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JEMALONG MUNDAMIA PROJECT

NOWRA

**RESPONSES to AGENCY COMMENTS on MUNDAMIA FLORA & FAUNA ASSESSMENT REPORT (SLR)
and UPDATED ASSESSMENT**

F Dominic Fanning

June 2015

Responses to Agency Comments on Mundamia Flora & Fauna Assessment Report

Agency	Comment	Response
DP&E ¹	The EA has not established that a suitable offset is proposed for the loss of native vegetation, removal of threatened species and habitat as a result of the project.	The proposed development utilises land identified in the <i>Nowra-Bomaderry Structure Plan</i> as appropriate for development activities. The <i>Structure Plan</i> identified lands to be protected as offsets for urban development – so additional offsets for the proposal are not necessary. Refer to detailed discussion in Chapter 8.3 of the SLR June 2015 <i>Flora & Fauna Assessment Report</i> .
	The bio-banking assessment methodology, or Property Vegetation Plan (PVP) calculator, should be used to determine the appropriate level of offsetting for the loss of habitat and impacts on threatened species.	As noted above, the development has already been offset through the <i>Nowra-Bomaderry Structure Plan</i> . BioBanking is a voluntary approach – and has not been adopted by the proponent. The PVP calculator is not relevant as the land is zoned for urban development purposes. The relevant <i>Biodiversity Offset Principles</i> have been addressed in Chapter 8.3.3 of the SLR June 2015 <i>Report</i> .
	The impact of the project on threatened species, and particularly groundwater dependent species, has not been satisfactorily addressed by the EA. You should demonstrate that water management will maintain suitable hydrologic conditions for ground water dependent threatened species, in particular the endangered Nowra Heath Myrtle, and for areas of Kunzea shrubland (an indicator of possible presence of the critically endangered Spring Tiny Greenhood orchid), refer also to comments below in relation to water management issues.	Further detailed and comprehensive discussion of the impacts of the proposal on threatened biota is provided in Chapter 7 of the SLR June 2015 <i>Report</i> . The stormwater management regime is detailed by Martens (2015), and is designed <i>inter alia</i> to maintain the groundwater regime beyond the development footprint. As noted in the SLR June 2015 <i>Report</i> : <ul style="list-style-type: none"> the Nowra Heath Myrtle is not groundwater-dependent – occurring in many parts of the site not maintained by groundwater Kunzea shrubland is not ground-water dependent, and is not a particularly good “indicator of possible presence of the critically endangered Spring Tiny Greenhood orchid” the Spring Tiny Greenhood orchid has not been recorded on the subject site

¹ DP&E - Department of Planning & Environment

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DP&E	The National Recovery Plan for Nowra Heath Myrtle <i>Triplarina nowraensis</i> (OEH 2011) has not been considered and should be addressed, including the loss of critical habitat and threats to this species from the development.	The <i>National Recovery Plan for the Nowra Heath Myrtle</i> is addressed in Chapter 8.2.3 of the SLR June 2015 <i>Report</i> . Whilst the development will involve the loss of specimens of and habitat for the Nowra Heath Myrtle, the majority of both specimens and habitat will be retained in the Public Reserve on the site, and dedicated to SCC for conservation purposes.
	The project will result in the removal of 5% of the population (although it is unclear whether this is 5% of individuals or known habitat) and it will therefore result in the loss of critical habitat.	Subsequent mapping reveals that 22% of patches and 35% of other individuals will be removed – Chapter 7.3 and Figure 6 of the SLR June 2015 <i>Report</i> . However, this is only a small proportion of the populations and habitat in this location (see the <i>National Recovery Plan for Nowra Heath Myrtle</i>).
	Further surveys for the Spring Tiny Greenhood orchid <i>Pterostylis vernalis</i> are required (particularly for areas mapped as Kunzea shrubland) along with clarification and justification in regard to the techniques used to identify terrestrial orchid species and the suitability of those techniques, such as random meander searches.	No further surveys have been undertaken for the Spring Tiny Greenhood, and no evidence for this species has been obtained by SLR (June 2015) or SCC. Kunzea shrubland is not an indicator for habitat for this species – which occurs in moss gardens. Terrestrial orchids have been surveyed throughout the extensive walked transects and surveys of the land by several ecologists (SLR/InSites, BES, SCC) since at least 2004.
	Impacts of the project on the riparian zone in the north eastern part of the site have not been adequately addressed, including the upper intermittent watercourse areas affected by proposed residential lots, which are important in conveying water runoff to Flat Rock Creek and Shoalhaven River, through the proposed Public Reserves containing groundwater dependent threatened species.	The Nowra Heath Myrtle is not 'groundwater-dependent', and the Spring Tiny Greenhood (which probably is) is not present on the site. Nevertheless, the stormwater management regime detailed by Martens (2015) is designed <i>inter alia</i> to maintain the groundwater regime and stormwater flows and water quality beyond the development footprint. Refer to Chapters 4.4, 4.5, 7.3 and 7.4 of the SLR June 2015 <i>Report</i> .
	The role of groundwater seepage areas for protection of these groundwater dependent species needs to be addressed and suitable justification provided with the PPR regarding the subdivision of these areas of the site, which otherwise should be excluded from development.	See comments in box above.

