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Submission details

I am making this submission as	A member of the general public
Submission type	I am making a personal submission
Consent to make submission public	I give my consent for this submission to be made public

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Terms of Reference (optional)

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Supporting documents or images

Attach files

- [NSW Independent Flood Inquiry submission - IJTaylor 190522.pdf](#)
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Submission to the NSW Flood Inquiry 2022 – I J Taylor

I am a Chartered professional Civil Engineer now retired after 45 years specialising in all aspects of floodplain management (and coastal management), incl; technical (hydraulics, hydrology, riverine), policy development and implementation, social impacts and community involvement, Governments' administration, and design and construction of flood risk reduction works.

Relevant to the NSW Independent Flood Inquiry, I have had a long involvement in flood management in NSW, particularly on the North Coast. For Lismore I was involved in flood mitigation efforts including preparation of floodplain management plans and their implementation. I worked with Council, the NSW Government, and as a consultant to the Government and Council's, on flood risk management.

Comments on Lismore flooding and risk reduction planning measures

Efforts to reduce impacts of flooding at Lismore and the Richmond Floodplain have continued for decades during which NSW Governments and Councils have showed ongoing commitment with assistance from the Federal Government.

Mitigation of flood damage on the Lismore floodplain has always been problematical for reasons of locations of settlements (North, South, Central, and East) at the junction of two major streams, the relatively narrow floodplain with a contraction at its downstream end, and the steep precipitous catchments upstream.

(The terms; Flood Mitigation, Floodplain Management, Merits based Floodplain Management, and Flood Risk reduction, all mean approximately the same thing, and are products of slight changes in approach over time).

Prior to the 1990s, the possibility of building flood mitigation levees at Lismore was determined unfeasible because of assessed increase in damage caused to floodplain areas left outside any built levee. However, in the 1990's improvements in hydrological and hydraulic methods allowed closer analysis of flood conditions.

Following extensive flood studies for Lismore, community involvement, and a Value Management study, it was determined a package of actions, consistent with the NSW Governments Floodplain Management Policy, could be employed to reduce material and social flood impacts. These actions included construction of a CBD levee at '1 in 10 year' ARI crest height, voluntary purchase of residences, voluntary house raising, and emergency plans of action.

The investigations showed that the 1 in 10 year levee crest height was optimal as it provides the CBD and Central Lismore residents protection from smaller frequent floods, delays onset of deeper flooding thereby allowing greater time for inundation preparation and evacuation. The levee also provides controlled inlet of floodwaters during higher floods to minimise potential for flood damage. The 1 in 10 year levee has proven its worth during a number of floods since construction.

Levees with crest heights greater than the 1 in 10 year level are not feasible as they would cause increased flood depths and velocities in North and South Lismore. Also, given the nature of expansive clays in the channel banks of the Wilson River, higher levees may suffer foundation problems which could have disastrous consequences for Central Lismore and CBD in major floods.

Extreme storms and flood events – the February 28 Flood 2022

It is well (and always) understood that devastating flood events like the Feb 28 flood will occur and re-occur at Lismore. Magnitude and impacts of these exceptional floods may not be predictable more than several hours prior to their arrival.

For occurrence of extreme events like flooding, bushfires, tsunami, or earthquake, it can be expected often that 'no amount' of practical pre-emptive planning can prevent tragic loss. Lismore, Council's flood risk reduction measures, in place on Feb 28 and which were designed around moderate to 1 in 100 year type flood events, were simply overwhelmed and Council should attract no criticism for this.

The existence of many established residences and businesses on the Lismore floodplain also means it is impractical and cost prohibitive to reduce flood risk associated with extreme flood events. Most flood prone towns and cities in Australia and around the World are similarly placed. Locally, for example, Murwillumbah, Grafton, Kempsey, face prospects of devastation under extreme events. The saving factor is that these events of very rare.

The rareness of extreme storms and floods is described by how often they might re-occur. Flood risk managers accord an "Average Recurrence Interval" (ARI), to each flood, based on the historical records of flood heights and acknowledged statistical procedures developed for this purpose. The ARI is used to rank floods in their significance and is essential data for assessing flood risk. Reference to the Lismore Feb 28 flood being a 500 year or 1000 year (to be confirmed) is meaningful and such references are used world-wide by flood risk managers.

The possibility of floods greater in magnitude than the Feb 28 was illustrated in flood studies (c2000) by determining a "Probable Maximum Flood" or PMF. For Lismore the PMF has been estimated at around 2 metres higher than the Feb. 28 flood. The PMF is a realistic estimate and for Lismore was determined by applying rainfall data to the Lismore catchment that occurred during a nearby extreme storm (nr Brisbane).

Geologists can also see signs of extreme flood events in the past from the size of river channels carved out by large flows, and changes in channel location.

