IS THERE ANY MERIT IN FLOODPLAIN MANAGEMENT ?

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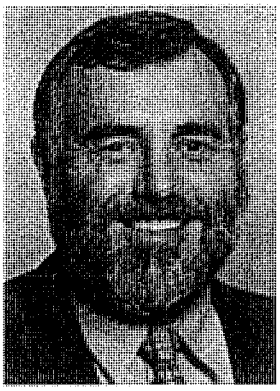

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1. Introduction

It is very easy to lose sight of the fundamental objective of effective management of communities' flood risk. Consider the NSW Flood Prone Land Policy, and its merit based approach for determining strategies to manage flood risk. The "merit approach" is supposed to weigh the intergenerational, social, economic, ecological, and cultural impacts of land use options for flood prone areas together with flood hazard and environmental objectives. It is meant to derive floodplain risk management plans that are socially responsible, equitable from the community point of view and ecologically sustainable in the long term (NSW Floodplain Management Manual, 2001). The approach however, is fundamentally flawed and hence has failed to deliver to many communities the effective management of their flood risk.

It must be recognized that an evaluation based on today's merits is not an equitable or reasonable process. It does not necessarily deliver outcomes that meet the overall expectations of the community, nor does it adequately take into account the expectations of future generations.

Merit changes substantially over time. Most inland and coastal country towns and cities with significant development within their floodplains simply expanded from the functions that caused development to be originally sited at that location. For example, transport junctions at safe river crossings became the sites for coach houses that promulgated the growth of further ancillary facilities and eventually became the centre of a town or city. Development of such towns and cities within the floodplain naturally increased with attributes of the floodplain including: land fertility, flat topography, proximity to transport and facilities, and low cost land, to what it is today. The original merit of locating a transport node in a convenient place was overtaken by *laissez faire* development to produce a particularly non-meritorious outcome.

In contrast to the simple commercial imperatives and the community's level of flood tolerance of yesteryear, today's same floodplains are being developed with high value property assets, and the community's expectation is that a level of certainty be provided that their properties are free from flood risk.

History dictates that decisions made on today's merits considerations may well encumber future generations with an insurmountable flood risk associated liability. Questioning of the basis of the NSW Flood Prone Land Policy, its effectiveness, and its ability to meet community expectations is a direct outcome of experience in flood risk management of some 2000 properties in the Pittwater Local Government Area on Sydney's Northern Beaches. Application of the Policy in Pittwater has demonstrated the deficiencies of the Policy. The present approach in Pittwater ensures that flood risk in not only reduced, but progressively removed for future generations, at minimal cost.

2. History of Flood Policy in New South Wales

Governor Macquarie in 1817 commanded that an order be read in all churches throughout the colony on three successive Sundays. The order was that settlers were not to place their residences and stockyards within the reach of floods (Easton, 1999). While in 1817 it may have been beyond the settler's expertise to assess the 1% AEP or PMF flood levels, the manner in which settlements developed in areas that were clearly flood prone demonstrated the ineffectiveness of Governor Macquarie's actions.

Interestingly, after repeated flooding some settlements did take note of the flood issues. For example, the township at Terara on the Shoalhaven was relocated to higher ground at Nowra. By the early 1970's the short term 'merit' of providing land for the expanding city at Nowra again saw residential development move back onto the floodplain.

Following extensive flooding over two decades from the mid 1950's to the mid 1970's the State government not only came to the same conclusion as Governor Macquarie but took it one step further. In 1977 the new Labor Government initially proposed a policy of not only preventing further development on floodplains, but also moving existing development out of flood prone areas. This policy direction had its genesis in the problems associated with the regular flooding of large country towns such as Murwillumbah, Lismore, Kempsey, Windsor, Richmond, Gundagai and many others.