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DP&E	<p>Additional recovery plans, listed below, have not been considered and need to be addressed to assess the significance of impacts from the project on threatened species and whether the project will be consistent with the recovery objectives or actions of the plans.</p> <ul style="list-style-type: none"> Draft National Recovery Plan for the Grey-headed Flying-fox <i>Pteropus poliocephalus</i> (DECCW (NSW) 2009); Recovery Plan for the Yellow-bellied Glider <i>Petaurus australis</i> (NSW NPWS 2003); and Recovery Plan for the Large Forest Owls (including the Powerful Owl) (DEC (NSW) 2006). 	<p>The proposed development is of no relevance for the Grey-headed Flying Fox – given the minimal area of potential habitat and the very high mobility and wide-ranging habits of this species.</p> <p>Only minimal impacts (the loss of a small area of habitat and resources relative to that available in the vicinity and locality) will or may be imposed upon the Yellow-bellied Glider and Powerful Owl. Detailed consideration of the potential impacts on these species is provided in Chapter 7 of the SLR June 2015 <i>Report</i>.</p> <p>Consideration of the relevant <i>Recovery Plans</i> is provided in Chapter 8.2.3 of the SLR June 2015 <i>Report</i>.</p>
	<p>There is insufficient information about the means of securing the conservation status of the Public Reserves, including their initial establishment and their ongoing management and maintenance.</p>	<p>The Public Reserves on the site will be established and rehabilitated (where necessary) by the developer, in accordance with the VMP, prior to dedication to Council.</p> <p>Details of commitments and responsibilities are provided in the PPR by APA.</p>
	<p>There is a lack of assessment of indirect impacts, and mitigation measures required, resulting from residents accessing the Public Reserves, once the subject land is developed and occupied.</p>	<p>No access into the Public Reserves is proposed.</p> <p>Indirect impacts are assessed in Chapter 7.10 (and elsewhere in Chapter 7) of the SLR June 2015 <i>Report</i>.</p>
	<p>Proposed asset protection zones (APZs) and fire trails should be relocated out of the Public Reserves.</p>	<p>The <i>Asset Protection Zones</i> (APZs) have been removed from the Public Reserves, and are now located fully within the development footprint.</p> <p>Refer to Chapter 7.5 of the SLR June 2015 <i>Report</i>.</p>
	<p>A draft VMP, as outlined in the principles for a VMP set out in the SLR flora and fauna assessment report, should be provided with the PPR. In conjunction with the statement of commitments this should address and include initial management and maintenance by the proponent for the conservation and open space areas.</p>	<p>It is considered inappropriate to prepare a Draft VMP prior to receiving consent for the proposal – as the final design of the project may change.</p> <p>The VMP Principles provided in the SLR June 2015 <i>Report</i> establish the expectations and requirements for management of the Public Reserves.</p> <p>These would be further developed in consultation with Council following approval of the project.</p>

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DP&E	A list of specific issues regarding the SLR flora and fauna assessment report is provided at Appendix A, which should also be addressed.	See below.
	Due to the issues raised above the department has concerns about the extent of development currently proposed. In particular this is due to the lack of suitable offsets for the loss of threatened species, native vegetation and habitat as well as the uncertainty about the impacts on ground water dependent threatened species from potentially adverse changes to hydrologic conditions.	Offsets were addressed through the <i>Nowra-Bomaderry Structure Plan</i> and subsequent zoning of the land. Stormwater and groundwater flows are addressed in considerable detail in the <i>Martens Report</i> . The Nowra Heath-myrtle is not “ <i>groundwater dependent</i> ” and the Spring Tiny Greenhood is not present. Refer to Chapters 4.4, 4.5, 7.3 and 7.4 of the SLR June 2015 <i>Report</i> .
	Appendix A	
	<u>Desktop Assessment</u>	
	<ul style="list-style-type: none"> given the proximity of the subject land to the Shoalhaven River and Flat Rock Creek, details regarding the potential interaction between water flows on the subject land and these waterways should be provided. Some general information should also be provided on the soils within the subject land. 	Details are provided in the <i>Hydrological Report</i> by Martens (2015). The stormwater management regime, detailed by Martens (2015), is designed <i>inter alia</i> to maintain the groundwater regime and water quality beyond the development footprint – including discharges into Flat Rock Creek and the Shoalhaven River.
	<ul style="list-style-type: none"> database searches were conducted in May 2012. New searches should be conducted to check for any additional species or records. 	Updated database searches (dated 19/05/2015) have been provided in the SLR June 2015 <i>Report</i> (Appendices C and D).
	<u>Field Surveys</u>	
	<ul style="list-style-type: none"> whilst Appendix A contains the details of quadrat and transect surveys undertaken within the subject land by Environmental InSites in 2008, this information has been omitted from the list surveys within Section 2.1 (Field Investigations). The locations of such surveys should be shown on a Figure within the report. 	Field survey details (methods, effort and locations) are contained in Appendix B of the SLR June 2015 <i>Report</i> . Chapter 2.1 of the SLR June 2015 <i>Report</i> includes reference to surveys by Environmental InSites in 2008. Fauna survey locations from InSites 2008 now shown in Appendix B.

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Agency	Comment	Response
DP&E	<u>Database and Literature Review</u>	
	<ul style="list-style-type: none"> no information is provided on the habitat requirements of each species and no justification for the determination of likelihood of occurrence is provided. Where a species is considered to be unlikely to occur, detail is required to justify this assessment (i.e. not suitable habitat, no recent records). Additional information should also be provided for species considered likely to occur (i.e. suitable foraging habitat) or present (i.e. recorded foraging/roosting in the northern portion of the subject land). 	<p>The likelihood of occurrence of threatened species is based on the well known and published information regarding species' habitat preferences and habits – which does not warrant repetition in the Report.</p> <p>The potential relevance of the subject site to threatened flora and fauna is addressed in Chapters 4.4 and 5.4 and in Appendix D of the SLR June 2015 <i>Report</i>.</p>
	<u>Flora Species</u>	
	<ul style="list-style-type: none"> additional detail should be provided to document the extent of weeds within the subject land, to further support the position that portions of the site are modified. 	<p>General descriptions of the presence of weed species are provided in Chapter 4 of the SLR June 2015 <i>Report</i></p> <p>Detailed weed mapping and a weed inventory, with species-specific control measures, will be included in the VMP.</p> <p>Chapter 8.2.2 of the SLR June 2015 <i>Report</i> recommends preparation of the VMP - including weed management.</p>
	<u>Vegetation Communities</u>	
	<ul style="list-style-type: none"> given that establishment and maintenance of the asset protection zones (APZs) will require modification of vegetation and associated habitats, these areas should be included within the development footprint, and located outside of the E2 zoning. 	<p><i>Asset Protection Zones</i> have been placed within the development footprint. The eastern extent of development has been reduced in the south of the proposal to reduce the potential impacts on the Public Reserve.</p>
	<u>Threatened Flora Species</u>	
	<ul style="list-style-type: none"> the total area of impact to the threatened species or the total number of individuals has not been documented. Whilst it is acknowledged that 5% of the population within the subject land will be removed, it is unclear if this is 5% of the known habitat of 5% of individuals; 	<p>See Chapters 7.3.3 and 7.3.4 of the SLR June 2015 <i>Report</i>.</p> <p>78% of the mapped extent of the species will be retained, as well as 65% of the additional mapped individuals.</p>

