Dear Mr Willett

I refer to your letter to the Minister for the Environment, the Hon Gabrielle Upton MP inviting the Minister to make a submission on a licence variation to the Catherine Hill Bay Water Facility under the Water Industry Competition Act 2006. Your email was referred to the Environment Protection Authority (EPA), and I have been asked to reply.

The EPA has reviewed the ADW Johnson PTY LTD reports titled '*Addendum to review environmental factors*' and '*Hydrology and Pollutant Assessment of Offsite Disposal of Wetland-Treated Recycled Water*' and additional documents related to a submission to IPART to make a variation to the existing Water Industry Competition Act (WICA) licence held by the Catherine Hill Bay Water Utility Pty Ltd (CHBWU). While CHBWU hold the IPART Network Operator Licence (N0. 16_035) granted under WICA, the EPA understands that they subcontract all design, construction, operation and maintenance activities to Solo Water. Solo Water are the IPART Retail Licence holder for all Solo Water schemes.

The EPA understands that CHBWU has applied to IPART to vary the licence conditions related to disposal of surplus recycled waste water generated from the seven stage *Beaches* housing development. The existing WICA licence for the development requires that this excess recycled water be disposed of via on-site irrigation at Stages 6 and 7. The developer (the Rose Property Group) instead wishes to develop the land for Stages 6 and 7 of the residential subdivision and instead discharge excess wetland-treated recycled water during 'wet' and 'dry' periods to the downstream environment. The proposed discharge will drain to a small intermittently open and closed 'un-named' creek and lagoon (ICOL) at the southern end of Middle Camp beach at Catherine Hill bay.

In summary the EPA understands that the variation application submitted to IPART is seeking:

- removal of the reverse osmosis treatment plant;
- removal of the irrigation area;
- replacing the reverse osmosis reject evaporation ponds with a constructed wetland;
- 2 ML tank storage pre-wetland to help control inflows and 3 ML of storage post-wetland and
- discharge of surplus water to the environment via two locations for wet and dry discharges.

I note that there are 5 questions being asked of the EPA by IPART with the EPA's answers provided below.

1. No, the EPA is not aware of any breach of the *Protection of the Environment Operations Act 1997* (the POEO Act) at this point in time.

2. There is no requirement for the proponent to hold an environment protection licence (licence) for the operation of the sewage treatment system, because the system does not meet the POEO Act licensing thresholds. However, the proponent has made application for a 'miscellaneous discharge to waters' licence for excess recycled water to be discharged to the environment. This licence, if issued, allows the discharge of pollutants which could otherwise be offence under Section 120 of the POEO Act (pollute waters).

3. Yes, the EPA will be considered a determining authority under Part 5 of the EP&A Act when the EPA's "*approval is required in order to enable to activity to be carried*

out" (section 5.1 of the EP&A Act). Approval is defined to include a "*licence*". Arguably, as the activity (being sewage treatment) requires a licence to regulate water pollution resulting from the activity, in order for the proponent to carry out the activity lawfully. The EPA would therefore be considered a determining authority.

4. Yes, the proposed variation to discharge excess wetland-treated recycled water to the environment (being the southern end of Middle Camp Beach at Catherine Hill Bay), instead of being disposed of via on-site irrigation at Stages 6 and 7, poses unacceptable risks at this point in time. The applicant has not followed an appropriate assessment pathway to properly assess and address these risks.

   Provided below is a summary of the key risks/issues that have not be properly assessed and addressed:

   a. Community risk: local communities appreciate their environment and place a high value on waterways/waters and should have a say in their values and the way in which they are used and maintained.

   b. Public Health risk: treated sewage and effluent has the potential to transmit pathogens that may impact on the values and users of the creek leading to the intermittently open and closed "un-named" lagoon (ICOL), the ICOL itself and Middle Camp Beach at Catherine Hill Bay. NSW Health should be consulted in respect of the public health risks posed.

   c. Environmental Health risk: the applicant has not adequately characterised the discharges or assessed the potential risks of these discharges.

   d. Environmental Health risk: the applicant has not provided sufficient information on the proposed treatment systems, discharge management and mitigation measures required to address any potential risks.

