17th November 2010

THE UNIVERSITY OF
NEW SOUTH WALES

Water Research
Laboratory

School of Civil and
Environmental Engineering

Our Ref 10065 BMM:WLP L101117

Department of Planning
GPO Box 39
SYDNEY NSW 2001

Attention: Ms Anna Scott

Dear Anna,

REVIEW OF NUMERICAL MODELLING OF THE ESTUARINE IMPACTS OF THE PROPOSED TILLEGRA DAM

Further to your discussion yesterday with Dr. Peirson and subsequent e-mail request, he has provided the following response to your questions as follows:

1. Have the impacts of the fill-up phase been adequately and appropriately assessed?

   Response: My understanding is that no detailed unsteady flow modelling has been undertaken to address the dam fill-up phase by Hunter Water. This was requested formally during both of the reviews. (See the summary and conclusions of my second review, point a. in 10065 BMM:WLP LR100913.)

2. Has the modelling analysed the possible changes to the frequency and duration of the medium to high flows (but not flood flows) i.e. those flows which are important from an ecological perspective;

   Response: In my second review I found that whilst the numerical modelling had been completed, sufficient analysis had not been undertaken of the model results to quantify the possible changes to wetland flood inundation. To date, I have seen no suitable quantitative analysis undertaken on behalf of Hunter Water (See the summary and conclusions of my second review, points d. and e. in 10065 BMM:WLP LR100913).

3. Is the modelling undertaken valid and appropriate for the questions that need to be answered about the impacts of the proposal, for example,

   a. Will the fill-up phase cause impacts on the upper or lower estuary?

      Response: Please refer to point 1 above. The fill up phase could take a period of a decade or more and could have a significant effect on the estuary if inflows are substantially reduced. I am unaware of this issue being addressed in the numerical modelling undertaken to date.

b. If a drought occurred concurrently with the fill-up phase, has this been assessed?

Response: No.

c. Will flow frequencies and duration change for the medium to high flows?

Response: Yes and the degree depends on the final flow translucency scenario selected but this is quantified on page 33 of BMT WBM (2010) *Ramsar Wetland Modelling Investigations for the Tillegra Dam Project*. R.N1651.001.01_Final.doc.

d. What would be the estuary impacts under the scenario when the Hunter is in drought and the Williams River is a major contributor of freshwater inflows to the estuary?

Response: This is a difficult question to answer as it would depend on drought duration and intensity on the Hunter and specific conditions on the Williams. Multi-decadal simulations of estuarine flow and salinity behaviour that incorporate a wide range of recorded climatic conditions are essential to ensure that representative conditions are included (e.g. Peirson *et al*., 2001 Assessment of Changes to saltwater/freshwater habitat from reductions in flow to the Richmond River estuary, Australia. Wat. Sc. And Tech. 43**, No. 9, 89-97, IWA Publishing. The 10 years of unsteady flow and salinity modelling described on page 139 of BMT WMB (2010) *Estuarine Impacts of the Proposed Tillegra Dam: A Collated Assessment*. R.N1651003.00.docx August using TUFLOW *may* include such scenarios.**

Overall response: Model accuracy is judged by appropriate comparison with recorded data. Model sensitivity to proposed changes in flow regime is used to assess the impact of the proposed changes in the context of appropriate assessment of model accuracy. Issues of concern regarding the models that have been developed are as described in my second review. (See the summary and conclusions of my second review, points b and c. in 10065 BMM:WLP LR100913.)

We trust that this addresses your present concerns regarding the numerical modelling undertaken. If you have any questions, please do not hesitate to contact Dr. Peirson.

Yours sincerely,

Brett Miller
Manager