

**Submission
No 31**

**INQUIRY INTO WATER NSW AMENDMENT
(WARRAGAMBA DAM) BILL 2018**

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Date Received: 2 October 2018

Submission to the Parliamentary Committee investigating the proposal to raise the crest of the Warragamba Dam wall.

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October 2nd, 2018.

Introduction:

This legislation is intended to facilitate the NSW government's proposal to raise the crest of Warragamba Dam as a flood mitigation measure. This proposal is itself the outcome of Infrastructure NSW's cost-benefit analysis (CBA) of five Hawkesbury Nepean Valley flood mitigation infrastructure projects. For unspecified reasons the CBA is not available for public scrutiny. The following analysis is therefore based on Infrastructure NSW's 2017 summary (published as *Resilient Valley, Resilient Communities*) and also on two key documents informing the CBA. These are the *Hawkesbury-Nepean Valley Flood Management Review: Stage One* (Dept. of Primary Industries, 2014) and *Hawkesbury-Nepean Flood Damages Assessment Final Report* (Infrastructure NSW, 2012).

Considering the arguments and methodology outlined in these documents, it appears that in several key respects the report informing the proposal to raise the crest of the Warragamba Dam wall does not comply with the basic procedures required of a CBA.

1) The scope of the investigation is not sufficiently narrow and the resultant quantitative estimate of cost and benefits therefore lacks credibility.

A CBA attempts to identify and estimate the costs and benefits of a specific project, policy or cogent set of policies over a certain period of time (Dept. of Finance and Administration, 2006, p.viii). In other words, when undertaking a CBA, the analyst must be able to distinguish the likely effects of the project under scrutiny from the likely effects of other events or projects which happen to be taking place at the same time or in the same region. Economists routinely abstract from the latter by means of what they call a "*ceteris paribus*" device. This means that, when analysing the impact of one or a set of projects or policies, economists assume that all other variables remain fairly constant during that period under consideration. The father of orthodox economics, Alfred Marshall, noted that this procedure is acceptable so long as the analyst does not anticipate any *major* changes which are likely to have widespread and cumulative impacts (Marshall 1928). This is because a major change or development (other than ones arising from the project under scrutiny) increases the proportion of potential "unknowns" which may impact on a project's costs and benefits. The credibility of a CBA is thus compromised to the extent that implementation of the project under scrutiny is likely to take place at the same time and in proximity to another *major* event or development.

These difficulties are apparent when considering Infrastructure NSW's CBA of five shortlisted Hawkesbury-Nepean flood mitigation infrastructure projects. These five projects are explicitly analysed in the context of a proposed major urban development, described in *Resilient Valley, Resilient Communities* as transformation from "a semi-rural landscape to an urbanized floodplain" (Infrastructure NSW, 2017, p.19.) The NSW government expects this major event,

the development of the Metropolitan West Sub-region, to include at least 39,000 homes and 37,000 jobs in the region in question.

Resilient Valley, Resilient Communities and its antecedent documents have detailed the costs and benefits of various flood mitigation proposals in terms of the increased risk to life and property *given* this major development of the floodplain. However what is conspicuously missing from these documents is any substantial appreciation of the likely impacts of such a major urban development on a wide range of factors held constant in its CBA. As notable examples, it is implausible to assume (as does Infrastructure NSW) that the transformation of a semi-rural landscape to an urbanized floodplain will have few appreciable effects on Local Government building and planning regulations, on the development of major regional roads, on the location of service and commercial facilities and on residential and commercial property values (Infrastructure NSW, 2017, p.10, p.21, p.30, Dept. of Primary Industries, 2014, p.19).

Narrowly focused on the flood risks associated with the development, the CBA has apparently not appreciated the likely wide ranging and cumulative effects of such a development and the indirect impact of such effects on the costs and benefits arising from its flood mitigation infrastructure options. The summary report thus reads as an incoherent document which posits significant regional change while simultaneously assuming that a wide variety of policies and events in the region will not be much affected by this significant change.

2) Inconsistency between the methodology applied in assessing the costs and benefits of infrastructure Option One (raising the crest of the Warragamba Dam Wall) and the methodology applied in assessing the other shortlisted infrastructure options. This inconsistency indicates a pre-analysis bias towards raising the crest of Warragamba Dam Wall.

Resilient Valley, Resilient Communities (2017) and its antecedent documents apply various techniques inconsistently when assessing the range of flood mitigation options. Most notably, assessing the river dredging and Currency Creek Diversion options, the CBA explicitly takes into account the cost of negative environmental impacts, including damage to sections of the Blue Mountains National Park (Infrastructure NSW, 2017, p.29). Indeed the CBA rejects the Currency Creek diversion and dredging options partly on the grounds of these likely intangible, yet significant negative environmental impacts. It also notes that earlier proposals to erect dams upstream of Warragamba were rejected for the same reason (Infrastructure NSW, 2017, p.32, Dept. of Primary Industries, 2014, p.27).

By contrast, when assessing the costs and benefits of its preferred option, raising the crest of the Warragamba Dam wall, the 2017 summary document does not at all mention any likely impacts on the National Park upstream from Warragamba dam. It moreover does not mention the aboriginal cultural heritage sites located in the area that would be subjected to temporary flooding. This inconsistency and omission is particularly remarkable given NSW Infrastructure's own (earlier) recommendation that further investigation of the intangible upstream environmental impacts of raising the crest of the Warragamba Dam wall be undertaken (Infrastructure NSW, 2012, p.50-51).

In the absence of stated reasons for this inconsistency in methods (and the complete omission of any consideration of impacts on the environment upstream of Warragamba Dam), readers of *Resilient Valley, Resilient Communities* are left with the impression that the decision to raise the dam wall was determined prior to undertaking cost-benefit analysis of any of the shortlisted options.

3) The CBA fails to consider the full range of policy and infrastructure options. In particular, it fails to acknowledge the Hawkesbury-Nepean flood mitigation infrastructure options detailed and recommended in leading professional and academic literature.

The objectivity or credibility of a cost benefit analysis depends upon it demonstrably considering the full range of plausible policy or project options (Abelson 2008, p.140). Plausible options should at least address the research and recommendations of recognised experts in the relevant fields. The CBA summarised in *Resilient Valley, Resilient Communities* (2017) appears to have excluded a range of such plausible options. Notably, NSW Infrastructure's analysis of the costs and benefits of *lowering* the crest of the Warragamba Dam wall fails to model this scenario in conjunction with the a policy of activating the Sydney Desalination Plant. This omission is remarkable, given that lowering the dam wall and conjointly activating the desalination plant had been identified by a team of Australian engineers, economists and environmental scientists as the *least cost* Hawkesbury-Nepean flood mitigation option consistent with ensuring the reliability of Sydney's water supply. (See Turner et al, 2016 for details.)

Conclusion: Judging by the summary document, *Resilient Valley, Resilient Communities* (2017), the cost benefit analysis underlying the NSW government's proposal to raise the crest of Warragamba Dam wall lacks credibility in three key respects. Firstly, the analysis has not adequately considered the likely impacts of a proposed major urban development on its estimation of various flood mitigation costs and benefits. Secondly, the inconsistency between the methods used to analyse the various infrastructure options suggests as pre-analysis bias towards raising the crest of the dam wall. Thirdly, the analysis lacks credibility since it fails to consider policy options for this region recommended by leading experts in engineering, economics and environmental science.

References

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