

# **Planning and Flood Risk Management in Queensland New Frontiers on an Old Issue**

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Queensland is entering a new era of flood risk management that with a hazard-based approach. This new era will be defined by the ability to integrate planning (both regulation and practice) into the wider arena of outcomes dictated by community impacts and needs. For example, the incorporation of uncertainty into planning outcomes, provision and allowance for resilient infrastructure and building solutions, fashioning of appropriate and practical emergency management systems among others.

This activity must be undertaken on both a local and regional scale and involve the cooperation and integration of all relevant professionals, stakeholders considering all regulations, requirements and expected practices.

It is recognised that land use planning and building regulation play a key role in long term flood risk management and in this light it is also widely recognised that appropriate land use planning is the most cost-effective flood risk management tool.

Currently, there are numerous challenges to incorporate hazard-based flood risk management principles into planning regulations and planning schemes in Queensland. These are discussed in this paper.

This paper discusses these challenges and contrasts these with those outlined in a previous paper focused on the same issues in NSW six years ago (Bewsher, 2007). It would seem that there are lessons to be learnt and mistakes to avoid by keeping a focus on our southern neighbour.

## Background

From 2000 until relatively recently Queensland— particularly SEQ has been subject to high rates of development - a function of population movement and peak activity in the commodities cycle.

The population in SEQ has doubled since the 1980's and created a large conurbation of cities often running into one another, generally with no one local authority controlling individual catchments. Adding to this has been a context of merging/boundary changes to LG areas with the difficulties that this presents in terms of continuance and understanding of local and catchment issue management.

The population increase has meant development of significant greenfield areas for both residential and commercial /industrial purposes often with uncoordinated, little or poor understanding of the impacts of, and, on storm water management within and between the various LG concerned - particularly in terms of flash or local flooding.

Since 2008 and the breaking of a long period of drought and the observed impacts on the community and economy locally, statewide and nationally there have been a number of

drivers and opportunities to gain better understanding and outcomes for communities in Queensland with respect to exposure and management of flooding including changes to the infrastructure charging requirements for stormwater (requiring detailed catchment based plans), the need for total water cycle planning (response to drought, water resources and environmental issues), and, the range of design and above design storm events and impacts experienced in many areas.

It is intended in this paper to explore recent Queensland experience with flood risk management and its relationship with land use planning, review learning's from events and other places e.g. NSW and provide suggestions to move forward.

### Flood Risk Management – the “Why” – why do we do it?

Flood risk management is the managing of the flood disaster to give the community protection from catastrophes that it cannot recover from. Gilbert White said "Floods are Acts of God, Flood Disasters are Acts of Man".

It is important to plan and implement measures before things happen – with new tools and information available we have the means to at least understand the levels of risk and likelihood in most situations and manage those things within our capacity and allow for those that are not.

FRM Principles can be listed as follows:

- Safety (people, public infrastructure, private investment, environment, social welfare)
- Investment Strategies (government, commercial, private)
- Sustainable long term outcomes delivered
- Integrated Land Use Management

FRM Practice & Problems revolve around addressing risk at different levels in the community:

- High Level - the state is at risk
- Medium level - Communities and Commercial Entities & the Environment is at risk
- Base Level – Individuals, properties & businesses at risk

We will find in this paper that for effective implementation of FRM, the questions engineers need to ask and address are - How do these things relate to the planners (and other stakeholders)? Why do we need to relate to the planners?

### **What are the Facts?**

Flooding, by definition occurs on Flood Prone Land. Flood plains have been formed by some level of previous flooding events and thus any uses need to be able to share the floodplain with Floods.

- Risk Management is not Risk Aversion. Realising risk documents what may actually happen – not understanding and managing liabilities is not a defence.

- Risk Management defines the level of Residual Risk
- Residual Risk must be evaluated
- Risk Management is an organic animal
- Flood Risk Management is a tool to provide a framework for living with “the enemy” – Floods
- In QLD flooding has a higher impact and cost impose than any other natural hazard type.
- Damage can result from more frequent floods – usually flash flooding or less frequent regional flooding – some locations are affected by both either separately or combined.
- Modern dwellings are structurally more vulnerable and in more vulnerable situations i.e. the best land is gone, houses are built differently and less robustly than of old.

### What is the Fiction ?

- Flood Risk Management will protect all on every occasion from a bad outcome
- Recent flooding is the worst that has ever happened
- Flood Models and Flood modeling are Real and not Forecasts
- “We know enough, we know it all”

### What are the Follies?

- “One size fits all”
- Ignoring Lessons from the past and the Present
- Imprecision, Research and Politics
- Avoiding direct & indirect conflict of interests. Pecuniary interests are Public Benefit
- Forecasting – based on the past, not future real operations
- Pretending we have all the answers – not applying risk management principles

### Flood Risk Management – the “what” – legislation & other considerations

The regulatory environment in QLD is somewhat different from NSW. In the past - prior to the events of 2011 and the QLD Floods Commission of Inquiry (QFCOI) outcomes (particularly for SEQ), there has been a reliance on the response of for each individual Council in terms of resources, policies, development potential (and place in the cycle), development representations, individual officers and the effect of potential compensation claims in the event of reduction in zoning entitlements.