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DP&E	<ul style="list-style-type: none"> additional detail should be provided on indirect impacts of the project on the local population of the Nowra Heath Myrtle, such as alteration of the hydrological regime and physical damage by residents; 	<p>The hydrological regime is not to be significantly altered – see the <i>Hydrological Report</i> by Martens (2015).</p> <p>There is no proposal to allow unmanaged access into the Public Reserves. Additional measures could readily be provided in the final VMP for the Public Reserves.</p>
	<ul style="list-style-type: none"> establishment and maintenance of the APZs may also result in direct and indirect impacts to the local population, which has not been qualified; 	<p>The APZs are now located entirely within the development footprint.</p>
	<ul style="list-style-type: none"> there is no assessment of the risks associated with potential failure of the stormwater management regime to mimic natural hydrological flows on the Nowra Heath Myrtle population and adjoining vegetation; 	<p>There is no reason to assume that the stormwater management regime will “fail”.</p> <p>Refer to the Martens <i>Hydrological Report</i> for details.</p>
	<ul style="list-style-type: none"> the 'National Recovery Plan for <i>Triplarina nowraensis</i>' (OEH (NSW) 2011) is relevant to the subject land. This should have been consulted and addressed to assess the significance of impacts and whether the development is consistent with the recovery objectives or actions of the plan; 	<p>The <i>National Recovery Plan for the Nowra Heath-myrtle</i> has been addressed – see Chapter 8.2.3 of the SLR June 2015 <i>Report</i>.</p>
	<ul style="list-style-type: none"> whilst considered within Section 16.2 (Relevant EPBC Act Considerations), <i>Pterostylis vernalis</i> (Spring Tiny Greenhood) is not discussed within the main impact chapter (Section 8.2); and 	<p>This species is not present on the subject site at Mundamia.</p> <p>There will therefore be no impacts on the Spring Tiny Greenhood</p>
	<ul style="list-style-type: none"> the inclusion of an assessment of significance (7 part test) would provide sound reasoning for determining a non-significant impact to the Nowra Heath Myrtle and Spring Tiny Greenhood. 	<p>The <i>Section 5A Assessment of Significance</i> (the incorrectly so-called “7 part test”) has been addressed.</p> <p>Assessments of Significance have been prepared for these (and other relevant threatened) species – Appendix L of the SLR June 2015 <i>Report</i>.</p>

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DP&E	<u>Threatened Fauna Species</u>	
	<ul style="list-style-type: none"> the inclusion of an assessments of significance (7 part test) would provide sound reasoning for determining a non-significant impact to threatened species. 	<p>The <i>Section 5A Assessment of Significance</i> (the incorrectly so-called “7 part test”) has been addressed.</p> <p>Assessments of Significance have been prepared for these (and other relevant threatened) species – Appendix L of the SLR June 2015 <i>Report</i>.</p>
	<ul style="list-style-type: none"> the following recovery plans are relevant to the subject land and should be consulted and addressed to assess the significance of impacts and whether the project will be consistent with the recovery objectives or actions of the plans. <ul style="list-style-type: none"> - Draft National Recovery Plan for the Grey-headed Flying-fox <i>Pteropus poliocephalus</i> (DECCW (NSW) 2009); - Recovery Plan for the Yellow-bellied Glider <i>Petaurus australis</i> (NSW NPWS 2003); and - Recovery Plan for the Large Forest Owls (including the Powerful Owl) (DEC (NSW) 2006). - 	<p>These <i>Recovery Plans</i> have been addressed in the revised SLR <i>Report</i> – see Chapter 8.3 of the SLR June 2015 <i>Report</i>.</p>
	<u>Habitat and Connectivity</u>	
	<ul style="list-style-type: none"> additional detail should be included to assess impacts to any water habitats. 	<p>There will be no adverse impacts on “<i>water habitats</i>” – given the impact amelioration and environmental management measures for the project.</p> <p>Refer to the Martens <i>Hydrological Report</i> and Chapters 7.4, 7.8 and 7.9 of the SLR June 2015 <i>Report</i> for details.</p>
	<i>Avoidance, Mitigation and Compensatory Measures</i> <u>Mitigation Measures</u>	
	<ul style="list-style-type: none"> additional detail should be provided regarding the monitoring of mitigation measures and an action plan should the measures be identified as inadequate during monitoring. 	<p>Monitoring measures will be an element detailed in the VMP – post approval of the project – see Appendix I of the SLR June 2015 <i>Report</i>.</p>

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DP&E	<u>Adaptive Measures for Stormwater Management</u>	
	<ul style="list-style-type: none"> no contingency plans or adaptive measures have been discussed, should the stormwater and groundwater designs not function as described in the Martens (2011) and Storm Consulting (2012) reports. 	See updated Martens 2015 <i>Report</i> .
	<u>APZ Management</u>	
	<ul style="list-style-type: none"> slashing in the APZ as a management technique to protect and enhance Nowra Heath Myrtle. is not considered an appropriate strategy and is not discussed within the Recovery Plan for the species. 	The APZs are now entirely located within the development footprint.
	<u>Hollows</u>	
	<ul style="list-style-type: none"> installation of nest boxes requires consideration of target species and appropriate hollow density. Details of follow-up monitoring, ideally annually, will also be required to ensure that hollows and nest boxes remain in good condition and are inhabited by targeted fauna species. 	Monitoring measures will be an element detailed in the VMP – post approval of the project. See Appendix I of the SLR June 2015 <i>Report</i> for preliminary monitoring protocols.
	<u>Access to the Public Reserves</u>	
	<ul style="list-style-type: none"> no indication is provided as to whether the public should be excluded from the Public Reserve. Details are required of further mitigation measures if access is allowed to prevent impacts to Nowra Heath Myrtle, including trampling, potential spread of soil pathogens, soil disturbance and disturbance of habitat by domestic pets. 	These issues will be an element detailed in the VMP – post approval of the project. It is anticipated that public access to the Public Reserves would be controlled and restricted - for precisely those reasons.
	<u>Funding</u>	
	<ul style="list-style-type: none"> no detail is provided on the proposed funding of any of the management measures proposed. 	Funding will be a matter of negotiation between the proponent and the Council – post development approval.

