

Appendix D

# Clarification of aspects of the stormwater management strategy



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13 April 2011

Mr Craig Harris  
CIC Australia Pty Ltd  
Level 3, 64 Allara St  
CANBERRA ACT 2601

Dear Craig,

**Response to Part 3A submission comments on stormwater management at  
Googong township**

Brown Consulting would like to offer the following response to comments received regarding the exhibited Part 3A Concept Plan and Stage 1 Project Application for the Googong township's Integrated Water Cycle (IWC).

The work undertaken by Brown Consulting on the stormwater management relates to the whole of the Googong township, with more specific attention given to the so called "Googong Creek" catchment, within which will be located the first neighbourhood of the township (Neighbourhood 1A).

This letter provides a summary of, and offers some clarification to, the extensive work that was undertaken over a period of four years and documented in the Part 3A Environmental Assessment (at Appendix M of that document). It should be noted that the stormwater management system is primarily part of the subdivision design, which is administered and approved by Queanbeyan City Council under Part 4 of the NSW EP&A Act.

*Philosophy and principles of the stormwater management strategy*

The fundamental philosophy of the stormwater strategy for Googong township has been to carefully assess and analyse the implications of an urban development in an existing rural catchment to ensure that post-development flows mimic pre-development conditions in terms of peak discharge and key pollutant loads as well as ensuring ambient water quality is maintained in downstream waterways in accordance with Queanbeyan City Council and NSW Government regulatory requirements.

The key principles that were central to the development of the stormwater management strategy and associated work were to:

1. Define the framework of a stormwater management strategy for the Googong township, based on the existing topography and site constraints;

2. Manage the impacts of catchment urbanisation (higher degree of imperviousness, more “reactive” catchment to rainfall) and minimise the potential detrimental impacts on the downstream receiving environment (such as increased peak flows, urban stormwater pollutants generation), including Googong Creek downstream of Googong Dam Road and the Queanbeyan River;
3. Design a strategy and an integrated series of measures to control stormwater quantity and quality to meet the specific targets set by Queanbeyan City Council particularly in ensuring post-development peak discharge and ambient water quality mimic pre-development conditions. Brown Consulting’s approach has also been based on relevant industry standards, Australian Standards and local, NSW and Australian regulations, policies and guidelines;
4. Consider both stormwater quantity management and stormwater quality management requirements in order to mitigate the impact of urbanisation of the catchments;
5. Integration of the stormwater management strategy and measures with the integrated water cycle management at Googong, including the discharge of excess recycled water into the stormwater system, integration with landscaping and provision of a network of linkages to support biodiversity.

*Some technical elements of the modelling and analyses carried out.*

Limited site specific flow information was available for the site. The modelling and analysis approach selected for the project included a combination of hydrological, hydraulic and water quality models that were calibrated to earlier preliminary studies (e.g., Northrop, 2004) as well as Australian ungauged catchment hydrological method (Probable Rational Method). This method is an industry wide standard used on most ungauged catchments in Australia and accepted by Agencies in situations of limited or poor actual monitoring data.

The modelling undertaken was used to compare a number of scenarios including pre-development conditions and post-development scenarios, analysis of the possible excess flows of recycled water out of the Googong water recycling plant, and climate change scenarios.

It is Brown Consulting’s professional judgement that the method used was the most appropriate for the task.

*Stormwater Management Strategy Outcomes*

The strategy developed consisted of a number of measures creating a stormwater treatment train including raingardens, swales, bioretention pods and ponds. Our analysis demonstrated that with or without recycled water flows, stormwater quality leaving the Googong township site below Googong Dam Road will be meeting all the applicable water quality parameter targets (nitrogen, phosphorus and suspended solids).

The results also show that there will be no changes to the peak of stormwater flows leaving the site. We acknowledge that there will be modification to the hydrological regime Googong Creek with more regular flows. It is our opinion that more frequent flows will contribute to improving the health of downstream waterways including the Murrumbidgee and the Murray Darling Basin. The results show the compliance with all applicable criteria from local, state and Australian government.

*An evolutive and flexible strategy*

The strategy designed for Googong township is robust and flexible. It will allow adjusting and modification as the project develops in stages. Googong township will take some 25 years to be fully developed. This extended development period means that for each new stage, the stormwater design is able to be based on a review of the performance of the current stormwater management measures. It will also look at the latest innovation for the stormwater industry. Where suitable, new technologies and approaches will be brought into developing the most appropriate mitigation response to the changes in land use in the Googong catchment. It should be noted that this will be supported by a series of monitoring programs including monitoring of flows in Googong Creek at Googong Dam Road (as part of Part 4 approvals) as well as in Queanbeyan River (as part of Part 3A approvals).

*Climate change considerations*

Brown Consulting acknowledges the issues of climate change and the potential impacts on temperature, evaporation, soil moisture content, rainfall patterns, etc. The water industry and the Australian Institution of Engineers are currently revising the applicable methods and tools for undertaking hydrological modelling and be able to perform scenario analysis to support risk management approaches.

In the interim, we have applied the best available scientific knowledge and guidelines (using for example CSIRO projections for the Murrumbidgee catchment) and over 40 years of local rainfall data as identified in Queanbeyan City Council stormwater design standards to assess the potential impact of climate change for our hydrological models. This approach is the most appropriate at this point in time, and given the flexibility in our strategy, as highlighted above, will allow the design of future stages to adjust and adapt the system to include new scientific knowledge and tools as they become available.

Brown Consulting has applied the highest professional standards in undertaking the development of the stormwater strategy and its integration with the urban planning and water recycling plant project. The best available scientific knowledge has been used wherever possible and sound professional judgement applied to bridge gaps in information. The proposed design response is flexible and adaptive, to ensure the strategy can be adapted over the 25 year timeframe for the project and our analysis has shown the absence of detrimental impacts and compliance with relevant legislation, design codes, guidelines, and industry standards.

Yours sincerely  
BROWN CONSULTING (ACT) PTY LTD

  
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