Before too long the Premier of the day found himself inundated by representations from many western Sydney residents in places such as Liverpool and Fairfield where there were many homes located in flood prone areas. It became apparent that in addition to country towns, there were many thousands of residences in the metropolitan area of Sydney that were constructed in flood liable land. It was clearly impractical, uneconomic and socially undesirable to dissemble whole suburbs in Sydney and relocate them to higher ground.

By 1979 a new policy had emerged. This new policy still allowed relocation and encouragement for new development to be planned for flood free areas however it promoted a "merits" based approach to existing development and from infill development within existing suburbs and towns. The merits based approach was an appealing, and apparently logical, way of bringing the flooding issue into planning and management of flood affected areas by providing a process that enabled a local community to determine the level of risk it was prepared to accept and the economically and socially acceptable approach to managing that risk at that location.

While the NSW Flood Prone Land Policy has undergone several reviews and changes, the basic original concept and philosophy of the merits based approach has been retained.

3. Policy Performance

The main objectives of the policy were to reduce the flood risk to life and property and the value of asset, both public and private, at risk. It was envisaged that through a three stage rational process of flood risk definition, consequence and management option identification and the implementation of a community agreed management plan it logically followed that the objectives would be achieved. Unfortunately, while this process has scientific rigour it is based on false premises. That is why some 25 years after the policy was first promulgated the value of assets at risk and the risk to life and property in NSW has dramatically increased rather than reduced. The policy has clearly fallen well short of meeting its objectives.

An examination of the reasons why the policy failed showed that it had four basic assumptions that were fatal flaws:

- The logic behind the policy was simplistic and naïve;
- The merits based approach adopted was contemporary and did not apply for "whole of life";
- There was never an appreciation nor commitment to the funding required for successful implementation;
- It was impossible to undertake the overall process in a timely manner.

3.1 Logical flaw in policy

There are two forms of decision-making logic, "closed" and "open". Scientific logic is closed logic wherein if you know the inputs and you use the correct equations you will always arrive at a predictable and consistent answer. Emotional, or "open", logic follows a very different path where in regardless of the inputs and the formulas the result is unpredictable. Engineers who had been brought up to believe closed logic was the only form of logic developed the policy.

Community decision-making is usually a mixture of closed and open logic. Scientifically derived "sensible" solutions are often overtaken by "emotional" political considerations and the political considerations can vary from day to day. A classical example of this is the experience most flood risk managers have had in that, if there has been a recent flooding event then there is emotional enthusiasm for a conservative, low risk approach. If on the other hand the last major event occurred many years ago many people in the community will not accept it "can happen again" or that it was "all that bad" hence a high risk decision-making environment predominates.

The policy is therefore flawed in that it fails to recognize that an open logic system only achieves an outcome that has merit for contemporary situations.

3.2 Merit – But for whom?

The merits based approach is superficially attractive as it provides a political mechanism to allow the community to develop an apparently logical compromise between the realities of the flood risk, the consequences and the financial and social resources/impacts required. In reality, experience has demonstrated that the merits based approach allows interest groups to justify to themselves, and to the broader community, the avoidance of the hard decisions needed to ensure future generations are not encumbered by a significant contingent liability.

Merits based decisions invariably accommodate the short term issues that effect the present situation with little or no consideration of "whole of life" costs and consequences. The whole process of determining the "merit" of an option lacks rigour. It focuses on issues such as the current communities' "willingness to pay or accept the consequences", a criteria that is generally inversely proportional to the time since the last flood. There is no justifiable merit in any approach that fails to reasonably take into account the consequences of today's decisions on future generations.

Further, the policy purports to encourage and incorporate consideration of environmental issues. While the policy may contain motherhood statements about environmental considerations, in the merit-based approach for considerations between private property and environmental matters it should come as no surprise that protection of private

property is usually considered to have the greater "merit", by those involved in the decision-making.

Based on experiential evidence it is difficult not to conclude that the merits based approach, as embodied in the application of the State's Flood Prone Land Policy, is only viable because there is no intergenerational or environmental accountability attached to the policy.

