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Submission – Warragamba Dam Raising Project – SSI 8441

Upon reviewing of the proposal, I hereby object to the proposal in its current form.

The reasons why I object to the proposal are;

The proposal is limited in scope. It is stated that: *Warragamba Dam Raising is a project to provide flood mitigation to reduce the significant existing risk to life and property in the Hawkesbury-Nepean Valley downstream of the dam.*

It however does not address the future risk to life and property, as there is no connection between planned increases in development within the current and likely flood risk areas, due to climate change. It is a project of "putting all eggs in the one basket" in relation to mitigating flood risk issues, as it does not take into account the issue of long-term consequences.

(1). All flood assessments rely on existing return periods for modelling of the floods. Therefore there is no basic risk assessment in relation to the potential projected increases in frequency, and intensities of rainfall/storm events over the principle flood event seasons of summer and autumn due to climate change.

This is a significant deficiency and flaw as there is no scenarios given for how the return periods could change. There will be definite change, but the amount of change will only be known in hind-sight. Thus the precautionary principle must be conservatory applied, particularly with the significant impacts if they are underestimated for the community. From for example a change of 10% to 100%. A 50% change (simplistically) would mean that a current 1:10 year event will now be a 1:5 year event, a current 1:100 event will now be a 1:50 year event etc.

The out-of-date references (OEH 2014) indicate:

- marginal increases in summer and autumn rainfall, but decreased winter and spring rainfall in the near-term (2030)
- increased rainfall across all seasons by up to 20 percent in the far-term (by 2070)
- an increase in rainfall extremes (intensity and duration)
- no change, or a small decline in the frequency of ECLs, but an increase in the number of intense ECLs

This is out of date in relation to the rapidity of climate change as demonstrated in the recent climate change meetings in Glasgow, where temperatures are already around 50 years in advance to the OEH 2014 report (ie much higher) and thus the associated variabilities of relative to the subject issue flooding will also be, at least, that much more in the near future.

The compounding results of climate change on flooding has a high probability of minimising any benefits of flood mitigation, with an actual increase in the length of time of any flood. People affected will only perceive that the problem has become worse, not better.

(2). There is no consideration of end-of-life for the dam and the implications of that. The project is only considering very short term issues. All dams have a life expectancy. The apparent consensus for large concrete dams is around 100 year life expectancy, and even if the dam had a useful life of 200 years, this is very short relative to the potential life of any city, including Sydney. To put that in perspective, many European cities are over 1000 years old, and several are over 2000 years old. These are the time frames that logically need to be considered, in relation to the long term effectiveness of any flood mitigation measures.

The construction of the dam was finished in 1960 and upgraded to "survive" a PMF event in the early 2000's. The dam thus is already 60 years old. Although the dam is designed not to fail, the purpose of the dam will; both as a water supply and proposed purpose as flood mitigation.

The increased temperatures due to climate change and thus the intensities and frequencies of major bushfires will significantly accelerate historical (ie the last 60 years), rates and amounts of sedimentation into the storage, along with increased erosion from agricultural lands in the catchment. What happens then?

This is the issue of putting all the flood mitigation risks all in one basket. There are current technical solutions for supplying water to Greater Sydney, but there will never be a technical solution for the storage (both water supply and flooding) once filled with sediment. Once used, always gone.

The issue of sedimentation also has significant detrimental implications for the so-called temporary inundation of all upstream areas. These will be permanently buried in this sediment without any chance to rectify. Overall this will impact upon the values of the few remaining wilderness rivers of the area, the Blue Mountains National Park the World Heritage Areas. This has a direct personal impact upon my amenity and enjoyment of using these areas.

The quickness of filling with sediment can be seen in many smaller and defunct town water supply dams in NSW, and how the MacDonald River in the lower HN catchment went from being a navigable water up to St Albans, to being filled with sediment.

Sydney will be existing for much longer then the useful life of the dam. Unless this is considered now and looking at the future development issues on current and certain extra climate change flood lands then the cost of future costs will be far greater than the avoidance of costs by only relying on the certain diminishing flood mitigation effects over time. If development is allowed to continue to occur on these current and future flood plains, there will then be no future alternative, except for flooding to re-establish to pre-mitigation levels with the added bonus of climate change impacts.

Most people currently perceive the current proposal as indicating that it will prevent flooding which will then make planners, government and owners of floodplain areas more complacent in having/doing development on the floodplains, exaggerating the current and future problems.