The *Sustainable Planning Act 2009 (SPAR)* is the key development planning legislation in QLD is which replaced the previous Integrated Planning Act (IPA). In general terms a key change was that SPAR reversed the requirement for the seeking of a “deemed refusal” by the developer onto the planning authority who had now to avoid a “deemed approval”.

The State Government introduced State planning policy **SPP01/03 Mitigating the Adverse Impacts of Flood, Bushfire and Landslide. (SPP)** in 2003. Alongside the requirements of SPAR, the SPP is the key regulation in terms of flooding management. The policy having “.. *effect when development applications are assessed, when planning schemes are made or amended and when land is designated for community infrastructure.*”

The SPP requires *...the identification of natural hazard management areas within which minimising risks to the community should be a key consideration in development assessment and the preparation of planning schemes.*” It goes on *“Effective land use planning is an important means of reducing the community’s vulnerability to natural hazards and promoting resilient communities.”*

The SPP was introduced due to a concern that natural disasters were a significant and rising cost to the community both direct and indirect tangible, with the significant intangible costs associated with loss of life, injury, human suffering, loss of productivity and environmental degradation. The key instrument being the identification and definition of a **Natural hazard management area (NHMA)** – which was for flooding not less than 1%AEP without agreement of the State.

Consideration to Climate change is required *“...These changes will have significant impacts on the nature and extent of natural hazards and, consistent with the precautionary principle, should be considered when undertaking natural hazard assessments or developing natural hazard mitigation strategies”*

The consideration in this area was strengthened with the release by the State Government of ***Increasing Queensland’s resilience to inland flooding in a changing climate: Final report on the Inland Flooding Study, 2010***, which recommended a 20% loading on design rain events as a means of assessing uncertainty due to climate change.

The SPP recommends that identification of NHMA’s to be undertaken as part of a disaster risk management process which considering, plans for and manages the potential effects of natural hazard events prior to their occurrence.

With view to resource constraints, the NHMA(flood) is to be determined from a comprehensive floodplain management study with the process outlined in ***Floodplain Management in Australia: Best Practice Principles and Guidelines (the Standing Committee on Agriculture and Resource Management (SCARM) Report)*** recommended when undertaking a floodplain management study and preparing a floodplain management plan.

It is understood that few planning schemes in QLD prior to 2011 events complied with all or any of these requirements.

What we have seen in Queensland in the last 5 years whether it is a coastal city, inland township or open-cut coal mines is all these principles in action – in the main not in a good way with the community continuing to count the cost, most recently from the Australia Day floods (ADF) in Bundaberg & Laidley where many 100s of people and businesses again lost properties and possessions with \$100’sM of infrastructure damaged – some still not fixed from the January events of 2011 when Grantham was flattened.

### **Recent environment**

As a response to the 2011 flood events the State Government created the QLD Reconstruction Authority (QRA) with wide ranging powers (including overriding planning controls) to manage the wide scale impacts and reconstruction in QLD.

During 2011-12 the QRA published *Planning for stronger, more resilient floodplains* a two-part Guideline to provide “..Councils with a suite of practical measures to better align floodplain management and land use planning.”

**Part 1, Interim measures to support floodplain management in existing planning schemes**, is to be “..a ready-made toolkit of floodplain mapping and development assessment controls that can be fast-tracked for inclusion in existing planning schemes.”

**Part 2, Measures to support floodplain management in existing planning schemes**, is a continuation “...of the journey to improving floodplain management practice in Queensland through land use planning. It provides detailed advice on how to investigate flooding and address its impacts through future Queensland planning schemes by providing step-by-step guidance and example planning scheme provisions.” This part was reissued as a 2<sup>nd</sup> draft late in 2012 - its current status is uncertain.

In the last 12 months QRA has used the process developed from these in many LGA’s localities to compile flood mapping and insert these plus flood management controls into the relevant planning scheme. The flood mapping is understood to be based on geospatial techniques, available soil/terrain and instrument/gauge readings.

Adjusted for flood gradient it is arguable and the objective laudable for low resource organizations that the technique has application on the wide, flat flood plains in inland QLD but the limitations of the method applied to more complex terrain and/or, populated areas has been questioned by LVRC previously e.g. Grantham would not have been mapped using these techniques, the cost of studies compared to cost of avoided impacts costs will generally be much less than 1 in many cases.