3.3 Funding

There is a substantial lack of council financial resources to undertake the various steps in the policy leading up to the adoption of a Flood Risk Management Plan. There are however State and Federal funding grants aimed at promoting and encouraging Councils to develop the Plans.

The State and Federal funding to actually implement effective whole of life management is however all but non-existent. That is, the Policy encourages community expectations through the management plan process then, because of the lack of adequate funding, forces the community to "choose" merits-based, sub-optimal, low cost options because the funding necessary for alternative solution is not forthcoming. The process thereby provides the government with a sophisticated excuse for placing an increasing number of properties and lives at risk and a convenient engagement of the community in ownership of the government's decision.

Even the flood studies and the development of Floodplain Risk Management Studies and Plans can suffer from a lack of adequate funding. In Pittwater for example, there are some 2000 properties (1875 plus the properties in the Warriewood Valley land release area) identified as flood prone. The total value of these properties is of the order $1.6B yet the total expenditure on the full process of finalizing management plans to risk manage the $1.6B of assets spread over 7 catchments is $2.438M that is $1.5 per $1000 at risk. The funding for implementation of solutions is, at present, minimal.

3.4 Drawn out Process

The time required to develop management plans is out of scale with the need for planning decisions and the development of planning controls. While the process set out in the NSW Floodplain Management Manual appears simple and logical and hence readily achievable, in practice the process is cumbersome and, given an articulate community, can take 5 years or more to work through to the end.

Of major concern is that the flood extent may be defined within a year of commencement however it may take a further 4 to 5 years to negotiate public agreement on the management plan and a further year to work through the State's processes to amend the Local Environmental Plan.

As an example of the consequences of this clumsy hierarchical process, the flood study in Avalon demonstrated that a site was in a high hazard floodway. Council received an application for an aged and disabled facility on the site, a SEPP 5 development. Council refused the development because it was in an area recently defined as a floodway and therefore not suitable for aged and disabled accommodation. The Land and Environment Court found that, although the Flood Study demonstrated it was sited in a floodway, the SEPP 5 development could be approved because the site had not yet been listed in the LEP as a floodway (*Hibiscus Court Pty Ltd v Pittwater Council*). It could not be listed in the LEP until the Floodplain Risk Management Plan had been adopted.

It took a further two years before the community agreed to a Floodplain Risk Management Plan for the area and the site has only just made it into the draft LEP that is currently on public exhibition. As a matter of interest it took some 10 months for the relevant State agency to even agree to place the draft LEP on exhibition.

4. A fundamentally inadequate process

The entire process is clumsy because it is dependent on a hierarchical approach that embodies considerable community consultation on numerous occasions. Further, it is assumed that the community consultation is a balanced and genuine process through which the entire community can honestly have their say. In reality, it tends to be a narrow, political exercise with the people whose property is affected seeking to minimize their risk, or losses; a natural human trait. The remainder of the community takes little interest until, usually too late, they realize that the adopted plan, or the plan about to be adopted, has adverse impacts on them such as increased rate funding or concessional development controls for the property owners at risk. The LEP modification process then provides the opportunity for the late-comers to "weigh in" and send the whole process back into the loop.

Even the easiest part of the process, the initial flood study to define the areas at risk, is time consuming and resource hungry. It is instructive to examine this stage as it follows a convoluted route of establishment of community committees, calling for proposals, through the elected council, assessment of proposals, reporting back to Council, gaining the necessary grant funding, juggling of Council budgets to find the matching grants, the engagement of consultants, the reporting back through community committees who generally have little technical knowledge yet feel obliged to question the consultant's work, adoption of the draft consultant's report for placing on public exhibition, community consultation, further reporting to the community committee and Council on the public submissions received and then adoption of the report.

This is unless of course the community comments require further work to be undertaken on the flood study in order to satisfy concerns that may or may not be well founded. In this case, the revised flood study has to again be formally adopted by Council and then placed on public exhibition for comment before being reported back to Council for final adoption.

