

# Objection to Warragamba Dam Raising Preferred Infrastructure Report and Submissions Report

## 1 Name and Qualifications

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*Continuing Specialisations:*

From 1967: Hydraulics

From 1976: Environmental engineering and ecological economics

From 1981: Economic and social impacts of flood-risk management strategies

From 1990: On-site wastewater management

From 1999: Archaeological studies of mediaeval water management systems

*Professional Activities*

1984-9 Environmental Engineering Panel, Sydney Division, Engineers Australia; Founding Chairman.

1995-2018: Standards Australia Committee WS-040 On-site Domestic Wastewater Management

Overseas experience: Oceania, Southeast Asia, Europe

## 2 Introduction

The Preferred Infrastructure Report (PIR) and the Submissions Report (SR) are inadequate documents for their purpose. They have not addressed many of the points raised in my submission. Where they have addressed them, the reasoning has been illogical, specious or contrary to reality.

I shall refer to the inadequacies of the SR mainly, unless I have discerned additional ones in the PIR.

## 3 The Levee Paradox

The Secretary's Environmental Assessment Requirement 2(1)b (SEAR 2(1)b) required that

“The EIS must include, but not necessarily be limited to ... a description of the project, including all components and activities (including ancillary components and activities) required to construct and operate it.”

While the SR acknowledged that there was a risk of the Project inducing a false sense of security (Sections 2.3.4, 5.2.3, 6.3.5, 6.10), it asserted (p. 370) that

*It is not within the scope of the Project and the EIS to encourage development in places outside of the floodplain nor to change the planning controls and restrict development in the Hawkesbury- Nepean Valley.*

Which runs counter to not only SEAR 2(1)b (and other SEARs, see below), but also Sec 192(1)(d)(iv) of the Environmental Planning and Assessment Regulation 2021, namely

*An environmental impact statement must contain ... an analysis of the development, activity or infrastructure, including ... a full description of the measures to mitigate adverse effects of the development, activity or infrastructure on the environment*

since incorporating strategies to counter the effects of the Levee Paradox is essential for the Project's viability.

It should not go unremarked that the verb in the first sentence of the first paragraph following this sentence, emphasised below, namely

*It is acknowledged that raising Warragamba Dam and creating flood mitigation benefits may provide a false sense of security for communities living on the floodplain.*

is misleading, if not deceptive. The WDR Team has received several submissions which in essence boil down to the import that this verb should read "will". If the WDR Team did not agree with these submissions, it should have explained why in its responses.

## 4 Additional population moving onto the floodplain not allowed for properly

One obvious partial strategy, limiting further development on the floodplain was arbitrarily removed from consideration (p. 370):

*It is not within the scope of the Project and the EIS to encourage development in places outside of the floodplain nor to change the planning controls and restrict development in the Hawkesbury- Nepean Valley.*

Further (p. 402):

*It is not the role of the Project or this EIS to assess the merits of previous planning decisions, those made applying current planning controls, or the validity of those controls.*

And (p. 402)

*It is not the role of this Project EIS to challenge the basis for and guidance within those adopted strategic documents for the development of Sydney.*

This runs counter to Sec 192(1)(c) of the Environmental Planning and Assessment Regulation 2021, namely,

*An environmental impact statement must contain ... an analysis of feasible alternatives to the carrying out of the development, activity or infrastructure, considering its objectives, including the consequences of not carrying out the development, activity or infrastructure,*

Setting this aside, there is an additional flaw, which has not been allowed for in the benefit-cost analyses. The false sense of security created by the dam being raised—as happens invariably worldwide—would induce onto the floodplain population and assets additional to those allowed for in the benefit-cost analyses. Had these extra costs been allowed for, the benefit-cost ratio would have worked out to be significantly less than one.

