the bottom.</p>
<p>Objective 6: Waterway condition - Development must ensure the maintenance or improvement of the stream habitat, wildlife corridors and landscape values</p> <p>Objective 7: Water quality - Development must maintain or improve the quality of stormwater and catchment run-off in rural and urban areas</p>	<p>Environmental impacts of cut and fill proposals need to be managed carefully, particularly in relation to the excavated areas where revegetation and future management will be important issues.</p>	

Appendix two - decision guidelines

	Planning scheme decision guidelines and objectives map	Flood flow	Flood storage	Site safety	Site access	Flood damage	Waterway condition	Water quality
SPPF Clause 13.02-1	Floodplain management - to help protect:							
	• Life, property and community infrastructure from flood hazard.			✓	✓	✓		
	• The natural flood carrying capacity of rivers, streams and floodways.	✓						
	• The flood storage function of floodplains and waterways.		✓					
	• Floodplain areas of environmental significance or of importance to river health.						✓	✓
LPPF	Refer to each councils Local Planning Policy Framework.							
Clause 65	Approval of an application or plan - Before deciding on an application or approval of a plan, the responsible authority must consider, as appropriate:							
	• The matters set out in Section 60 of the Act.							
	• The State Planning Policy Framework and the Local Planning Policy Framework, including the Municipal Strategic Statement and local planning policies.							
	• The purpose of the zone, overlay or other provision.							
	• Any matter required to be considered in the zone, overlay or other provision.							
	• The orderly planning of the area.							
	• The effect on the amenity of the area.						✓	
	• The proximity of the land to any public land.							✓
	• Factors likely to cause or contribute to land degradation, salinity or reduce water quality.							✓
	• Whether the proposed development is designed to maintain or improve the quality of stormwater within and exiting the site.							
	• The extent and character of native vegetation and the likelihood of its destruction.						✓	
	• Whether native vegetation is to be or can be protected, planted or allowed to regenerate.						✓	
	• The degree of flood, erosion or fire hazard associated with the location of the land and the use, development or management of the land so as to minimise any such hazard.	✓			✓	✓	✓	

Planning scheme decision guidelines and objectives map		Flood flow	Flood storage	Site safety	Site access	Flood damage	Waterway condition	Water quality	
UFZ	Before deciding on an application, in addition to the decision guidelines in Clause 65, the responsible authority must consider, as appropriate:								
	• The State Planning Policy Framework and the Local Planning Policy Framework, including the Municipal Strategic Statement and local planning policies.								
	• The local floodplain development plan or flood risk report.	✓	✓	✓	✓	✓			
	• Any comments of the relevant floodplain management authority.	✓	✓	✓	✓	✓	✓	✓	
Flood risk report	Flood risk report- If a local floodplain development plan for the area has not been incorporated into this scheme, an application must be accompanied by a flood risk report to the satisfaction of the responsible authority. The flood risk report must consider the following, where applicable:								
	• The existing use and development of the land.								
	• Whether the proposed use or development could be located on flood-free land or land with a lesser flood hazard outside this zone.			✓	✓	✓			
	• The susceptibility of the development to flooding and flood damage.	✓	✓			✓			
	• The potential flood risk to life, health and safety associated with the development.			✓	✓	✓			
	Flood risk factors to consider include:								
	• The frequency, duration, extent, depth and velocity of flooding of the site and accessway.			✓	✓	✓			
	• The flood warning time available.			✓	✓	✓			
	• The danger to the occupants of the development, other floodplain residents and emergency personnel if the site or accessway is flooded.			✓	✓				
	• The effect of the development on redirecting or obstructing floodwater, stormwater or drainage water and the effect of the development on reducing flood storage and increasing flood levels and flow velocities.	✓	✓						
• The effects of the development on environmental values such as natural habitat, stream stability, erosion, water quality and sites of scientific significance.							✓	✓	