All of the above is simply the precursor to the more difficult and convoluted phases of the development of the floodplain risk management study and its associated management options in consultation with the community. This is a far more nebulous exercise in which interested parties jockey for positions that best suit themselves. It can become very political and has little in common with the ideal embodied in the State's process that the community goes through a process of establishing options that can be later considered on merit when deciding on the plan to be adopted.

The naive person may be under the misapprehension that the selection and evaluation of the weaknesses and strengths of options is a scientific exercise. The "smart money" knows that you only allow options to go forward that are favorable to you and you eliminate all other options before you get to the "merits" considerations. Further interested persons realise that this is the best opportunity to ensure, through political processes, the "merit" of an option is presented in such a way as to produce a result that will be favorable to their interests when the plan is finally considered. This results in seemingly endless rounds of community consultation, dealing with affected individuals, and their solicitors, drafts to council, public exhibitions, public comments, reports to Council, further exhibitions, further reports to Council until eventually both the community and Council become fed up with the process and a floodplain risk management study is adopted.

Then begins the actual process of weighing up the options and determining the most "meritorious" option or combination of options. This tends to be a wholly political process driven by self-interest. It is most unusual to see altruistic input from persons representing the wider community or even interested persons that are giving any thought to the issues that future generations and/or the environment will face as a result of the choice of options.

5. The Floodplain Risk Management Plan

In some ways it is just as well that the final adoption of the "merit" based management plan takes years and considerable energy and resources because at the end of the process there is usually little or no funding to actually implement anything meaningful. If the process of establishment of the floodplain risk management plan did not exhaust the community, then it would undoubtedly become annoyed that there are little or no resources for its implementation.

6. The Pittwater Experience

The State's current Flood Policy began life in 1979. Pittwater Council came into being some 13 years later in 1992. By that time only one of the flood liable areas, the Narrabeen Lakes region had been addressed. A Flood Study and a Floodplain Risk Management Study had been completed however the Plan had not been adopted. This final phase of adoption of the Plan was not completed until 2002. Warringah Council adopted an overall policy for development in flood-affected areas in 1991. This Policy was carried forward into Pittwater as part of the formation process for the new Council.

The first few years of the new Pittwater Council were turbulent hence little effort was devoted to issues such as flood risk management. In 1996, a new start was made with the initial definition of flood-affected properties for another four main catchments - Nareen Creek, Mona Vale, Newport and Avalon. The maps delineating the affected properties were derived from historical records and a compilation of site-specific studies. They were a start.

Another major catchment, Warriewood Valley, was considered separately as it formed a State Urban Land Release Area and hence was subject to a different process. In the case of Warriewood Valley an overall water and flood management strategy was developed as part of the Land Release process. This strategy ensured that all development was located above the flood planning level of 1% AEP flood height plus 500 millimetres freeboard and, where possible, that multi unit development was above the PMF. The creeks, watercourses and detention basins were modified/constructed to accommodate this outcome.

The current situation, some 8 years after commencing an intense program to finalise Flood Management Plans for all major catchments is as shown in Table 6.1.