## 5 Improvements needed for warning, forecasting and preparedness strategies not addressed

Another obvious partial strategy, measures to improve warnings, forecasting and preparedness was also arbitrarily removed from consideration (p. 372):

*This warning, forecasting and education activity is separate to but complementary to the Project.*

Even more concerning was the uncertainty of their implementation (emphasis added) (p. 367-8):

*These outcomes [programs for the flood-prone community becoming aware, prepared and responsive; programs for improved weather and flood predictions; and best practice emergency response and recovery] are led by the nominated agencies and **may be subject to their own approvals and business cases.***

This again runs counter to Sec 192(1)(c) of the Environmental Planning and Assessment Regulation 2021. It is not a quibble. It is the norm rather than the exception worldwide for emergency programs to degrade and become under-funded over time, so that if the disasters are large but rare, these programs will almost inevitably have become all but dysfunctional. The two examples of impairment of such programs set out in Section 4 of my earlier submission were chosen from a large list of suitable candidates, because they happened to be directly relevant to the Project.

## 6 The unjustifiable Project Under Impact Area (PUIA)

Even the Department of Planning and Environment advised that a clear definition is required for the term ‘Project Upstream Impact Area (PUIA)’ used in analysis for Chapter 18, and across the Aboriginal Cultural Heritage (ACH) assessment. The response of the WDR Team (p. 325) was to assert that the PUIA

*is clearly presented in the EIS and resulted in the defining of the PUIA*

Quite plainly, the DPE would not have asked for a clear definition of the PUIA had there been one. The response of the Project Team to simply assert that PUIA is explained clearly in the EIS might be interpreted by some as hubris.

As I have explained in my earlier submission—to which there has been no response in the PIR nor in the SR—no clear definition can be provided, since the calculated ‘average’ or likely inundation level (PIR p. 78) has no significance for evaluating the losses of Aboriginal Cultural Heritage (ACH), since the PUIA is an area and not an evaluation of these losses. Neither the EIS nor the PIR provides any theoretical underpinning for calculating the PUIA, whose use ignores all items of cultural value above the level of the PUIA but below the level of the Probable Maximum Flood (PMF). Nor has any justification for using the PUIA been discerned in the fields of economics or statistics. To the extent that any sense can be made of this index, it is inconsistent with the standard statistical formula for expected value, taught nowadays as early as in high school.

Even setting aside this elaborate but seemingly unexplainable index, the revised PUIA is still deficient. The so-described “potential impacts in the context of the incremental increase in temporary inundation” (PIR p. 38) is only for levels up to the level of the 1 in 100 chance in a year flood event. It is not sufficient to ignore items of cultural value at higher levels because the likelihood of their inundation in any year is low. To evaluate these losses, one must take into account not only the likelihood but also the quantum of loss. Table 68 of the Niche Report is therefore incomplete and misleading.

If the WDR Team disagreed with my assessment of this index, it should have set out the arguments for its stance.

I also sought to help the WDR Team by advising them of formulae that could have been used for its assessments, this time based on statistical theory. If it was unsure how to apply these formulae, the Team could have asked.

## 7 Additional assessments of upstream inundation

As far as I can tell, the estimates of upstream levels in the PIR (p. 78) for assessing the impacts for the 1 in 5, 1 in 10, 1 in 50 and 1 in 100 year chance in a year did not allow for climate change. Nor did it seem to consider the effects of climate change for periods beyond the project life, given that the effects on all items of cultural heritage below the level of the PMF would become manifest well beyond the useful life of the project, unless the dam were lowered after the project life. Such a lowering has patently not been allowed for in the costings.

The Treasury Guidelines for evaluating projects (NSW Treasury 2007, p. 17) warns that attention needs to be paid to all costs of a proposal. The raised Dam would not be removed at the end of its project life, and it would continue to raise the flood levels upstream until the Dam were lowered. If this removal would take centuries or millennia to initiate, it is certain that most items below the level of the raised PMF would be inundated one day. This cost has not been evaluated. The Treasury Guidelines (NSW Treasury 2007, p. 39) allow for calculations of the cost of an option in perpetuity.

Likewise, there seems to have been no allowances for the effects of climate change for all assessments of the effects of the 1 in 5, 1 in 10, 1 in 50 and 1 in 100 year chance in a year events on the various adverse impacts in the SR (e.g. Tables 4-7 and 6-3 of the SR).

## 8 The benefit-cost ratio of the Project would be significantly less than 1

I pointed out in my earlier submission that citing a benefit-cost ratio (BCR) of 1.05, implying an accuracy of  $\pm 2.5\%$ , was unjustified because of all the inaccuracies in the assumptions and calculations, many of which have been discussed in the EIS, the PIR, the SR and the submissions. Yet this number was used by the Minister in justifying the Project. I note too, that I have found no response to my submission on this issue.