   e. Environmental Health risk: increases in loadings of nitrogen and phosphorus to the receiving waters are expected to increase primary production (phytoplankton, benthic microalgae and macroalgae) particularly if the major forms of nitrogen and phosphorous being discharged are more biologically available species such as ammonia, nitrate, nitrate, urea and dissolved inorganic phosphate. This could result in problems as algal blooms.

   f. Environmental Health risk: ICOLs are important in providing cultural, economic and ecological benefits to communities, as well as delivering invaluable ecosystem services such as water filtration and habitat protection which are fundamental life-support processes upon which all organisms depend (Daily et al., 1997; Barbier, 2011) and should be protected.

   g. Environmental Health risk: ICOLs are particularly vulnerable to organic matter and nutrient enrichment from anthropogenic catchment development due to their restricted and intermittent flushing regimes (Perissinotto et al. 2002; Newton and Mudge, 2005; Gobler et al. 2005). Both organic matter and nutrient enrichment can lead to a suite of undesirable outcomes impacting the values of the waterway and these include harmful algal blooms, excessive macrophyte and macroalgal growth, increased ecosystem metabolism and hypoxic events, reduced biodiversity, fish kills, reduced amenity, water discolouration and odour as a result of the formation of hydrogen sulphide Gas (H_2S).

The document Risk Based Framework for considering waterway health outcomes in strategic land use planning (http://www.environment.nsw.gov.au/research-and-publications/publications-search/risk-based-framework-for-considering-waterway-health-outcomes-in-strategic-land-use-planning), whilst intended for the assessment of diffuse source pollution, can and should be applied here.

As a minimum, the EPA considers that the applicant should have:

i. Determined the community's values for the waterway and associated areas (e.g. beaches);
ii. Defined the environmental conditions required to ensure the values are maintained;
iii. Robustly characterised the potential discharge/s and assessed the potential impacts on receiving waters;
iv. Provided more detailed information about treatment systems, discharge management and mitigation measures; and
v. Assessed whether the proposal will result in conditions that exceed the criteria defined in Step ii) above and therefore degrade values. This will require a proper definition of existing conditions, robust assessment of the stressors and processes that could leading to degradation and objective assessment of whether the proposal will lead to those conditions.

The current proposal fails at each of these 5 steps.

5. The EPA recommends that the variation not be approved until a full and proper assessment is undertaken. This will allow the EPA to provide IPART with more specific advice regarding environmental impacts and recommended conditions to address those impacts. The EPA is unable to issue an environment protection licence until these matters have been addressed.

Provided at Attachment A to this email are the EPA's assessment requirements that need to be addressed to allow the EPA to consider whether to issue an environment protection licence.

If you have any further questions about this issue, please contact [redacted], Unit Head Hunter South, EPA on [redacted] or via [redacted].

ADAM GILLIGAN
Regional Director North
Environment Protection Authority

Attachment A – Information required by the EPA

ATTACHMENT A

Information required by the EPA

- What are the community (in its broadest sense, including government) values for this waterway and what are the critical indicators of attainment of those values?
- What are acceptable levels for those indicators (proposed revised ANZECC Trigger values for NSW estuaries are attached. Note that the waterway is classified as a "Creek")?
- What is the conceptual understanding for how pollutants from this proposal might impact on the values and associated indicators?
- The EPA requires that impacts on water quality and ecological health be assessment through a risk-based approach[1] at a catchment or sub-catchment level. Therefore, there is a need for the discharges to be assessed in context of other inputs to the ICOL. This information will allow a better determination of the relative risks and impacts of the proposed discharges.

To properly address the questions above, the following information is required.

1. Current condition

An assessment of how the current and projected estimates of key water quality parameters including ammonia, nitrate, nitrate, dissolved organic nitrogen (urea etc), particulate nitrogen, dissolved inorganic phosphate, dissolved organic phosphate and particulate phosphorus, chlorophyll-a concentrations and turbidity compare to the NSW water quality trigger values for estuaries is required.

The applicant needs to demonstrate that the proposed discharge will not lead to further decline in water quality, particularly in key indicators such as chlorophyll-a and turbidity.

2. Assessment of relative influence of discharge

The applicant must determine how the quality of the proposed 'wet' and 'dry' discharges compare to the existing run-off in the catchment. A minimum set of quality variables would be: ammonia, nitrate, nitrate, dissolved organic nitrogen (urea etc), particulate nitrogen, dissolved inorganic phosphate, dissolved organic phosphate and particulate phosphorus in runoff from the various sub-catchments and in receiving waters within the creek and ICOL.