Table 6.1 – Flood risk management of Pittwater Council's Catchments

Catchment	Initial definition of flood affectation	Flood Study	Flood Risk Management Study	Flood Risk Management Plan	Approx. Cost – not corrected to 2004 ($)	Number of Properties affected	Comments
Narrabeen Lagoon foreshore	1990	1991	1992	2002	$440,000	447	Earlier studies commissioned by Warringah Council
Nareen Creek - North Narrabeen	1996	1996 & 2003	Draft prepared	Commenced	$540,000	353	Includes cost of major flood study revision
Warriewood Valley (urban land release area)	1997	Model being regularly updated	Development being undertaken to risk managed specifications	Risk managed specification for all development	$350,000 (Cost to date)	Potentially 50% of 2000 residences however nil as a result of the adopted plan	Includes water management specifications and revisions
Mona Vale /Bayview	1996	2002	In preparation	Commenced	$220,000	346	Mainly commercial and industrial land but includes some houses
Newport Beach	1996	1999	Final report prepared and on public exhibition	Draft prepared	$480,000	235	Significant difficulties with high hazard creek line area
Careel Creek, Avalon	1996	2000	2002	2002	$350,000	402	Includes detailed overland flow analysis and high hazard area
Mackerel Beach	1999	2004 *	Not Commenced	Not Commenced	$58,000 Flood Study only	92	*Anticipated completion of Flood Study

7. The Asset at Risk in Pittwater

Residential subdivision of most of the flood-affected land in Pittwater with the exception of Warriewood Valley took place some 100 years ago. Much of the original housing stock is 50 to 80 years old. In the flood prone areas, the original housing is mainly of fibro or weatherboard construction, although houses built from the 1960's onward tend to be brick. The village centres of North Narrabeen, Newport and Avalon and the commercial centre at Mona Vale were all originally constructed on floodplains where presumably it was easy to construct buildings on the flat land beside what were coastal lagoons. The original buildings in these centres are generally 50 to 80 years old and, with the exception of Narrabeen, the lagoons have been reclaimed to enable the villages and commercial centres to expand.

Up until the 1970's Pittwater was considered too far from the Sydney CBD to make it popular as a "dormitory" area for the Sydney CBD. In more recent times the growth of Sydney's population combined with lifestyle changes and an increase in local work opportunities has seen housing and commercial stock in the Pittwater area come under increasing pressure for re-development. Small fibro houses in flood liable areas could be purchased for $150,000 only 10 years ago. Today they start at $600,000 and some "knock downs" are fetching over $1 million, in desirable locations with water views. Re-developed dwellings with water, or near water, addresses can command in excess of $1.5 million. To put this into perspective, quality water front houses on the Pittwater estuary command between $4 million and $7 million, with an exceptional residence changing hands recently for over $20 million.

The escalation of house and land prices reflects the growing popularity of the area. Because of the rapidly increasing land values there is a tendency to re-develop the land with far larger and more expensive dwellings. The demand for shop top housing, and the inherent profitability of this form of development has also triggered a major re-development of the village centres. This in turn has generated a trend towards a requirement for underground parking in the flood liable villages.

The corollary of this increase in property values and net assets poured into the Pittwater area is the escalation of potential flood losses, and ensuing economic and emotional impacts on the community. The present community's expectation of flood protection is therefore far greater than what could have been perceived in the early, low cost, development of Pittwater.

While the arduous State floodplain management process restricts immediate protection of these flood prone properties, flood protection is progressively being achieved by concurrent alternative measures in Pittwater.

8. Flood Risk Management Strategy for Pittwater

The flood affected properties in Pittwater are mainly located on low lying coastal areas where backwater effects due to sea levels during storm events is a major determinant in flood levels. Further the catchments are relatively small and steep hence the flooding is short duration but may be intense due to rapid runoff.

The difference between a 1% AEP and a 5% AEP flood is small in most cases and there is little or no opportunity to have an effective flood warning or rapid response option as the worst of the flood peak occurs within one to two hours.

With a couple of significant exceptions, flood mitigation works such as levee banks, diversion works and detention areas are of little use and consume valuable land. The most effective option to manage flood risk is to raise the flood affected developments above the reach of the flood waters - given that in most of the catchments flood depths are only 1 to 1.5 metres, this is a practical solution.

Because of the current redevelopment pressures Pittwater is experiencing a unique opportunity to minimise flood risk for future generations by ensuring that all new development and re-development is constructed above an established flood planning level (FPL). In the case of low hazard areas/developments the FPL is generally taken as the 1% AEP flood height plus a freeboard of 500 millimetres and in the high hazard areas it is the FPL or the probable maximum flood (PMF), which ever is the greater. Interestingly, because of the proximity of the flood-affected areas to the coast, the FPL and the PMF are often very similar.

