



Mr Jim Murray  
Ethos Urban  
173 Sussex St  
SYDNEY NSW 2000

30<sup>th</sup> January 2018

Dear Jim,

**SHELL COVE BOAT HARBOUR PRECINCT  
SECTION 75W MODIFICATION  
RESPONSE TO EPA COMMENTS (MP 07\_0027 MOD 1)**

I refer to your email dated 26<sup>th</sup> October 2017 in which you request Advisian’s response to NSW EPA’s comments on the Section 75W modification related to water quality, as outlined in the attachment to their letter to the Department of Planning and Environment dated 28<sup>th</sup> September 2017.

We have reviewed the EPA comments and provide our responses in the following table. The responses have been listed according to the order of paragraphs in the EPA letter attachment.

Para-graph	EPA Comment	Advisian Response
1	The Modification seeks an increase in the number of dwellings, increased lands for residential development and increased building heights. These changes could increase nutrient and suspended solid loads to receiving waters.	<p>The Modification does not seek to change the stormwater treatment related requirements that were noted in previous conditions of approval and which apply to all future Development Applications (refer to Condition 8 in Part D of the 2011 Concept Approval issued by NSW Planning).</p> <p>The previously agreed stormwater treatment requirements are still being met with the proposed Modification.</p> <p>One of the requirements is to ensure that the annual pollutant load export to the proposed Boat Harbour in the developed state does not exceed the export from the existing (pre-development) conditions.</p> <p>Extensive MUSIC modelling (Model for Urban Stormwater Improvement Conceptualisation) has been completed to determine the treatment systems required to ensure that the development does not increase existing nutrient and suspended solids loads into receiving waters. A network of treatment systems is proposed including gross pollutant traps, wetlands, bioretention systems, HydroCon porous concrete pipes (proprietary product supplied by HydroCon) with sand filters and Jellyfish treatment units (proprietary product supplied by Stormwater360). These systems will be distributed throughout the development. In combination these systems will result in the stormwater treatment related requirements noted in the previous conditions of approval being met.</p>



Para-graph	EPA Comment	Advisian Response
2	<p>The Modification presents an opportunity to ensure that the community's environmental values and uses of waterways in the Shell Cove Boat Harbour Precinct, such as boating and swimming, are recognised and integrated into land-use planning decisions.</p>	<p>The community's environmental values and uses of waterways have been considered in the report titled, <i>Shell Cove Boat Harbour: Section 96 Modification of Consent 95/133 – Support Information</i>, which was prepared in December 2005 by Patterson Britton and Partners. This report was prepared as supporting documentation for the Section 96 modification application lodged in December 2005, which was approved and subsequently formed part of the Consent Conditions for the Boat Harbour.</p> <p>In this report, the commentary relating to the community's environmental values and uses of the waterway is followed by discussion relating to the adoption of pollutant trigger values at which management action is to be triggered. These trigger values are based on information in the ANZECC/ARMCANZ 2000 guidelines, which are still current.</p> <p>The Modification does not seek to change the stormwater treatment related requirements that were noted in previous conditions of approval.</p>