Nor have I found any responses to the issues of:

- Treasury's guidance for the benefit-cost study to use a range of discount rates;
- The historically high proportion of government construction projects that run over budget;
- The historically low proportion of government projects that gain their estimated benefits;
- The unjustified zero valuations of the losses to ecosystems and aboriginal cultural heritage (ACH);
- The absence of sensitivity testing.

Had any of these omissions been included, the BCR would have been substantially less than 1.

Given the importance of this figure of 1.05 for justifying the Project, and the omission of the criticisms surrounding it in the PIR and SR, it is not yet clear that the Minister has not been misled.

## 9 Raising the Dam by 17 m

The probability of raising the Dam by another 3 m, decades after it was raised by 14 m, is well on the cards, because the benefits of the 14-m raising will likely have decreased with climate change, and the relatively low cost of this additional work. The fact that the abutments are to be installed to 17 m means in logic that the WDR Team considers this a likely event. It follows that the omission of the scenario of raising the Dam by 17 m runs counter to Sec 192(1)(d)3 of the Environmental Planning and Assessment Regulation 2021, namely,

*An environmental impact statement must contain ... an analysis of feasible alternatives to the carrying out of the development, activity or infrastructure, including ... the **likely** impact on the environment of the development, activity or infrastructure,*

## 10 Failure to address many of Secretary's Environmental Assessment Requirements (SEARs)

In my previous submission, I identified the following SEARs as not being adequately dealt with, if at all. They are listed below (by number only for compactness) as having an improved consideration and those not having been addressed further.

The following have now received improved consideration: -

2.1h, 2.1p, 8.2h, 8.6,

I do not evaluate here whether the improved consideration is adequate. Rather this is to acknowledge that there has been a response.

Those below do not appear to have been received additional consideration yet: -

2.1b, 2.1e, 2.1f, 2.1g, 2.1i, 2.1n,

3.1, 3.2b, 3.2c, 3.2d, 3.2e, 3.2f, 3.3,

7.1, 7.2,

8.2b, 8.2g, 8.4, 8.5,

9.3e, 9.3f, 9.5

10,

13,

16

20

The details of the deficiencies are listed in the earlier submission.

## 11 Alternative strategies

My earlier submission put forward a suggested combination of alternative strategies: -

- lowering the full storage level during periods of La Niña;
- recycling of the order of 30% of the water supplied to Sydney Water;
- not just flood education but also flood training of the community, such as through drills;
- amending Standard Instrument (Local Environmental Plans) Order 2006 to encourage new developments with a net reduction in flood affectation on the floodplain;
- involving insurance companies in flood-risk management.

The strategy of lowering the full storage level *during periods of La Niña* does not appear to have been addressed.

The strategy of recycling has been deemed to be beyond the scope of this Project (p. 221). This is a non-compliance with Sec 192(1)(c) of the Environmental Planning and Assessment Regulation 2021. It has been briefly alluded to in Sec 6.3.4. (p. 368).

The strategy of flood training has been deemed to be beyond the scope of the Project, as mentioned already (Section 5).

The strategy of involving insurance companies in flood-risk management has not been addressed. Section 6.11.4 indicates that the WDR Team has not deemed it desirable to seek to proactively engage the insurance industry in the Project.

Amending Standard Instrument (Local Environmental Plans) Order 2006 to encourage new developments with a net reduction in flood affectation on the floodplain seems not to have been considered. On the basis of the WDR Team's other responses to suggestions, one might wonder if it too was deemed to be outside the scope of the Project.

## 12 Summary

1. The PIR and the SR do not appear to have addressed many of the lacunae of the EIS.
2. The Project EIS, PIR and SR seem in breach of Section 192(1) of the Environmental Planning and Assessment Regulation 2021.
3. Many activities and impacts associated with the Project have been deemed beyond its scope, without justification.
4. It has not yet been demonstrated that the proposed Project is economically justified.
5. The advice to the Minister that the BCR of the Project was 1.05 was misleading, if not deceptive.
6. Some of my objections to the EIS seem not to have been considered.