Planning scheme decision guidelines and objectives map		Flood flow	Flood storage	Site safety	Site access	Flood damage	Waterway condition	Water quality
FO	Before deciding on an application, in addition to the decision guidelines in Clause 65, the responsible authority must consider, as appropriate:							
	• The State Planning Policy Framework and the Local Planning Policy Framework, including the Municipal Strategic Statement and local planning policies.	✓	✓	✓	✓	✓	✓	✓
	• The local floodplain development plan or flood risk report.	✓	✓	✓	✓	✓	✓	✓
	• Any comments of the relevant floodplain management authority.	✓	✓	✓	✓	✓	✓	✓
	• The Victorian River Health Strategy (2002) and any relevant regional river health strategy and associated wetland plan.						✓	✓
LSIO	Before deciding on an application, in addition to the decision guidelines in Clause 65, the responsible authority must consider, as appropriate:							
	• The State Planning Policy Framework and the Local Planning Policy Framework, including the Municipal Strategic Statement and local planning policies.	✓	✓	✓	✓	✓		
	• Any local floodplain development plan							
	• Any comments from the relevant floodplain management authority.	✓	✓	✓	✓	✓		
	• The existing use and development of the land.			✓	✓	✓		
	• Whether the proposed use or development could be located on flood-free land or land with a lesser flood hazard outside this overlay.			✓	✓	✓		
	• The susceptibility of the development to flooding and flood damage.			✓		✓		
	• The potential flood risk to life, health and safety associated with the development.			✓	✓			
	Flood risk factors to consider include:							
	• The frequency, duration, extent, depth and velocity of flooding of the site and accessway.			✓	✓	✓		
	• The flood warning time available.			✓	✓	✓		
	• The danger to the occupants of the development, other floodplain residents and emergency personnel if the site or accessway is flooded.			✓	✓			
	• The effect of the development on redirecting or obstructing floodwater, stormwater or drainage water and the effect of the development on reducing flood storage and increasing flood levels and flow velocities.	✓	✓					
	• The effect of the development on river health values including wetlands, natural habitat, stream stability, erosion, environmental flows, water quality and sites of scientific significance.						✓	✓

	Planning scheme decision guidelines and objectives map	Flood flow	Flood storage	Site safety	Site access	Flood damage	Waterway condition	Water quality
Practice Note	We will consider the following decision guidelines when deciding or commenting on an application:							
	• A development must be consistent with:							
	- the SPPF (clause 13.02)	✓	✓	✓	✓	✓	✓	✓
	- any flood-related statements made in the MSS (clause 21) and local planning policies (clause 22) of the planning scheme							
	- any flood-related guidelines incorporated in the planning scheme							
	- any regional catchment strategy or floodplain management strategy adopted by the CMA							
	- any local floodplain development plan adopted by a council							
	- any other development guidelines agreed to by the council and the floodplain management authority.							
	- The potential impact of an extreme event larger than the 100-year ARI flood on life, health, safety and damage.	✓	✓	✓	✓	✓		
	• Emergency facilities should be located above the 100-year ARI flood level, and preferably above the PMF level.							
	• The possibility of relocating that development to land which is flood-free or which has a lesser risk.			✓	✓	✓		
	• Residential, commercial and industrial buildings are not generally an appropriate development on floodway land in view of their potential for flood hazard and for obstruction of flood flows.	✓	✓	✓	✓	✓	✓	✓
	• Significant earthworks, such as levee banks, channel banks and raised roads are not appropriate on floodway land in view of their potential for obstruction of flood flows.	✓	✓					
	• The incremental long-term effects of developments. While a single development may not cause a significant change, the cumulative effect of several similar developments may be substantial.	✓	✓	✓	✓	✓	✓	✓
	• The design of buildings should adopt flood-proofing measures that minimise the physical effects of flooding on the building structure and its contents.					✓		
• Activities that generate or store significant quantities of nutrients or noxious or hazardous materials should not be located on land subject to inundation; for example, sewage treatment and pumping plants, intensive animal industries, sanitary landfill depots and food-processing plants.						✓	✓	