Para-graph	EPA Comment	Advisian Response
3	<p>The Modification adopts generic load reductions for total suspended solids, total phosphorus and total nitrogen. These load reduction targets do not reflect contemporary best-practice and may not deliver improvements in the health of receiving waters.</p>	<p>Three water quality objectives are being addressed by the proposed stormwater treatment strategy. These are:</p> <ol style="list-style-type: none"> <li>1) Ensure that the annual pollutant load export to the proposed Boat Harbour in the developed state does not exceed the export from the existing (pre-development) conditions.</li> <li>2) Achieve the following pollutant percentage reductions in load from the developed site by way of the proposed treatment measures, as presented in the Managing Urban Stormwater: Council Handbook by the EPA (1997). <ul style="list-style-type: none"> <li>• Total suspended solids (TSS) – 80%</li> <li>• Total phosphorus (TP) – 45%</li> <li>• Total nitrogen (TN) – 45%</li> </ul> </li> <li>3) Ensure the nutrient concentration within the harbour is below the default trigger values for an estuarine aquatic ecosystem as presented in the ANZECC/ARMCANZ 2000 guidelines. The adopted trigger values are: <ul style="list-style-type: none"> <li>• Total phosphorus (TP) – 30 µg/L</li> <li>• Total nitrogen (TN) – 300 µg/L</li> </ul> </li> </ol> <p>The first objective ensures that the pollutant load from the development is less than (or equal to) that associated with the pre-development conditions and therefore should result in similar health, or an improvement in the health, of receiving waters.</p> <p>The second objective may be considered generic. However, it is a typical objective adopted for such developments.</p> <p>The third objective ensures that the health of the receiving waters is not negatively impacted.</p> <p>The consideration of these three treatment objectives as part of the treatment train design is in accordance with current best practice.</p>



Para-graph	EPA Comment	Advisian Response
3	<p>Water quality targets to support the NSW Water Quality Objectives (WQOs) should be developed instead of adopting load reduction targets. The Risk-Based Framework for Considering Waterway Health Outcomes in Strategic Land-use Planning Decisions (OEH &amp; EPA, 2017) is a protocol that can be used to ensure the community's environmental values and uses for waterways are recognised and integrated into land-use planning decisions. The Modifications should identify opportunities to adopt this framework, including the development of water quality targets and management responses to support the WQOs. A copy of this framework can be obtained at: <a href="http://www.epa.nsw.gov.au/Water_pollution/policy.htm">http://www.epa.nsw.gov.au/Water_pollution/policy.htm</a></p>	<p>As noted above, the load reduction targets are one of three objectives that have been adopted for the stormwater treatment strategy.</p> <p>An approach similar to that outlined in <i>Risk-Based Framework for Considering Waterway Health Outcomes in Strategic Land-use Planning Decisions</i> (OEH &amp; EPA, 2017) was followed during preparation of the report titled, <i>Shell Cove Boat Harbour: Section 96 Modification of Consent 95/133 – Support Information</i>, prepared in December 2005 by Patterson Britton and Partners.</p> <p>This included a mass balance modelling approach to predict nutrient concentrations according to MUSIC model results and expected tidal flushing rates.</p> <p>We have reviewed the risk-based framework (OEH &amp; EPA, 2017) and make the following comments:</p> <p><u>Step 1: Establish Context</u></p> <p>The majority of the tasks required for this step have been completed as part of the abovementioned report prepared in December 2005 by Patterson Britton and Partners. The report identified water quality objectives for the Boat Harbour in the form of nutrient concentration trigger values (refer to Objective 3 listed above).</p> <p><u>Step 2: Effects-based assessment</u></p> <p>This is undertaken to quantify how the land-use activity will potentially change the health of the waterway.</p> <p>Shellharbour Swamp, a relatively degraded water body, was originally on the site of the proposed Boat Harbour. The Boat Harbour will be a new and very different environment to what was there originally. Quantifying any change in the condition of the harbour is not possible.</p> <p>MUSIC has been used to model the development. Stormwater treatment measures have been adopted throughout the development.</p> <p>To assess Objective 3 relating to the nutrient concentration trigger values, the methodology outlined in the report prepared in December 2005 by Patterson Britton and Partners was again followed and applied to the latest MUSIC model results.</p>