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DP&E	<u>Public Reserves</u>	
	<ul style="list-style-type: none"> consideration needs to be given to mechanisms required to secure the Public Reserves in the long term; and 	The Public Reserves are to be dedicated to Shoalhaven City Council
	<ul style="list-style-type: none"> other compensatory measures should be considered, such as research or involvement in management as per the proposed recovery actions of the National Recovery Plan for <i>Triplarina nowraensis</i>. 	This and other such matters will be addressed in negotiations with government agencies following review of the <i>Preferred Project Report</i>
	<u>Other matters</u>	
	<ul style="list-style-type: none"> The total area of land that is proposed for development is reported as 30.94ha on pages 2, 3 45 and in Table 2, reported as 30.95ha in Table 7 and 31.03ha on page 3; 	The total area of land that is proposed for development is now 30.027 ha
	<ul style="list-style-type: none"> Areas of clearing in text on page 35 do not all match the areas provided in Table 7; and 	See amended areas listed in Table 6 of the SLR June 2015 <i>Report</i> .
	<ul style="list-style-type: none"> The vegetation community reported as regrowth woodland and scattered trees in Table 1 and 2 is reported as Regrowth woodland with kunzea heath in Table 7. 	<p>See amended SLR June 2015 <i>Report</i>.</p> <p>Now referred to as 'Regrowth Woodland with Kunzea Heath and Mixed Woodland Strip' in Tables 1, 2 and 6.</p>

Agency	Comment	Response
OEH ²	1.1 Development footprint	
	OEH has reviewed the current proposed layout and considers the current layout is inconsistent with the Nowra Bombaderry Structure Plan (NBSP). Not all the land within the urban investigation area was considered suitable for development. The Structure Plan specifically states in reference to the Mundamia site that <i>"Threatened species and valuable ecological communities will be retained and protected through appropriate land use zones"</i> .	It is not considered appropriate or statutorily valid that all <i>"Threatened species and valuable ecological communities .. be retained and protected"</i> . There is no legislative requirement that all <i>"Threatened species .. be retained and protected"</i> . The statutory requirements for assessment are addressed in Chapters 6 and 7 of the SLR June 2015 <i>Report</i> .
	In the map provided (Attachment A) areas within the red line (and implicitly outside the blue line) shown on the map were to be conserved if a maintain and improve outcome was to be achieved. This arose in the potential biocertification negotiations on the NBSP in 2006 between Shoalhaven City Council (SCC) and OEH, as they were deemed to be of high conservation value. This determination was based on numerous surveys of the area and the presence not only of the Threatened Species Conservation Act (TSC Act, 1979) listed <i>Triplarina nowraensis</i> but also the presence of the rare or threatened species <i>Acacia hispidula</i> , <i>A. subtilinervis</i> , <i>Leptospermum epacridoideum</i> , <i>L. sejunctum</i> (see Appendix B, Annexure 3 -Flora & Fauna Issues & Assessment Report) and threatened fauna habitat. OEH is of the opinion that previous findings regarding the high conservation value of vegetation on this particular site are still valid and part of the area included in the development footprint (particularly the area of native vegetation near the border of the two lots) is of High Conservation Value.	This map was prepared for the proposed BioCertification of the Mundamia development area. However, BioCertification is no longer proposed. The underlying assumption for that process was that there subsequently would be no requirement for any further assessment of threatened biota. The SLR June 2015 <i>Report</i> addresses the potential impacts of the proposal on the relevant threatened biota. The non TSC-listed species are not of particular relevance to the subject site, and have no statutory protection. Further, the areas to be cleared are not regarded as of <i>"High Conservation Value"</i> – as documented in the SLR June 2015 <i>Report</i> .
	Similarly, the Paperbark Closed Forest EEC and the associated drainage line should be protected.	The Paperbark Closed Forest Is NOT an <i>"endangered ecological community"</i> (EEC) – as detailed in Chapter 4.4.3 of the SLR June 2015 <i>Report</i> . Most of the drainage line is to be protected.

² OEH - The Office of Environment & Heritage

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OEH	Regardless of consistency or otherwise with the NBSP, the Asset Protection Zone (APZ) is considered as part of the development footprint and should not be located in land which is currently (and proposed to be) zoned as E2- Environmental Conservation.	The APZs have been removed from the Public Reserve. See Chapter 7.5 and Figure 8 of the SLR June 2015 <i>Report</i> .
	In addition, the area covered by the APZ should also be included in the calculation of areas of vegetation types to be impacted by the development (Table 2 Annexure 3) and consequently, should be considered in the development of an offset proposal (see below). The proposal to overlap APZs with the area proposed for environmental conservation on the eastern and northern boundaries is at odds with the statement in Section 4.5.2 of the EA that <i>"It should be noted that in relation to land zoned E2, these contain forested lands which are to be created as public reserves for dedication to sec to ensure their conservation into the future"</i>	The APZs are now entirely located within the development footprint.
	If the conservation zone is intended dedicated to Shoalhaven City Council to manage for conservation purposes as an addition to the Flat Rock Creek Nature Reserve, and the APZs are not relocated, then SCC should agree they will be responsible for APZ management for the urban area. The EA does not make clear whether council is aware of this or whether SCC is in agreement with the proposal to receive and manage the dedicated land	This issue will be the subject of negotiations between the proponent and Council - post development approval.