Underground parking is considered to be high hazard, regardless of where it is sited in the floodplain because of the potential risk to life and damage to property. Therefore Pittwater Council requires that all entries to underground parking areas are above the PMF level, including the lip on any entry or exit driveway and pedestrian access to the parking area.

9. Pittwater's Flood Risk Management Policy

Since 1996, Pittwater's policy for managing flood risk has undergone several revisions, however its underlying intentions have remained the same, that is to manage the social, environmental and economic risks and impacts associated with major flood events, to provide development controls on flood prone land for the safety of people and property, and to reduce the impact of flooding on individual properties, to inform and raise awareness and flood preparedness of the community, and to facilitate actions through the State's floodplain management process.

While it originally bridged the gap in enabling development decisions to be consistent until such time as the Floodplain Management Plan for each of the 7 floodplains were prepared and implemented, as a planning control it has become the main driver in successful flood protection within the Pittwater LGA.

The current form of the policy is the Flood Risk Management Policy for Pittwater, 2002 and the development controls are provided in Development Control Plan No. 30 – Pittwater Flood Risk Management, 2002 (DCP30). Together, they set quantifiable levels of flood risk reduction that over time will deliver to the community positive outcomes of flood risk management to the agreed risk levels.

Development within Pittwater's floodplains is defined in terms of flood protection up to the Flood Planning Level (FPL) or to the Probable Maximum Flood (PMF), and a suite of Flood Affected Properties Maps. These maps classify property flood affectation into three categories:

- Category 1 - Properties located within the Primary Flood Prone areas and affected by the FPL and PMF.
- Category 2 - Properties located within the Primary Flood Prone areas and affected by the PMF only, ie wholly above the FPL.
- Category 3 - Properties located outside the Primary Flood Prone areas but within major drainage systems, local overland flowpaths or drainage easements affected by the FPL.

In addition to the flood categories, properties are classified into Low Hazard or High Hazard in accordance with definitions from the NSW Flood Management Manual for the 1% AEP.

DCP30 is a prescriptive planning control allowing development to occur on the floodplain only where it can meet the criteria dictated by a property's flood category and hazard classification. Such criteria include acceptable minimum floor levels and minimum car park entry levels, the demonstration that the development does not worsen impacts on the environment of the floodplain and the surrounding properties, acceptable flood proofing and evacuation strategies.

With its subsequent revisions and its prescriptive methods, Pittwater's Flood Risk Management Policy and DCP30, provide greater autonomy in directing acceptable development within Pittwater's floodplains. Its clear benefits include that:

- Flood impacts on the property are removed or reduced to a defined acceptable level of flood tolerance;

- Costs are borne on the owner/developer. There is no dependency on the availability of Council and government funds or on the need for special rates;
- There is no need to undertake lengthy community consultation/reporting processes typical of the State floodplain management process, the policy has already been considered by the overall community;

- The process is not reliant on the "merits" approach and does not generate intergenerational inequity;

- Interpretation of the flood planning controls is no longer an engineering matter and can be interpreted more readily by the general public.

10. Application of Pittwater's Policy

Pittwater Council first began promulgation of the approach in 1996. In 2001 and 2002 it reviewed the policy to address "loopholes" that were being exploited by some developers.

The current situation in the residential areas of Pittwater adjacent to Narrabeen Lake, where the Flood Studies and the Flood Risk Management Studies were completed in the early 1990's and Council's flood policy has been actively pursued since 1996, a significant number of residences have now been elevated. For example, in the Collins Street/Park Road region, 26 of the 68 residences (38%) have now been raised above the FPL and in the Wimbledon Avenue region, 29 of the 101 (29%) residences have now been raised. Overall, for all 1,875 flood affected properties, excluding Warriewood Valley, some 12% have been "flood-proofed" by the policy and all new development in Warriewood Valley (some 300 houses to date) have been undertaken within the Warriewood Water Management Strategy; an impressive statistic when it is considered that flood risk management studies have been completed for very few areas and therefore Council has had to apply its policy directly to the flood study information. In most areas, even the flood studies have only been available for four years or less.