3. Estimated Impact

The applicant needs to demonstrate that the proposed discharge will not lead to decline in values as measured by the indicators chosen. To do this, the applicant must provide a clear and unambiguous description of how impacts will be assessed. This includes how ambient concentrations of stressors will be determined and how the impacts of those stressors on indicators (e.g. chlorophyll-a concentrations (a proxy for primary production) and turbidity (a proxy for water clarity)) will be determined.

Treated and untreated sewage effluent discharges typically have greater proportions of bioavailable nutrients compared to natural systems. The applicant must provide discharge loads and concentrations for all the nutrient fractions (ammonia, nitrate, nitrate, dissolved organic nitrogen (urea etc), particulate nitrogen, dissolved inorganic phosphate, dissolved organic phosphate and particulate phosphorus) for the proposed wet and dry discharges so that impacts can be properly assessed.
The ADW Johnson PTY LTD report '*Hydrology and Pollutant Assessment of Offsite Disposal of Wetland-Treated Recycled Water*' (the report) estimates that the proposed discharge of excess wetland-treated recycled water during 'wet' and 'dry' periods will result in increases of 38% for annual flow, 60% for total nitrogen (TN), 40% for total phosphorus (TP) and 7% for total suspended solids (TSS) to the mid catchment site (mixing point A), when compared to the currently 'approved' flow and loading estimates. The report also estimates increases of 35% for annual flow, 10% for TN, 24% for TP and 12% for TSS to the ICOL.

The EPA requires the applicant to provide a comparison of the annual flow, TN, TP and TSS loading estimates for pre- development, approved development and proposed discharge scenarios to provide details of the potential impacts of the whole development on the creek and ICOL.

The EPA requires the applicant to provide a comparison of the annual flow, nutrient and TSS loading estimates for pre- development, approved development and proposed discharge scenarios normalised to receiving water areas with other NSW 'creek' type ICOLs, i.e. Manly lagoon, Bellambi lagoon, etc. Flow and nutrient loading estimates for other NSW coastal creeks can be provided by OEH Science on request (contact [redacted], Senior Environmental Scientist, Estuaries and Catchments Science on [redacted] or [redacted]).

The applicant must provide a concise summary of the model set-up and parameters that were used to determine these values.

The applicant must provide details of the basis for the treatment efficiencies that are used and how they intend to ensure that their treatment process achieves and maintains (in the long term) these efficiencies.

Information required for consideration of an environment protection license

1. The applicant must provide an appropriate options assessment for disposal of surplus treated effluent, including consideration of practical options to avoid or minimise discharges and any potential impacts.
2. The applicant must characterise discharges in terms of the minimum (for pH), median and maximum concentrations and, where relevant, loads of all pollutants present that pose a risk of non-trivial harm to human health or the environment. The characterisation should include, at a minimum, total nitrogen, oxides of nitrogen, ammonia, total phosphorus, filterable reactive phosphorus, pH, electrical conductivity, total suspended solids, turbidity, biological oxygen demand, and chlorine.
3. The applicant must assess:
    a. the degree and nature of potential impacts on the environmental values of the receiving waters with reference to the NSW Water Quality Objectives and the ANZECC (2000) trigger values. If a mixing zone(s) is proposed, the proponent should provide mixing model results for a range of operational and hydrological conditions, including periods when the lagoon is closed to tidal flushing.

    b. the significance of any impacts on the environmental values and consider the practical measures that could be taken to restore or maintain those environmental values.

4. The applicant must detail procedures for the management of the discharges and ongoing maintenance of the effluent treatment, storage and conveyance measures, including a plan for long-term management of the tanks and wetland (e.g. managing salt and sediment accumulation).
5. The proponent should consider and discuss the practical measures that could be taken to minimise pollution and mitigate potential impacts including specifically considering measures to mitigate impacts to the lagoon during prolonged periods of closure. As part of this the proponent should detail how:
    a. mitigation measures would be implemented including responsibilities for ensuring completion and ongoing maintenance;
    b. how the effectiveness of mitigation measures will be measured.
6. Predicted discharge volumes should be accurate and consistent throughout the environmental assessment.