

Can Flood Damages Guide Planning Levels?

E. Armstrong

How We Set Planning Levels

Traditionally flood planning levels have been set using a flood average exceedance probability (AEP) with the 1% AEP being the most common event used to define residential flood planning levels in Australia. Although it has become the norm, its selection is somewhat arbitrary.

The general justification for its use is that the flooring of a home getting wet once in a lifetime seems like a tolerable risk. However, this assumes that all floodplains are equal and fails to differentiate between those where above floor flooding can only reach maximum depths of a few hundred millimetres compared to those where flooding can reach several metres deep and even completely destroy a dwelling.

While the chance of above floor flooding is one of the critical thresholds that should be considered when determining what is appropriate for floodplain development, it is not the only threshold. Only considering the chance of above floor flooding ignores how deep flooding can become, the probability of those depths, and the affordability of more significant damage.

Is There a More Robust Method?

The use of financial models such as affordability of insurance, average annual damages (AAD) or maximum sustainable loss may be a more robust method for determining appropriate flood planning levels for a particular floodplain.

It is possible that using financial models would provide a more consistent method of setting planning levels in a way which:

- recognises the diversity of flood behaviours at different locations
- ensures more equitable financial risk exposure to property owners and occupiers
- affords an appropriate level of property protection to all development

Deciding at what point the risks of developing a floodplain exceed the benefits is subjective. However, the use of financial models can provide much greater insight into the costs of building within a floodplain and how much of a floodplain should be developed.

Using Average Annual Damages

Annual Average Damages (AAD) represent the financial risk of flooding.

The Moree, Lismore, and Windsor floodplains were used as examples because the depths of rarer floods vary considerably between these floodplains.

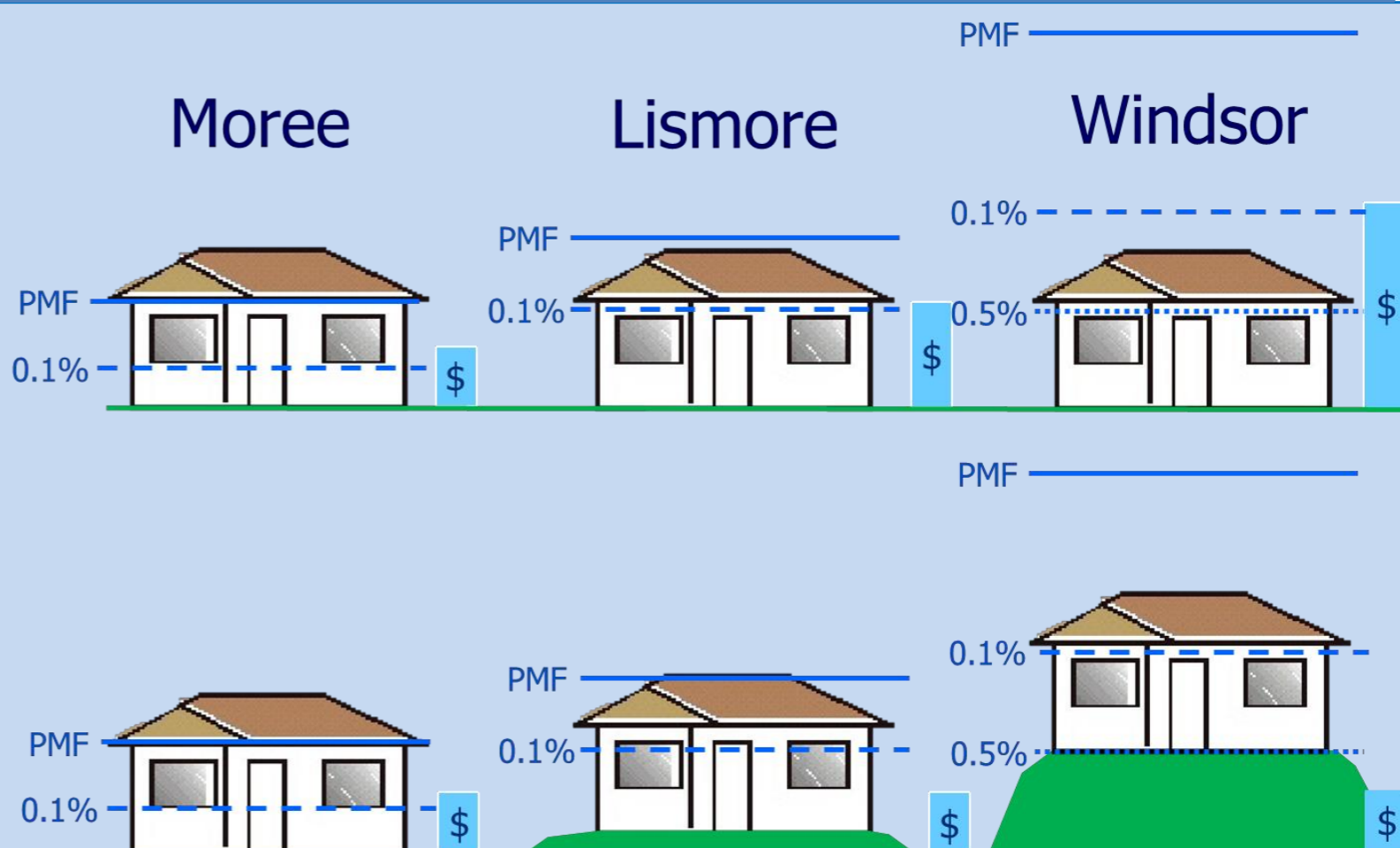
A property which has its floor level built at the 1% AEP level was selected from each floodplain and the AADs were calculated. The AADs were also calculated with the inclusion of building failure. It was assumed that a depth of flooding greater than 4 m would result in failure. It was found that buildings in Moree and Lismore would be unlikely to fail in any flood, but buildings in Windsor would fail in floods greater than or equal to the 0.05% AEP.

To assess the difference that using AAD to determine floor level instead of the 1% AEP level would have on development, the floor levels in Lismore and Windsor were raised until they produced an AAD similar to the AAD of the dwelling in Moree.

It was determined that for the AAD of a dwelling in Windsor to be roughly equal to the AAD of a dwelling in Moree, the floor level would need to be constructed at 18.3 m, which is just below the 0.5% AEP flood (18.6 m). A dwelling in Windsor constructed at 18.3 m would not fail until the 0.02% AEP flood.

	Moree	Lismore	Windsor	Windsor with Building Failure
Floor Level	208.6	12.4	17.3	17.3
AAD	\$656	\$857	\$1,285	\$1,732

	Moree	Lismore	Windsor	Windsor with Building Failure
Floor Level	208.6	12.5	18.3	18.3
AAD	\$656	\$621	\$637	\$739



To determine what AAD should be used to set floor levels, it would be necessary to determine what society considers a tolerable risk. The ability of individuals or businesses to bear the costs of the losses from an individual flood is an important consideration. Many individuals or business would never be able to recover financially should a single loss be large. Flood insurance is a means of averaging out the potential losses to an amount which is affordable annually. AADs are indicative of what the relative insurance premiums might be across floodplains and between dwellings. As such, willingness to pay annual flood insurance premiums may be indicative of what is an affordable AAD and, in turn, a tolerable minimum floor level for each floodplain.