Agency	Comment	Response
OEH	1.2 Vegetation Clearance and Offset	
	<p>As stated in section 13.11 of the EA the proposed offset for the development is currently 9.49 ha. This will encompass the Public Reserve proposed in the NE corner of the site and a strip along the eastern boundary. There is no indication in the EA whether or not this constitutes a suitable offset such as those reached using Government endorsed tools (Biobanking Assessment Methodology, PVP calculator). The initial appraisal of the offset by OEH suggests it does not appear to be sufficient for the loss of habitat and impact on threatened species at the site as the ratio of clearing is close to 1:1. OEH recommends the use of the Biobanking Assessment Methodology, or the PVP calculator to determine the appropriate level of offsetting for this vegetation type and threatened species habitat.</p>	<p>The <i>BioBanking Methodology</i> is not being used because:</p> <ol style="list-style-type: none"> 1 it is a voluntary process; and 2 it creates unreasonable offset ratios (of approximately 10:1) for development activities. <p>Furthermore, offsets were dealt with by the <i>Nowra-Bomaderry Structure Plan</i> and subsequent zoning of the subject site (see Chapter 8.3 of the SLR June 2015 <i>Report</i>). Other offsets include the rehabilitation and dedication of the Public Reserves to Council.</p>
	<p>In addition approximately a further 2 ha of the conservation zone is proposed to be modified for the establishment of the APZ as per the guidelines in Planning for Bush Fire Protection (RFS 2006). Section 4.1.3 of the aforementioned document states that:</p> <p>The APZ is considered be part of the development footprint as its establishment and management requires removal or modification of the ecological integrity of remaining vegetation that greatly alters the structure and integrity of the vegetation. As such it is not consistent with the principle of improve or maintain biodiversity values and cannot be considered as part of the offset.</p>	<p>The APZs are now entirely located within the development footprint.</p> <p>The APZs are now entirely located within the development footprint.</p>
	<p>To be considered as a valid offset, the proposed offset area should be secured in perpetuity by an approved mechanism that is defined prior to construction. Currently the EA does not fully describe the mechanism for the conservation of the site in perpetuity or the nature of funding for management of the offset. OEH does not consider the current offset proposal satisfies the OEH principles for biodiversity offsetting. These principles can be found at the following link http://www.environment.nsw.gov.au/biocertification/offsets.htm</p>	<p>This issue will be the subject of negotiations between the proponent and Council - post development approval.</p> <p>The <i>Principles</i> for biodiversity offsetting have been addressed in the SLR June 2015 <i>Report</i> – see Chapter 8.3.3.</p> <p>Offsets were dealt with by the <i>Nowra-Bomaderry Structure Plan</i> and subsequent zoning of the subject site, and are addressed in Chapter 8 of the SLR June 2015 <i>Report</i>.</p>

Agency	Comment	Response
OEH	<p>In addition, there is also no consideration of the net loss of 30-40 hollow bearing trees (HBTs) in the site in this offset proposal. OEH considers that the proposal to translocate hollows excised from existing HBTs into the proposed Public Reserve on the site (Flora and Fauna Report Section 18.3) to be inadequate as this is not consistent with the 'improve or maintain' principle for this habitat resource, nor is it a proven ameliorative technique. In addition whilst it is proposed that the net loss of hollows can be addressed with artificial nest boxes, studies examining the use of artificial nest boxes (1,2,3) have shown that, as a resource, nest boxes;</p> <ul style="list-style-type: none"> • quickly degrade over time particularly in high rainfall areas • need continued maintenance to ensure they remain habitable • are of limited use to some threatened species 	<p>There will be NO nett loss of tree-hollows on the land at Mundamia – due to implementation of the <i>Hollow-bearing Tree Protocol</i> created by Mr F Dominic Fanning.</p> <p>This is “<i>consistent with the ‘maintain or improve’ principle</i>” – as it WILL “<i>maintain</i>” that resource, and could readily “<i>improve</i>” it.</p> <p>That it is not a “<i>proven ameliorative technique</i>” does not mean that it is not far superior to the use of artificial nest boxes – with their acknowledged flaws (see OEH comments at left).</p>
	An appropriate offset for the proposal should be developed in consultation with OEH and included in the Statement of Commitments.	Offsets were dealt with by the <i>Nowra-Bomaderry Structure Plan</i> and subsequent zoning of the subject site.
	Impact on the Nowra Heath Myrtle (<i>Triplarina nowraensis</i>)	
	<p>OEH considers that the proponent has not fully considered the impacts of the subdivision on the local population of <i>T. nowraensis</i>. This plant is listed as Endangered under both NSW and Commonwealth legislation, as such any impacts on this plant needs to be very carefully assessed. OEH considers that clearing an unquantified number of individuals from the local population (either directly or during establishment and maintenance of APZs) might remove a significant proportion of the population of a highly localised endemic species. The species presence in vegetation on the site is one of the main reasons that SCC and OEH agreed to retain the aforementioned areas of native vegetation (see point 1.1). It is a species that is not considered can sustain loss (less than 20 plants) in the biobanking calculations.</p>	<p>78% of the mapped extent of the species will be retained, as well as 65% of the additional mapped individuals.</p> <p>In addition, specimens of this species can be salvaged from the development footprint, and relocated or used in other locations. This is a technique which is used and discussed in the <i>Nowra Heath Myrtle Recovery Plan</i> !</p> <p>There are thousands of specimens of the Nowra Heath Myrtle on the subject site, and the population extends well beyond the site. Most of the individuals on the site will be retained.</p> <p>It cannot reasonably be likely that this species at this location cannot “<i>sustain [any] loss</i>” or the loss of more than 20 specimens.</p>

Agency	Comment	Response
OEH	<p>In addition, the view of OEH is that despite installation of biofiltration systems recommended by the Hydrogeological Assessment to reduce nutrient loads flowing into the surrounding waterways and native forest, the vast increase in the proportion of impervious surfaces and higher nutrient inputs derived from the urban area will, inevitably: (i) increase runoff volumes, (ii) increase the total amount of nutrients such as phosphorus which are entering drainage lines to the north of the site, and (iii) increase the number of exotic plant propagules that enter this area. This drainage line runs through the area which is being set aside for conservation of <i>T. nowraensis</i> (and other species) and a large proportion of the local population surrounds the drainage line in the north east of the site. In the view of OEH the drainage and influx of nutrients into this area of bushland will, over time, lead to a negative impact on the conservation value of this area and, in particular on the <i>T. nowraensis</i> population by encouraging the proliferation of exotic weeds. This will also degrade part of the area to be set aside as an offset/Public Reserve (see above).</p>	<p>Most of the population of the Nowra Heath-myrtle is located upslope of the proposed development or will not be affected by any stormwater discharges (because of slopes on the site).</p> <p>Weed management will be an intrinsic element of the long-term management of the Public Reserves</p> <p>Further consideration of this issue has been provided in Chapter 7.4 of the SLR June 2015 <i>Report</i>, and in the Martens <i>Hydrological Report</i>.</p>
	<p>OEH considers that the claim in the EA that slashing of the understorey to maintain APZs (p43) will favour the population of Nowra Heath Myrtle is not based on adequate scientific evidence. OEH also notes this is strategy is not part of the current Recovery Plan for this species. The observation that <i>T. nowraensis</i> persists in the north of the site where slashing has previously been employed is not a sufficient demonstration that this practice actively promotes recruitment into the population. The population of <i>T. nowraensis</i> would be better protected by altering the design of the urban area to avoid clearing plants and moving APZs out of this area.</p>	<p>Whilst this approach may not be discussed in the <i>Recovery Plan</i>, it has been demonstrated on the subject site – where there is now a dense sward of Nowra Heath-myrtle in the north of the site.</p> <p>The proposed development has been altered <i>inter alia</i> to reduce impacts on this species.</p>
	<p>OEH recommends that either the subdivision design and vegetation management plans are modified to avoid both short and long term impacts to the population or an appropriate offset is established that accounts for removal of habitat for this threatened species. OEH recommends that the proponent quantify exactly the number of <i>T. nowraensis</i> plants that will be removed as a result of any finalised design as this will inform the appropriateness of any offset proposed and indicate the impact of the development on the population.</p>	<p>As discussed above, the proposed development has been altered <i>inter alia</i> to reduce impacts on this species - as discussed in the SLR June 2015 <i>Report</i>. 78% of the mapped extent of the species will be retained, as well as 69% of the additional mapped individuals.</p> <p>There are thousands of specimens of the Nowra Heath Myrtle on the subject site, and the population extends beyond the site. Most will be retained.</p>