#### Add additional comments from SKM paper

A Temporary State Planning Policy SPP 2/11 related to Parts 1 & 2 to this work was repealed in September 2012.

The QRA was to wind up in February 2013 but in the light of the Australia Day Floods (ADF) 2013 its brief has been extended, abet it is understood, without the planning functionality.

The QLD Floods Commission of Inquiry (QFCOI) published 2 sets of recommendations in its findings, an Interim Report 2011 and Final Report 2012. These recommendations place consideration of individual and public safety as paramount. The recommendations address the complete spectrum of controls with specific requirements directed at State and Local Governments.

Post the inland study, and, prior to the events of 2011, it was understood that SPP01/03 was under review by the State. It is understood that there is a draft document post CFCOI but this has not been circulated.

The new draft of SCARM of course is understood to be close to release for final comment.

## Flood Risk Management – the “who” – understanding the stakeholders

With a review of the items listed – list item – it is unsurprising that nothing has changed in relation to Brewsters 2007 paper, either the management strategies and/or pitfalls all are still valid after 6 years transferred to a QLD environment

- Planners are the key statutory agent in managing and decision making in relation to development activity
- There may be no engineers or limited engineering in either the direct process or the policy process
- The planning process has to balance a large number of variables, including the limitations of planning legislation and in inexperienced or misunderstanding hands the importance of uncertainty can be lost
- Engineers need to understand the process, thinking & notions and talk the language
- Planning instruments have difficulties dealing with uncertainty – need creative ways to manage, fighting a mentality of the range of those who use them i.e. all society with all levels of understanding – not just professionals,
- People get “blinded by the line in the sand” – which is likely to be a regional 1%AEP, a desktop (building certifier) will place the house in the gully that was entering this area – but was above the line.
  
- difficulties & barriers legislation, planners, insurance, banks & valuers, community
  
- insurance & banking have their shareholders and business sustainability interests at heart – they will apply a standard based on their assessments to avoid losses and make a profit even if their base information is error or conservative
- landowner in a power imbalance with institutions. They have no fall back except their own resources unless the community is supported by the local/state government
- “The Rational Method” approach - lack of understanding of the disconnection of rain and flows, inappropriate application.
- practitioners – “blackbox” mentality, use of software without understanding, old site specific research extended beyond application, support the understanding of profession & all stakeholders. Loss of the understanding of the uncertainty principle
- importing of outcomes from overseas without full understanding regard for coordination local application e.g. building codes US , QRA part 2 0.UK 1%AEP limitations
- Confusion AEP,ARI and what information is required

**How do these things relate to the planners, why do we need to relate to the planners,**

## Flood Risk Management – the “how & when”

The author has been involved in the on the implementation of risk management

LVRC has been undertaking flood studies and flood risk management studies on the basis of accepted practice including SCRAM, AR&R projects and the like examining, considering and managing flood impacts upto and including the PMF. The interim outcomes from this work were accepted by Council in June 2012 and incorporated in the a Temporary Planning Instrument – Flood Management (TLPI) 20 January 2013. The instrument consists of DFE (design event set at minimum flood level 1%AEP or 2011 event – whatever is higher – can be 0.05%AEP), investigation and overland flow paths to trigger acceptable outcomes and includes 3 hazard areas in line with the QFCOI requirements (low, medium and high *mapped hazard categories*). In the light of the 2<sup>nd</sup> draft and the intent to reduce the scope of consideration LVRC has sought advice from its consultant and a number of Peer reviewers to ensure that it remains on solid ground in terms of the possible difficulties with the QRA document and other aspects.

2 events in 2 years of 0.05%AEP what this means for AR&R design storms , general 1%AEP need to focus on vulnerability/exposure and sustainable damage rather than design storms

- **outcomes based**
- LVRC successful approach
  
- application of principles
- get the planners and other stakeholders on board – integral to process from the start - not external
- have support of council – keep informed officer & councilor level
- have community support – use SAG & consultation
- avoid land given value by zoning – no value before this
- address the de-engineering of decision process and lack of experienced unbiased advice for decision makers
- climate change focus has pushed the focus away form the real issue i.e. as only one of many uncertainty items, the popular uptake giving leeway for entrenched interests to push back reflecting an emotive responses masking the need to address the true issue.
- Funding – funding for flood relief at magnitudes greater than mitigation cots (outgoing Federal Attorney General)
- Support for LG – recognizing the resource and funding squeeze as more responsibility is passed down from other levels
- Funding from Insurance & other interested parties – UK model
- Managing QLD compensation laws – allowable use of defining parameters over particular land
- Use sensitivity to manage uncertainty make a decision based on appreciation of the all factors not just an arbitrary design level. In many cases some minor improvements and little extra cost will provide the necessary level of reliance e.g. low level crossing low usage short time of operation = resilience & long term.

