

Draft Shelter-in-place Guideline - Preamble

Keeping people safe during floods requires using many different risk management strategies and relies on good planning, how infrastructure and development is designed and where it is located, flood preparedness and the ability to evacuate safely. This draft guideline is about using shelter in place as one part of helping ensure people are safe during floods.

Evacuation constraints are a critical issue when councils and consent authorities are considering development applications, planning proposals and state-led rezonings. There are two evacuation options – horizontal and vertical (shelter-in-place).

The primary strategy for the NSW State Emergency Service is horizontal evacuation of people to an area outside of the effects of flooding that has adequate facilities to maintain the safety of the community. However, during flash floods this may not be possible due to the short warning times.

This draft guideline should be read in conjunction with Sections A and D of the [Support for Emergency Management Planning - Flood Risk Management Guide EM01](#) which provides advice on emergency management, including the consideration of shelter in place.

The department is consulting on this draft shelter-in-place guideline with the intention that, once finalised, there will be clear and consistent guidance available to councils and consent authorities about when shelter-in-place can be used as an alternative to off-site evacuation for emergency management in flood events.

As with any other flood risk management strategy, the use of shelter-in-place as a flood risk management approach will require clear and regular communication and a robust community awareness for individuals to understand their level of risk and the triggers for associated actions.

Evacuation as the initial response strategy for flooding

Flooding may displace individuals or disrupt services to communities for hours, days or weeks. Getting people out before major floods is the best way to keep people safe and reduce the impacts of an emergency on a community. Evacuation involves moving people threatened by a flood to a safer location and, typically, their eventual safe and timely return.

The NSW State Flood Plan identifies the ability for people to move themselves from flood-affected areas to a safe location, preferably with access to community services, as the best flood response

strategy. For an evacuation to be as effective as possible, it must be appropriately planned and implemented.

Understanding flood behaviour

Planning for flood emergencies requires an understanding of the full range of flood behaviour up to the probable maximum flood (PMF). This is achieved through flood studies, floodplain risk management studies and plans by the state and local government, and flood plans developed by the NSW SES. The flood emergency planning process determines the most appropriate risk management strategy for each community.

In some situations, attempting to evacuate may be worse than not evacuating. This is especially the case where flash flooding leaves very little time for evacuation and can result in isolation with very little notice. This is where there can be a role for shelter-in-place approaches.

Flash flooding

Flash flooding is inherently more dangerous than riverine flooding or coastal inundation, largely due to the short timeframes associated with flash flood events, the speeds and depths associated with these events, and difficulties associated with evacuation to a safe location.

In flash flood catchments, the time to flooding and flood duration are typically very short with minimal warning time. Warnings to the community are often limited to severe weather warnings or flood watches for the general area. There is often no specific advice available on the local impacts of flash flooding and there may be little time between the start of flood-producing rainfall and flooding of roads, property and potentially buildings.

Draft Shelter-in-place Guideline

Evacuation is the primary response strategy for flooding

- Horizontal evacuation at street level is achieved by vehicle before any roads are cut by floodwaters.
- It is a risk management strategy used to reduce loss of life or lessen the effects of an emergency on a community.
- Evacuation requires an understanding of the full range of flood behaviour up to the probable maximum flood (PMF), which is reflected in flood plans developed by the NSW SES and Floodplain Risk Management Studies by councils.

Shelter-in-place (SIP)

- Shelter-in-place is the movement of occupants to a building or the occupants remaining in a location that provides vertical refuge on the site or near the site above the PMF level before their property becomes flood-affected.
- Currently, SIP in infill developments is being approved on an ad hoc basis (part of a merit-based assessment of each development), while it is not considered an acceptable flood management approach in greenfield areas or large-scale urban renewal.
- There are limited applications of SIP as a policy for floodplain management internationally and it is not widely practised in Australia, although some councils such as Tweed, Northern Beaches and Parramatta have SIP provisions in their development control plans.

When SIP is appropriate

- SIP is an emergency management response, especially when the flood warning time and flood duration are both less than six hours (typically called flash floods).
- These flooding events are dangerous because of the short timeframes, as well as the flood speed and depth.
- Under such circumstances, evacuation via vehicle may not be possible. SIP is the last resort evacuation option for development in greenfield and infill areas.

Where to apply SIP

- SIP is a refuge occurring above the PMF level. Thus, the height of PMF would determine the application of SIP regardless of development types, i.e. infill or greenfield development.
- For example, if the height of PMF of a site is above two storeys, SIP in a one- or two-storey building would not be viable. However, SIP might apply in high-density development on the site because the refuge or habitable floor level could be built above PMF.
- Note that SIP should not determine development scale or density. Rather, the height of PMF in a location is used to inform where SIP could be applied.

What considerations are needed for SIP to be successful

- Councils can develop SIP-related controls for their development control plans (DCP) and apply those controls when assessing Development Applications.

- The department proposes the following when considering whether to apply SIP controls, noting that evacuation off-site is always preferable. If this cannot be achieved, then SIP may be used if:
 - The duration for flood inundation is less than six hours
 - The development is not located in an area of high-risk (eg, floodways and H5 or H6 flood hazard areas)
 - Access to on-site systems to provide power, water and sewerage services during and beyond the event for the full range of flooding
 - The location of storage of food, water and medical emergency for SIP purposes should be above the PMF level and available during and beyond the event for the full range of flooding
 - SIP floor level is above PMF
 - SIP provides a minimum floor space per person
 - SIP must be structurally safe and accessible during floods up to the PMF.
- Education is critical to ensuring that the community is aware of actions to be taken before, during and after SIP and the key triggers that require SIP. If SIP is proposed there needs to be ongoing community education campaigns for the areas where SIP will apply.