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Agency	Comment	Response
SCC ³	As submitted the Environmental Assessment for Twynam Mundamia Pty Ltd George Evans Rd Mundamia, does not meet the DGR's for Flora and Fauna.	See final revised SLR June 2015 <i>Report</i> .
	Although the development is located in the most disturbed and cleared areas within the site, the extent of impacts on the threatened species known to occur within areas directly impacted would be unknown if the proposal was to proceed without further assessment in accordance with the required assessment process and recommendations below.	Further detailed assessment is contained in the revised SLR June 2015 <i>Report</i> .
	The current proposed offset ratio is considered unlikely to meet the "improve or maintain test" (DGR 9.2). Offsets must be re addressed in consideration of the comments below including the likely impacts to hollow dependant threatened fauna, Swamp Sclerophyll Forest on Coastal Floodplains EEC and the Nowra Heath Myrtle within the proposed areas of direct and indirect impacts (including APZ).	The Nowra-Bomaderry Structure Plan needs to be taken into account in this assessment – see the revised SLR June 2015 <i>Report</i> . There will be no nett loss of tree-hollows (Chapter 8.2.2). The Swamp Sclerophyll Forest on Coastal Floodplains EEC is not present on the site (Chapter 4.4.3). Direct and indirect impacts have been addressed (Chapter 7).
	The SLR Assessment has not defined the extent of threatened species populations and endangered ecological communities at the site and has not quantified the impacts to these populations that will occur as a result of the development.	The revised SLR June 2015 <i>Report</i> considers the extent of threatened species, populations and habitats both on the subject site and beyond it (Chapters 4 and 5). Impacts are considered in Chapter 7 of the SLR <i>Report</i> .
	The assessment assumes habitat features exist in surrounding areas. Habitats are likely to exist outside the site, however the quality, condition and conservation of these habitats and land tenure is undescribed. The extent and importance of the threatened species habitat impacted by the development and the extent of this habitat within conserved areas has not been quantified. The assessment has not quantified the loss of habitat resources for any of the threatened species likely to be present on the site. The assessment has not taken into consideration the approved recovery plan for large forest owls (DEC 2006).	See revised SLR June 2015 <i>Report</i> – which deals with issues of the extent, distribution and tenure of habitats and resources in the vicinity, locality and region. The losses of hollow-bearing trees, of resources for the Yellow-bellied Glider and Powerful Owl, and of habitat for and specimens of, the Nowra Heath-myrtle are quantified in the revised SLR June 2015 <i>Report</i> . The approved <i>Recovery Plan for Large Forest Owls</i> has been taken into consideration (see Chapter 8.2.3).

³ SCC - Shoalhaven City Council

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Agency	Comment	Response
SCC	The SLR assessment claims that the vegetation on the site is unlikely to provide a significant portion of habitat within the home range of the threatened species likely to occur on the site however, no reference is made to the size of each species home range, or what proportions of their home range are used for foraging, roosting etc.	See revised SLR June 2015 <i>Report</i> .
	SLR claims that although threatened species have been recorded on site the site is not likely to provide significant or special value for any fauna species. This statement has not been adequately justified by the survey effort or assessment of impacts.	See revised SLR June 2015 <i>Report</i> . Supplementary field surveys have been undertaken and additional data provided on threatened biota and their resources and habitats. Further detailed impact assessments have been provided. It is a fact that the subject site represents only a very small area of available, and substantially protected, habitat for the threatened species of relevance to the Mundamia development.
	The assessment does not provide data relevant to the utilisation and value of the hollow-bearing trees to the threatened microbat species on the site meaning the nature of the habitat to be removed is unknown. It is highly likely that there are threatened microbat roosts on the property and there is potential for maternity roosts of some species to occur on the site.	See revised SLR June 2015 <i>Report</i> – particularly including the approach of ‘no nett loss of tree-hollows’ on the site and implementation of the <i>Hollow-bearing Tree Protocol</i> – Chapter 8.2.2 of the revised SLR June 2015 <i>Report</i> . Microchiropteran bats are addressed in the revised SLR June 2015 <i>Report</i> – Chapters 5 and 7.
	Disturbance of temporary roosts such as bachelor roosts and wintering roosts or disturbance of maternity colonies during spring and summer breeding and raising of young can result in a significant impact on regional populations (DEC 2004).	See amended SLR <i>Report</i> – particularly including the approach of ‘no nett loss of tree-hollows’ on the site. In addition, the subject site represents only a minute proportion of suitable habitat and resources for threatened microchiropteran bats in the vicinity, locality and region.
	<u>Recommendations</u>	
	1) Further targeted survey for <i>P. vernalis</i> (Spring Tiny Greenhood) is required to discount its potential to occur within areas of impacts or clarification of survey effort that demonstrates adequate survey of all potential habitats has occurred. (see detailed comments below)	No targeted ecological surveys to date, by 3 sets of ecologists (BES, Shoalhaven City Council and SLR) have recorded any specimens of the Spring Tiny Greenhood on the subject site.