Para-graph	EPA Comment	Advisian Response
		<p>Based on the latest stormwater treatment strategy and using data exported from the MUSIC model the predicted 80<sup>th</sup> percentile nutrient concentrations in the harbour are expected to be:</p> <ul style="list-style-type: none"> <li>• Total phosphorus (TP) – 20 µg/L</li> <li>• Total nitrogen (TN) – 244 µg/L</li> </ul> <p><u>Step 3: Compare against waterway objectives (analysing risk of impact)</u></p> <p>The predicted concentrations determined in Step 2 are below the adopted trigger values for Objective 3 noted above.</p> <p><u>Step 4: Strategic impact assessment (evaluating risks based on feasibility)</u></p> <p>This involves evaluating the risks of impacts of the land-use activity on the waterway based on the feasibility of achieving the intended outcomes of each management response.</p> <p>It is feasible to install the proposed stormwater treatment measures.</p> <p><u>Step 5: Design and implementation</u></p> <p>This involves detailed planning of specific controls or treatment measures to achieve the intended outcomes of the chosen management response.</p> <p>The various development precincts are at different stages of development so the status of this step varies throughout the development.</p> <p>*** Note the above breakdown of the framework steps has focused on water quality Objective 3 to align with the comments from NSW EPA. However, it is also appropriate to include Objectives 1 and 2 as part of these steps. The proposed stormwater treatment strategy results in all three objectives being met.</p>
4	<p>A change to housing density and diversity could cause increases in flow event peaks while also increasing the loads of nutrients and sediment delivered to waterways, if not managed appropriately.</p>	<p>As shown above, the proposed treatment measures will manage stormwater run-off appropriately. There will be no increase in nutrient or sediment loads to waterways.</p>



Para-graph	EPA Comment	Advisian Response
4	<p>The Modification seeks to remove bio-retention swales in favour of gross pollutant traps and tertiary treatment devices. The Modification should ensure that specific controls or treatment measures will deliver improvements in the health of receiving waters. Justification for the removal or inclusion of specific controls or treatment measures should be provided. This should include details of any arrangements to ensure that specific controls or treatment measures are monitored and maintained to meet desired levels of performance.</p>	<p>Primarily for maintenance reasons Council has requested that bio-retention swales be removed from the stormwater treatment strategy. Other changes have been made to ensure the strategy aligns with current best practice. The main change that has occurred compared to the original strategy is that treatment systems have been configured in off-line arrangements where possible, and have been sized to treat frequent flows associated with minor storm events only.</p> <p>The Modification aside, the objectives of the stormwater treatment strategy have always been as noted above and therefore, specific controls and treatment measures will be in place to ensure that the health of receiving waters is not compromised.</p> <p>A monitoring and maintenance program will be developed for all stormwater treatment measures that form part of the development. This program will ensure that the measures are monitored and maintained to ensure that the treatment objectives are met. Significant investigation has been undertaken and information provided to Council regarding maintenance regimes and costs.</p>
5	<p>A change to housing density and diversity could cause increases in sewage loads. The Modification should ensure that there is adequate capacity in the existing sewage system to cater for any additional load and the system's environmental performance will not be compromised. This includes sewage overflows from any sewage pumping station and discharges from any associated wastewater treatment plant. The EPA's policy is that for new systems, there should be no pollution of waters as a result of sewage overflows from the reticulation system during dry weather and overflows during wet weather should be avoided.</p>	<p>Comments are to be provided by others, as wastewater infrastructure is not within Advisian's project scope.</p>



## References:

- Australian and New Zealand and Conservation Council (ANZECC) and Agriculture and Resources Management Council of Australia and New Zealand (ARMCANZ) (2000), *Australian and New Zealand Guidelines for Fresh and Marine Water Quality, Volumes 1, 2 and 3*, Department of the Environment and Heritage, Canberra, Australia.
- Office of Environment & Heritage & Environment Protection Authority (2017), *Risk-Based Framework for Considering Waterway Health Outcomes in Strategic Land-use Planning Decisions*.
- Patterson Britton and Partners (2005), *Shell Cove Boat Harbour: Section 96 Modification of Consent 95/133 – Support Information*.

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Should you have any questions on the above responses, please do not hesitate to contact me on (02) 8456 7232.

Yours sincerely,  
**ADVISIAN**

Warick Honour  
Principal Engineer, Water Resources