

Date 24 February 2017

Dr Michael Barry  
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Dear Michael

**Review of Explanatory Note – West Culburra Concept Plan and associated documents**

Thank you for the opportunity to review the latest iteration of correspondence regarding the proposed development at West Culburra, NSW. I have been through the material and have identified a few key issues associated the notes prepared by Martens and Associates.

***Review***

In assessing the submission from Martens, my focus has been on whether their responses would ensure a robust, sustainable outcome for the proposed development at West Culburra.

The critical component of this assessment is whether the proposed stormwater strategy included in their water cycle management report will deliver the required outcomes for the development and Crookhaven estuary. With reference to their explanatory note and previous correspondence issued by BMT WBM, I note the following:

- The continued reliance by the consultant on the assumption that infiltrated water from treatment systems would "disappear" in terms of both flows and pollutant loads has not been properly justified and is not supported by evidence, modelling or literature. While it is completely accepted that riparian zones can process and take up nutrients and particulates, the literature they have previously relied on shows that this occurs for high inflow concentrations (e.g. sewage effluent, agricultural runoff), but there is no evidence that the same would occur at the low concentrations likely to infiltrate below a stormwater treatment biofiltration system. This is simply due to the fact that as the concentration of infiltrated water approaches that of the underlying groundwater, the effectiveness of biological processes diminishes so that it is no longer a significant removal mechanism. The proponent continues to state that it "is incorrect and overly conservative" to pass the infiltrated water straight to the model outlet within the MUSIC model but does not provide any justification for why this is the case.
- Given the reliance on infiltrating water into the groundwater zone to provide a level of treatment, they continue to assert that they do not have adverse impacts on groundwater, however no groundwater modelling of sufficient robustness has been provided to justify this statement. We therefore cannot make a quantitative analysis as to whether an impact would or would not occur.
- The proponent suggests that the design of their "within road" bioretention swale can wait until the detailed design stage, however this is a key component of their strategy, so without this design we are unable to assess whether the proposed system would function properly and deliver the level of pollutant reduction required. This reduces our confidence that the strategy would deliver the required outcomes for the development.
- With regards to impacts on oyster leases, no specific actions have been identified which address pathogen loadings to the estuary, only the statement that the stormwater treatments have been

designed to maximise UV exposure and residence time. Given that the treatments are vegetated systems, the ability of them to provide sufficient UV exposure is questionable as the vegetation would provide significant shading. The statement that oyster industry representatives were consulted in developing the strategy does not address the risk of pathogen contamination.

- The proponent states that they have undertaken a sensitivity analysis of their treatment options assuming no infiltration to groundwater, and demonstrated that there is negligible impact to the estuary. This analysis only considers the ability for the groundwater system to reduce pollutant loads, it does not account for the release of additional groundwater into the estuary through the increased infiltration. As such, the sensitivity analysis does not provide sufficient certainty that the stormwater strategy will not impact upon the estuary condition. I would also defer to Dr Michael Barry of BMT WBM as to whether the assessment of estuary impact was undertaken with an appropriate level of rigour.

I hope the above notes are satisfactory for your current requirements. Please feel free to contact me if any of the above requires further explanation or more detail

Kind regards



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