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Agency	Comment	Response
SCC	2) Amended assessment of impacts to the Swamp Sclerophyll Forest on Coastal Floodplains EEC that occurs within areas mapped by BES 2004 and SLR 2008 as Paperbark Closed Forest and amend mapping to demonstrate the protection of this EEC via adequate buffers	The Swamp Sclerophyll Forest on Coastal Floodplains EEC is not present on the site. Refer to Chapter 4 of the revised SLR June 2015 <i>Report</i> .
	3) Further information to justify the conclusion of 'no significant impact' on threatened biota which should include	
	<ul style="list-style-type: none"> an assessment of the extent and importance of the threatened species habitat to be lost against the specific habitat requirements of each threatened species on the subject site including <ul style="list-style-type: none"> The extent of loss of hollow bearing trees utilised for breeding, roosting or denning by hollow dependant threatened fauna known to occur on the site including: the Powerful Owl, Gang-gang Cockatoo, Glossy Black-cockatoo, Yellow-bellied Glider, and microchiropteran bats the extent of loss of foraging resources and impact this may have on the above species 	See revised SLR June 2015 <i>Report</i> – particularly including the approach of 'no nett loss of tree-hollows' on the site and implementation of the <i>Hollow-bearing Tree Protocol</i> – Chapter 8.2.2 of the revised SLR June 2015 <i>Report</i> . Hollow-dependent threatened fauna are addressed in the SLR June 2015 <i>Report</i> – Chapters 5 and 7.
	<ul style="list-style-type: none"> assessment of indirect impacts on the threatened species and EEC's within all areas impacted including <ul style="list-style-type: none"> Change in vegetation floristics and structure from edge effects Altered hydrology regimes including increased run-off, Soil erosion and pollution-potential impacts on EEC Disturbance to feeding, nesting or breeding of species including the Powerful Owl Trampling and other impacts due to increased use by humans Habitat fragmentation and disruption of wildlife movement corridors altered light and noise regimes likely contribution of the action proposed to the threatening processes already acting on populations of threatened species or populations in the locality 	Indirect impacts on threatened biota are addressed in Chapter 7 of the SLR June 2015 <i>Report</i> .

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Agency	Comment	Response
SCC	<ul style="list-style-type: none"> an assessment of the distribution and condition of similar habitats in the region and the extent of this habitat within conserved areas outside the subject site 	<p>It cannot be denied that there are VERY substantial areas of conserved habitat for the threatened fauna species recorded at Mundamia throughout the conserved lands in the Shoalhaven LGA. The vast majority of those conserved lands are in excellent condition, and provide abundant resources for the relevant or potentially threatened biota at Mundamia.</p> <p>There are also substantial areas of conserved lands in the vicinity of the subject site.</p>
	2) Further information on the mitigation measures proposed that demonstrates their proven effectiveness and successful implementation elsewhere in mitigating impacts on the threatened species that will be impacted by the proposal	See Chapter 8 of amended SLR June 2015 <i>Report</i> .
	3) In the absence of the above, Offsets must be re addressed in consideration of the comments below including the likely impacts to hollow dependant threatened fauna, Spring tiny greenhood, Swamp Sclerophyll Forest on Coastal Floodplains EEC and the Nowra Heath Myrtle within the proposed areas of direct and indirect impacts (including APZ). Current proposed offsets do not meet improve or maintain	<p>See amended SLR June 2015 <i>Report</i>.</p> <p>The SSFCF EEC is NOT present on the site.</p>

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Agency	Comment	Response
NOW ⁴	<p>1. Watercourses and Riparian Land</p> <p>The Office of Water considers the tributary exhibits good riparian values. The F&F report notes the upper parts of the watercourse support a band of Swamp Paperbark and a patch of threatened Nowra Heath Myrtle (pages 10 and 54). Given the above-mentioned functions and values of the watercourse depression, its connection to the proposed Public Reserve, and the proximity of the site to Flatrock Creek and the Shoalhaven River it is recommended the full length of the tributary is protected and excluded from development. This would also assist to maximise the buffer available to minimise water quality impacts from the development to Flatrock Creek and the River.</p>	<p>Notwithstanding this advice, the NSW Office of Water (NOW) has accepted that the upper parts of that drainage line is NOT of relevance with respect to the <i>Water Management Act 2000</i>. The retention of the upper parts of this drainage line would NOT materially improve water quality or biodiversity conservation outcomes.</p> <p>There is no likelihood of significant, if any, effects on Flat Rock Creek or the Shoalhaven River.</p> <p>Refer to Chapter 7 of the SLR June 2015 <i>Report</i> and the <i>Hydrological Report</i> of Martens.</p>
	<p>The Natural Resource Sensitivity- Water Map (013E) in the draft Shoalhaven LEP 2013 shows the watercourse on the site is a Category 2 watercourse but the EA has not addressed this. It is recommended the riparian corridor is protected and rehabilitated along the full length of the drainage line and the riparian corridor is consistent with this Map.</p>	<p>The upper parts of the drainage line is not a “<i>Category 2 watercourse</i>” – as has been accepted by NOW.</p> <p>The “<i>riparian corridor</i>” in the upper parts of the drainage line will not be retained pursuant to the proposed development.</p>
	<p>The Office of Water supports the proposed 140 metre to 300 metre native vegetation setback between Flat Rock Creek and the development area (F&F report, page 56). The riparian corridor along Flat Rock Creek provides an environmental corridor linking the Shoalhaven River to remnant vegetation near Nowra Hill.</p>	<p>Noted.</p>