Given the current rate of re-development it is anticipated that this approach will result in 80% of all flood prone properties having flood risk managed development forms within 30 years; a reasonable result when it is considered that this will reverse the trend that had developed over the first 20 years following the introduction of the State's Floodplain Policy in 1979.

While development applications that include the demolishing of an existing building and the construction of a new building are relatively easily handled through the Planning and Assessment Development Application (DA) process, additions and refurbishment of existing buildings initially proved a greater challenge. The principal issue was to determine the quantum of redevelopment that was allowable before triggering either a DA and/or the need to raise the building.

Because re-cladding and re-roofing did not initially require a DA and a 30m² increase in habitable space was allowed at existing floor levels the more "enterprising" community members were purchasing old fibro houses and carrying out major upgrades by completely stripping the building inside and out then adding a second floor, re-cladding, re-roofing and adding a double or triple garage, which subsequently wholly or partly turned into a family room. The net result, along with the new floors, carpets, various electrical items and furniture, increased the value of asset at risk by $500,000 and the damage potential for a 1% AEP flood to $300,000.

The 2002 policy now refers to a cumulative maximum gross floor area of the ground floor and upper storey addition of up to 30m² before the minimum floor level requirement is triggered.

While Pittwater's Flood Risk Management Policy and DCP30 tend to become increasingly prescriptive to gain greater clarity in its application, the process is being compensated by Council's direction to present a property/development specific web-based interface, essentially directing the searcher to the relevant planning controls applicable to the development.

11. Conclusions and Comment

There is a pressing need to revisit the NSW Flood Prone Land Policy and flood management process. The processes involved in developing a Floodplain Risk Management Plan are clumsy, long-winded and in the end relatively ineffectual in producing a trans-generational solution. The end effectiveness of any Plan is also questionable given that the funds for the implementation phase are very limited.

Given that a 1% AEP event has a 26% probability of occurrence in an economic life time of 30 years, or a 63% probability in the realistic life of a residential house, it is essential to adopt a far more restrictive approach at State level. Unless this occurs there will be no real impact made on the value of asset at risk from flooding and the current tendency to increase the adverse economic consequences of re-development in flood prone areas. Without change future generations will be burdened with major financial and environmental contingent liabilities.

On the coastal plains and the far western plains of the State, where much of the flood prone land is only inundated by 1 to 2 metres or less (even in an event greater than the 1% AEP), it would be very practical and reasonable to simply require all new and major re-developments be constructed above a Flood Planning Level (say 1% AEP plus a freeboard of 300 to 500 millimetres).

All "Greenfield" developments should be subject to a water management strategy that amongst environmental and sustainability issues includes flood risk management criteria for all development such as what Pittwater Council has undertaken for Warriewood Valley.

As far as the statutory planning process is concerned, once the initial flood studies have been completed and the properties affected by flooding identified, there must be an automatic process that enables those properties to be identified in Local Environmental Plans with Councils required to immediately implement an Interim Planning Control. The Interim Planning Control is to ensure that any development addresses the defined flood risk and hazard level in such a way that minimises the impact of flood risk and consequence to life and property.

The Interim controls can be relaxed, if appropriate, once a Floodplain Risk Management Plan has been developed and implemented. That is, the "drivers" of the current floodplain management process need to be reversed and incentives put in place as soon as possible to encourage the community to rapidly determine and implement a practical floodplain management plan.

As surely as yesterday's humble riverside fibro home has become today's waterside mansion, the NSW floodplain management process must also progress with the times.

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