- Get the right advice. Use the right set of practitioners to get a balanced outcome. get legal advice on grey areas.
- Ensure get the required outcomes, data and IP
- Clear documents and explanations – explain to staff & users
  
- Engage with related stakeholders to seek support , understanding and pass on findings relevant to them

### Managing the Risk

Flooding and Floods are not Generic

Spatially confined but random outcomes

Coincidence of 'natural' events before, during and after

Intervention of development

Tangible and Intangible

What value do you assign to Life?

Insurance? Who pays what? We all pay, in the end there are no free lunches. (quote from Risk Frontiers paper)

Insurance and Government intervention.

Consistency may not be so stupid

Do nothing and Leave to Nature is a real

Investment Strategy option - "making room for water"

Land Use Management as the first step in FRM.

Do nothing (that is no development) is a strategic land use management option (quote from Larry Larson)

### Conclusion

#### Legacy

What we leave for others

What's our Legacy

We ignore the lessons of the past at our peril

Lachlan Macquarie had a problem, he had raised this in 1810 already. Windsor kept flooding, people kept building in flood affected areas and looking for relief.

In 1817 Lachlan Macquarie issued a proclamation about living in Windsor area ..... he warned that if people did not build in the high ground that people would not get government assistance if they subsequently got flooded.

Here's a potentially radical perspective. Macquarie had established a town plan, Macquarie required that people built their homes in the designated town area (the high ground) to ensure that homes were not flooded and only then would government relief be forthcoming in the event of a flood .

It follows that Macquarie, nearly 200 years ago, set in train the presumption that

- land designated by government as suitable for residential development was 'flood free'
- ; and

- government would provide substantive relief if flooding occurred to the designated area

The radical thought? Did Macquarie set a legal precedent and so the bounds of a 'duty of care'? Did Macquarie set a precedent that Government tells you where to build in flood safety and that in the event of flooding government will pay compensation? If the duty of care exists, we foot the Bill

A less radical thought. In 200 years we have not progressed very far.

Two centuries after Macquarie we are still busy populating the same floodplain despite an overabundance of non floodplain land.

How do we know there is a problem? The evidence of the 1867 flood (refer to NSW SES website) is available as is the evidence collected and reported in the 1990's. On the positive side Guidelines were developed applicable to floodplain development management.

Macquarie's exhortations have been largely consigned to history. When the inevitable rare flood occurs will the state be able to "foot the bill" or will the catastrophe remain largely unanswered and the community fail to recover?

It's not like that this is the 'only example' around.

Flooding of the Brisbane Valley in 2011 is well remembered. Flooding in 1974 largely remembered. But the flooding of the 1890's (and possible flooding in 1820's) are virtually unknown. The heights of flooding are in the reverse order of the dates. (Refer the Goodna totem)

Development of Brisbane has continued at a frenzied pace within the floodplain since 1974, with filling, reclamation and land clearing all in accordance with government zonings.

And what would be the damages bill within the Brisbane Valley for the flood of 1893 in 2013 (some 120 years on) ??

Done properly, such exercises are beyond the resources of Local Government, particularly those at the head of the catchment. But such exercises that must be undertaken to deliver meaningful flood policy at state and national level and augmented by the misery which has occurred elsewhere due to policy failure. The adoption of resilience measures at all levels, adoption of programs based on "making room for water", programs based on need and capacity to deliver are some of the overseas policies which need to be studied and the lessons adsorbed.

Mitigating the misery of flooding starts with Strategic Land Use Planning. Strategic Land Use Planning is the most cost effective tool to mitigating flood misery. That is well documented both overseas and in Australia.

In Australia, the balance of responsibilities between the Commonwealth and the States means that the prime responsibility for Strategic Land Use planning nominally lies with the States. Commonwealth override takes precedent when security and safety of the Commonwealth becomes paramount.

So planning is undertaken at three levels

High Level - National and State

Medium Level - State and Regional

Low Level - Local

You cannot expect local government to fix national and state planning failure at the local level, nor can you expect local government to fix the flood misery that results from policy failure at Commonwealth and State level.

Despite all the wonderful sounding words what has been increasingly delivered over the last decade is

Federal Government - abandoning responsibility to the States and ignoring national implications

State Governments - shifting costs and responsibility to local government

Local Government - Failing to cope, inadequately funded, increasingly subjected to development or perish pressures

#### References

SPP 01/03

Inland flood study 2010

SKM interim report Lockyer Creek FS & FRMS June 2012

SKM feedback on QRA Part 2 2013

UK investment strategy

Brewster 2007

Milano 2012

QFCOI 2012 Interim & Final Report

QLD State Govt response to QFCOI 2012