Response to Feb 28 extreme flood

When major and extreme flooding occurs, emergency response is the only flood loss reduction measure operating. On Feb 28, the SES and many volunteers made brave efforts and were largely successful. Resources and coordination are key elements. Some observations:

- Funds should be made available for acquisition of an increased number of rescue boats, say 8 new boats and engines, to be permanently housed at Lismore with other increased flood rescue resources such as rescue cutting equipment, all to be and trialed at the beginning of each summer. Other flood rescue materials and human resources needs should be considered.
- My monitoring of BOM and SES flood level forecasting on Feb 28 suggested to me the BOM and SES may possibly have been carrying out their flood predicting duties 'individually' rather than jointly. (I could be mistaken though). It is important to have regular (30 minute) reliable updates of flood heights and predictions, and main implications for flood conditions on the floodplain.
- If coordination of BOM data and SES interpretation is an issue, a coordinating leader (CL) could be attached during times of flooding to interpret all data coming from the BOM and make decisive and authoritative calls on flood levels, predicted timing of levee overtopping and other changes in conditions on the floodplain as the flood develops.
- The CL would need to be a qualified and experienced flood practitioner with knowledge of floodplain conditions during various stages of flooding. The CL would be given authority by the Government to act in this role to ensure clarity of message, and to have knowledgeable input to the emergency response actions of the SES.
- On a different aspect; following the extremely testing conditions of the Feb 28 and 30 floods, the structural and foundation integrity of the CBD levee should be examined closely and repaired where

necessary. A recurring levee integrity monitoring program should be developed and maintained by Council as part of a flood structures asset register.

Post flood and future planning

Recovery of Lismore City in the aftermath of the Feb 28 requires consideration of future flooding in terms of risk. The Feb 28 flood was an extremely rare flood, perhaps expected to re-occur only each several hundreds of years. It is generally acknowledged that frequency of flooding may increase as a result of global warming, which in practice may mean what is now a 100 year flood may become a 70 year flood; an extreme 500-year flood may become 300-year flood, or such. While the hazard of extreme floods is itself extreme, the probability of occurrence is low and consequently risk to the City from such floods is low.

If this low-risk assessment is accepted, there is a strong case for supporting recovery of the City to largely 'how it was' pre Feb 28. Further consideration requires separation of the business parts and residential parts, although these are inter-twined in parts.

CBD - future

Lismore City has suburban areas of; North, South, East, Lismore Heights and Goonellabah, that surround the CBD (almost as a ring). The CBD is intimately connected to the residential parts of the City through providing, employment, medical services, financial services, as well as equipment and shopping needs. Southern Cross University and Lismore Base Hospital are also served by the CBD.

The CBD is a very highly valued social focal point, many residents have fond regard for, and sentimental attachment to the CBD', it is important in their lives. Lismore without its CBD 'heart' is unimaginable to many residents, and irrespective of future planning and Government/Council action, the CBD will continue to recover and will have at least moral support of resident patrons.

While the Government's Flood Prone Land Policy is primarily directed at reduction of damage and suffering of residents rather than commercial interests, given the critical connection between Lismore residents and the CBD, the Governments should continue to provide special recovery funding for business, at least at some level for several years, or until a CBD self-recovery momentum is identified.

It is appropriate to consider other approaches for the CBD. These might include:

Redevelopment of a completely new CBD where the existing central CBD block is replaced by a high-level (elevated, under parking) service and shopping facility, but the idea would require high private capital investment that is unlikely to be found given the flood prone nature of the CBD. The idea is therefore not feasible in my view.

Establishment of an alternative CBD on land to the east of Goonellabah. This could be attractive to private developers and would provide an alternative for businesses concerned about investing in the existing flood prone CBD. However, the 'inertial mass' of the current CBD to resisting such moves should be recognised. The result would likely be a Lismore flood free 'uptown' and a flood prone 'downtown'. However, a new uptown would always provide the choice for businesses.

Residences on the floodplain

Existing flood risk management planning for Lismore embraces Voluntary House Purchase and House Raising. These are sound programs and should continue. Voluntary Purchase (VP) provides the ultimate solution to residential flood loss. The VP program could be accelerated, with high priority parcels of houses (blocks) identified, acquired and removed.

NSW Government role in flood risk management – decline in service

Over many decades the NSW Government has demonstrated a strong commitment to reducing flood damage through development of flood prone land policies, provision of technical guidance, and financial assistance to Local Government for implementing the policies.

Importantly, the Government owned a team of flood risk specialists within its agencies. These were predominantly and necessarily engineers with expertise in flood hydraulics, hydrology, policy development, construction, and implementation of flood risk management measures. This group worked closely with Universities, Councils, peak Council and technical bodies, flood consultants, and others in what was a flood risk management industry which provided high-level service to Councils, Governments, businesses, and individuals affected by flooding.

For various reasons, over the past 20+ years the Government's floodplain management capabilities have been steadily eroding. Reasons include continual change in Government agency structures and policies, Flood risk management not being agency core business, and blending of flood risk management resources and funding with other environmental management undertakings. This has resulted in Councils largely being left to work on their own with inadequate Government support, resulting in a decline in overall effectiveness of Government/Council flood risk reduction efforts.

In the 'big picture' this means that the 'pendulum' of the past which was firmly located in pre-emptive planning for flood damage reduction has swung to an opposing point where flood risk will be managed increasingly 'after the event' through high-cost emergency management and ongoing Governments' funding support.

There is no 'quick fix' for this problem but step one is for the Government to understand what has happened and to see the need for Government to always hold a body of expertise in all technical areas. This need cannot be satisfied by outsourcing. Threats from global warming add more weight for Government to re-consider its need to hold in-house engineering expertise in riverine and coastal flooding.

End.