(3).This project demonstrates a gross misunderstanding of risk in relation to flooding. Throughout the EIS the terminology of Average Recurrence Intervals is mostly used, and is well-recognised to be misleading for understanding by the general public. *Table 15-2. Design flood terminology*, gives 3 different expressions of risk. However only the Annual Exceedance Probability (%) gives a more accurate, but still not clear idea of risk for the average person.

Using the apparent planning standard of an Average Recurrence Interval of a 1:100 year flood, which can be expressed as a Annual Exceedance Probability (%) of 1%, most people will have the impression that a flood of that magnitude will only occur once in 100 years, where in fact every year it has a 1% chance of happening. Thus this magnitude of a storm could actually happen several times in one season. The same as throwing a dice, where 6 could be thrown several times in a row, or conversely a 6 is not thrown after 20 times.

Rainfall records have only been sustained for around 120 years in the area at only one location. The longest records in Australia are from inner Sydney from 1857. However information presented in this EIS imply certainty of flood events well beyond that, such as 1:200 and 1:500. The 1867 flood has been deemed a 1:500 year event, but as indicated above, any event can occur at any time in any year. Therefore that event could actually be a more frequent event to how it is shown.

All levels of flooding will happen, it is a matter of when not if, particularly when the need to take into account the expected "life" of the object to be protected, which is Sydney.

(4). Community perceptions do not to support the project in its current form.

Figure 1-1 shows the community sentiments expressed as percentages of the total. Only 6% were in favour 15% not in favour and all others (79%) neutral. The biggest issue for most appear being further development on the flood plain. So there is no overall community imperative to have this project in the first place. The imperative appears to be all on the desire by government to encourage development on these flood plains, and thinking that this project will save their poor planning.

(5). It would appear that a significant stakeholder on the subject of flooding was not consulted or considered. This is the insurance industry, where current trends of existing flood insurance are so expensive that few landholders can afford them. Although commendable that this proposal is in the sentiment of wanting to mitigate flooding in existing flood areas, it would appear that climate change is already making the insurance industry more risk-adverse and thus even more expensive; that is if you can even get insurance for flooding. This will also affect those areas not currently considered flood risky until the impacts of climate change increase the current flood areas. The EIS has again not attempted to look at future flood levels for particular climate change scenarios, which could give a conservative guide to those areas that should not be developed.

The current and likely future inability of flood insurance in all current and future flood areas will by "natural attrition" discourage development on current areas, as damage and probably abandonment occurs of existing dwelling and structures. This however will only happen if the public are actually informed of these risks of buying property in flood risk areas. **This is particularly in new development areas. This will be seen as the State deliberately deceiving/hiding the risks for those people and leaving the State liable to future litigation.**

(6). The people who are putting their life's savings and future wellbeing and happiness into buying a home in the new subdivision areas within the floodplains would be buying because they are reasonably assuming that they are flood-safe, otherwise why are these developments in those areas being allowed and actively encouraged by government?

This is a clear breach of abrogating the health and safety of those people by the State and again leaving the State open to future litigation, which will be borne by the citizens of the state, while developers gain a windfall with no responsibility.

The extent of this issue is not known, as there is no information on the rate of development on the existing and probable floodplains. This information should be provided. There should be an idea of existing development at the time of the dam was completed in 1960 and a snapshot every 20 years after that. This will demonstrate the significance of controlling development relative to only relying on partial flood mitigation.

It is noted that the alternatives to the flood mitigation are very restricted in scope by the EIS.

Buy back all dwellings within the 1 in 100 chance in a year flood extent. This reduces flood risk to both life and property by removing dwellings exposed to the most frequent floods and replacing them with a more compatible land use such as recreation. Implementation would have major economic and social impacts on entire communities and would incur considerable costs.

Disallow all new dwellings within the 1 in 500 in a year flood extent. This reduces future flood risk but does not reduce the large existing flood risk. Implementation would be costly and difficult, given large areas above the 1 in 100 chance in a year floodplain have been approved and/or zoned for residential development.

As demonstrated above, what are the costs once the flood mitigation effects stop? Relative to current and proposed levels of development. All developments should not be below the design flood level used for the flood evacuation routes within the catchment (nominally referred to as a 1:350 year event).

The apparent purpose of this project is to mitigate problems, however without addressing the issue of continued and accelerating development on the floodplains, the project will enhance the problems, and at a greater future cost.

The issue of development of the flood plains and flood mitigation must be a single consideration and proposal, otherwise disaster far greater than known historical and recent floods are a certainty. Therefor I reiterate my objection to this proposal as presented.

I declare that I have not made any reportable political donations in the previous two years.

Greg Brady