Planning scheme decision guidelines and objectives map

	Flood flow	Flood storage	Site safety	Site access	Flood damage	Waterway condition	Water quality
<ul style="list-style-type: none"> A development should be refused if it is likely to cause an unacceptable increase in flood risk in the following situations: 							
- it is likely to result in danger to the life, health and safety of the occupants due to flooding of the site			✓				
- it relies on low-level access to and from the site				✓			
- it is likely to increase the burden on emergency services and the risk to emergency personnel			✓	✓	✓		
- it is likely to increase the amount of flood damage to public or private assets							
- it is likely to raise flood levels or flow velocities to the detriment of other properties. Potentially adverse effects on upstream and downstream areas must be identified and addressed. Development should not transfer flooding problems from one location to another	✓						
- it is likely to obstruct flood flows or reduce natural flood storage. The capacity of land subject to inundation to convey and store floodwater must be maintained	✓	✓					
- it is likely to be detrimental to natural habitats, waterway stability, water quality or sites of significance						✓	✓
- if any subdivision, development or redevelopment is likely to increase the number of buildings located in a floodway area.					✓		

Glossary

Active Flow Path

Areas of an overland flow path or floodplain where a significant proportion of the flow occurs. Usually aligned with naturally or artificially defined channels and carrying relatively deep and / or high velocity flows.

Average Recurrence Interval (ARI):

A statistical estimate of the average period in years between the occurrence of a flood of a given size or larger.

Development

In the context of this document, refers to building, works and sub-division.

Flood Level

The maximum level that would be reached by floodwaters during a particular event.

- 100-year flood level: The maximum level that would be reached by floodwaters during a 100-year event.
- 100-year event: A large flooding event that has a probability of occurrence of 1 in 100 in any given year. Over a very long time period, such events would, on average, occur once per 100 years of record.

Flood Risk

Relationship between flood level, consequence of flooding and the likelihood of flooding.

Flood Fringe Area

An area of an overland flow path or floodplain where inundation is shallow and which does not accommodate a significant proportion of flow capacity or storage capacity.

Freeboard

Freeboard is the height above a defined flood level (eg 100 year ARI) and is used to provide a factor of safety in the setting of floor and other levels.

Overland Flow Path (OLFP)

Land affected by surface flows that occur when the underground drainage system cannot accept any more stormwater. The overland flow path could:

- Comprise a natural drainage surcharge path, a constructed floodway associated with an underground drainage system or a roadway above or along an underground drainage system to carry flows that exceed the underground drain capacity.
- Have no flood warning time.

Runoff

The component of rainfall that runs off into the drainage / waterway network (Rainfall = Runoff + Evaporation + Infiltration). Also known as rainfall excess.

Safe Access

Means by which entry or exit may be gained to or from a building to adjoining land or roadways above flood level. Safe access should be consistent with site safety requirements. (see 4.3.4).

Safety Risk

May be a function of velocity or depth, or both. Safety risk information is available from West Gippsland Catchment Management Authority for properties within the drainage survey areas.

References

- Best Practice Environmental Management Guidelines for Urban Stormwater; CSIRO 1999
- Guidelines for Setbacks from Waterways – for Greenfield Development Zones within the Port Phillip and Westernport Region (draft); Melbourne Water, 2010
- Melbourne Water Land Development Manual (refer Melbourne Water website)
- The Waters of Victoria State Environmental Planning Policies (SEPP)
- Victoria's Native Vegetation Management: A Framework for Action; Department of Natural Resources and Environment 2002
- Guidelines for Coastal Catchment Management Authorities: Assessing development in relation to sea level rise, Department of Sustainability and Environment, June 2012
- Victoria Planning Provisions (VPPs).Department of Planning and Community Development
- Victoria Planning Provisions Practice Notes: Applying the Flood Provisions in a Planning Scheme - A Guide for Councils.Department of Planning and Community Development, 2012
- Victoria Planning Provisions Practice Notes: Applying for a Planning Permit under the Flood Provision - A Guide for Councils, Referral Authorities and Applicants.Department of Infrastructure, 2000

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