⁴ NOW - NSW Office of Water

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Agency	Comment	Response
NOW	2. Groundwater	
	2.1 Aquifer Interference Policy	
	The EA indicates the proposed residential development requires safeguard measures to mimic the existing stormwater characteristics by enabling the supplementary recharge of the drainage system at regular intervals and the developer is to implement the installation of stormwater infrastructure to maintain water quality, soil moisture and groundwater regimes. The EA concludes that as a result of the implementation of the mitigation measures the proposal will not have any adverse impacts on the groundwater requirements of the Nowra Heath-Myrtle or potential habitat of the Spring Tiny Greenhood Orchid (page 132). It is noted only the potential habitat of the Spring Tiny Greenhood Orchid (<i>Kunzea</i> Shrubland/Heathland community) has been found on the site (page 131 of EA).	Noted.
	The proposed stormwater recharge structures trigger the requirements of the Aquifer Interference Policy in regard to assessment of impacts and mitigation measures. The Aquifer Interference Policy identifies the obligations on proponents of aquifer interference activities under section 3.2. The proponent needs to demonstrate that adequate arrangements will be in place at the site to ensure minimal impact.	This matter is addressed by the Martens <i>Hydrological Report</i> and in the PPR prepared by APA.
	As Aquifer Interference Approvals have not yet commenced, the proposal may require a licence under Part 5 of the Water Act 1912.	This matter is addressed by the Martens <i>Hydrological Report</i> and in the PPR prepared by APA.
	2.2 Groundwater Dependent Ecosystems CGDEs	
	The F&F report notes Swamp Paperbark community in and adjacent to the tributary and small moss gardens within some of the <i>Kunzea</i> Shrubland on the eastern side of the site appear to be partially dependent on groundwater drainage and discharges (Section 9, page 41). The Hydrological Assessment also indicates the Nowra Heath Myrtle is partially dependent on groundwater.	The moss gardens are likely to be partially dependent on groundwater, but the Nowra Heath-myrtle is not. It is located in many areas upslope of the development footprint, and on slopes and ridges that are not likely to be maintained by groundwater.

Agency	Comment	Response
NOW	It is noted in Table 1 of the F&F report that the Paperbark Closed Forest only comprises 1.82% of the land (page 11) but Table 7 indicates it is proposed to remove 0.71 ha of the Swamp Paperbark and retain only 0.08 ha. The Office of Water recommends the remnant vegetation which is partially dependent on groundwater is protected at the site from development, including the Swamp Paperbark community, small moss gardens and Nowra Heath Myrtle. It is recommended the proposed subdivision design is amended to protect these areas.	This recommendation of the NOW is not accepted.
	2.3 Groundwater seepage areas	
	The Preliminary Geotechnical and Constraints Assessment notes groundwater seepage was observed in the eastern portion of Lot 384 and Figure 1.7 of the Water Cycle management report shows a typical seepage area on the eastern side of the site (page 9). Comparing Sheet Attachment A with the proposed development footprint, the groundwater seepage area is proposed to be developed. It is unclear if the observed seepage area coincides with remnant Kunzea heathland and the Office of Water seeks clarification on this. It is recommended the proposed subdivision design is amended to protect the seepage areas, particularly as the seepage is a permanent feature.	The hydrologic regime for the development has been designed to maintain groundwater and stormwater flows downslope of the proposal (see the <i>Martens Report</i>).
	3. The E2 Zone	
	Section 4.5.2 of the EA indicates the E2 Zone proposes to permit with consent a range of uses such as dwelling houses, recreation areas, water recreation structures. While the E2-zoned land at the site is to be created as public reserves for dedication to Council to ensure conservation, the Office of Water has recently provided a submission on the draft Shoalhaven LEP 2013 and repeats concern that the E2 zone proposes to permit with consent the above-mentioned uses. The locating of such uses in the E2 zone appears to conflict with the Standard Instrument (Local Environmental Plans) Order 2006. Locating such development, for example within riparian corridors could have significant impacts on the existing and future value and function of the waterways and riparian land that are meant to be protected by the E2 Zone.	Refer to the final PPR prepared by APA.

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Agency	Comment	Response
NOW	4. Statement of Commitments	
	The Water Quality Management and Soil Control - Statement of Commitment (14) includes a commitment for the detailed design of the peripheral bio-retention swale system to maintain soil moisture and groundwater regimes. It is important that mitigation measures implemented at the site replicates the natural surface and groundwater flow conditions and the development maintains infiltration and the recharge of groundwater. The detailed design needs to demonstrate the proposal would not adversely impact the partially dependent ecosystems at the site or down- slope of the site and the proposed stormwater control measures will maintain soil moisture and groundwater regimes at the site and down-slope. The plan should be prepared in consultation with and to the satisfaction of the Department of Planning & Infrastructure (DP&I) and the Office of Water. DP&I needs to be satisfied that potential impacts can be adequately mitigated.	The hydrologic regime for the development has been designed to maintain groundwater and stormwater flows downslope of the proposal (see the Martens <i>Report</i>).
	Landscaping Plans - Statement of Commitment (30) indicates the developer will use native species, endemic the locality in the preparation of landscaping plans (page 158). The use of local native plant species on this site is supported, as it would have lower water demand requirements and assist to improve local biodiversity.	Noted.
	Ecological - Statement of Commitment (36) indicates the developer will implement the installation of stormwater infrastructure to maintain water quality, soil moisture and groundwater regimes. If the proposal is approved, adequate mitigation measures need to be provided to ensure the groundwater regimes are maintained at the site and down slope of the site to protect ecosystems which are partially dependent on the groundwater.	The hydrologic regime for the development has been designed to maintain groundwater and stormwater flows downslope of the proposal (see the Martens <i>Report</i>).

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Agency	Comment	Response
NOW	Other - it is recommended a Statement of Commitment is included to monitor and manage the potential impacts of the development on the GDE's. A comprehensive monitoring and management plan needs to be prepared and implemented to monitor potential impacts on groundwater dependent ecosystems at the site and down slope of the site. Details need to be provided in the monitoring program including the key criteria to be monitored. Monitoring needs to commence prior to construction to provide baseline data and should continue during construction and the operational phase of the development.	The hydrologic regime for the development has been designed to maintain groundwater and stormwater flows downslope of the proposal (see the <i>Martens Report</i>).
	5. Recommended amendments to the development	
	The following amendments to the development footprint are recommended	
	(i) The un-named tributary of Flat Rock Creek located in the north eastern part of the site is to be protected along its full length on the site. A vegetated riparian corridor is to be provided either side of the tributary (measured from top of bank) consistent with draft Shoalhaven LEP 2013.	This recommendation of the NOW is not accepted.
	(ii) Vegetation partially dependent on groundwater at the site, including the Swamp Paperbark community, small moss gardens and Nowra Heath Myrtle be conserved and protected from development.	It is not accepted that all such vegetation should be retained. The majority of the Nowra Heath-myrtle and of the moss gardens will be retained.
	(iii) The groundwater seepage area identified in the Preliminary Geotechnical and Constraints Assessment and shown on Sheet Attachment A be conserved and protected from development	Refer to the <i>Martens Report</i> .