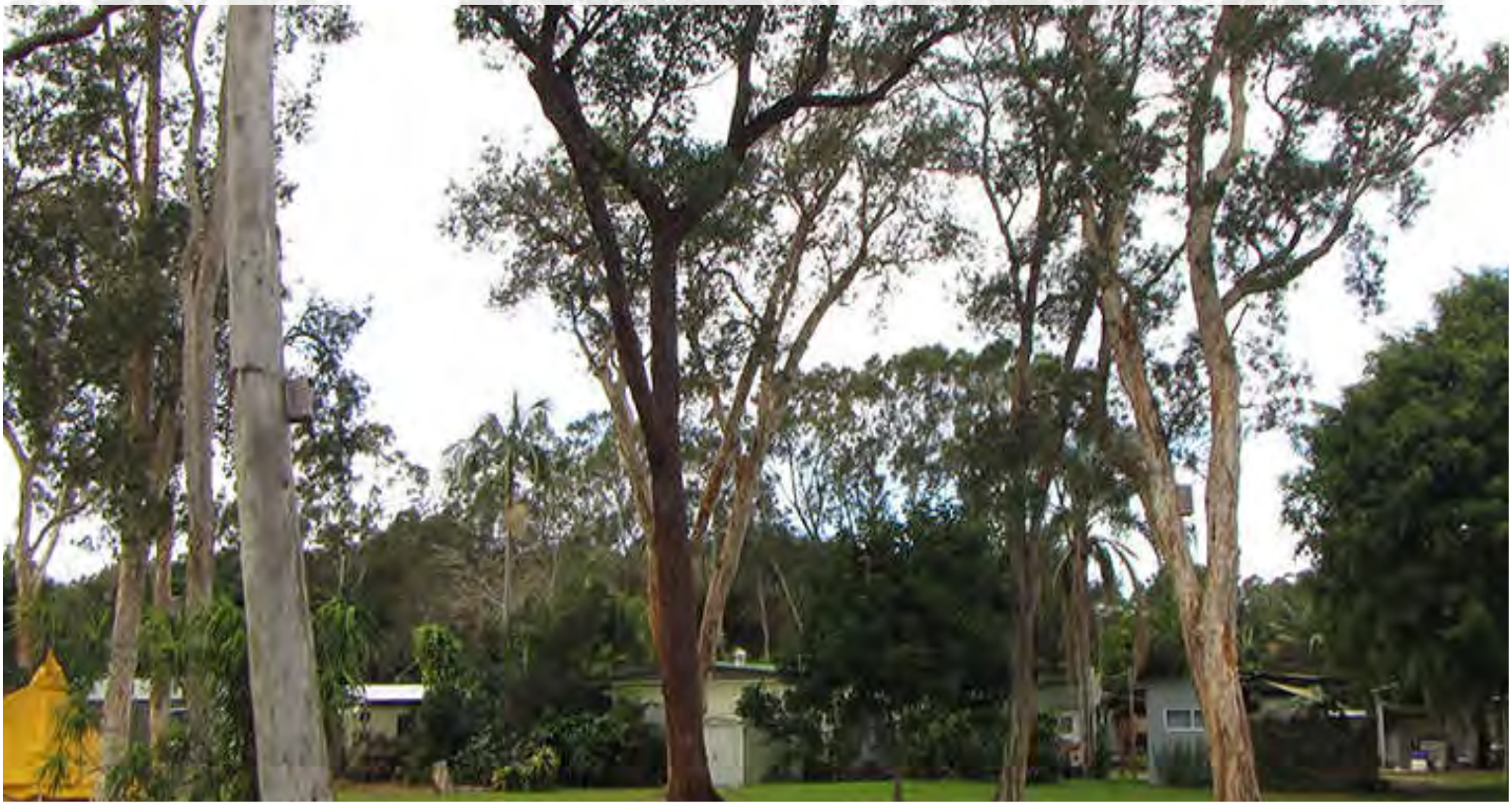
This assessment was prepared as part of the documentation for a Statement for Environmental Effects to support DA 0667/16 for a residential subdivision of the Arrawarra Caravan Park. The environmental assessments prepared for DA 0667/16 are relevant to the current DA to reconstruct and extend an existing revetment with the same land.

ecosure

Addendum to Statutory Ecological Assessment – Arrawarra Caravan Park

Final Report
June 2016

Keiley Hunter Planning



ecology / vegetation / wildlife / aquatic ecology / GIS

ecosure

29 September 2016

Keiley Hunter
Keiley Hunter Town Planning
115 Victoria Street
Coffs Harbour NSW 2450

Dear Keiley

RE: Response to Request for Information Arrawarra Caravan Park

The following information has been provided as per Ecosure proposal dated 31 August 2016. It is in response to a Request for Information (RFI) from Coffs Harbour City Council (CHCC), dated 24 August 2016, regarding Development Application No. 0667/16DA – Demolition of existing structures and subdivision – Lot 1 DP1209371, Lot 1 DP 26125, Lot 2 DP 1209371, Arrawarra Caravan Park, 46 Arrawarra Beach Road Arrawarra.

For ease of reference, the requested information from CHCC to be addressed has been outlined below, with responses and attachments included. It should be read in conjunction with the following documents:

- Naturecall Environmental 2015, *Statutory Ecological Assessment of Residential Subdivision of Arrawarra Beach Caravan Park*, *Arrawarra*, Report for Keiley Hunter Planning, Coffs Harbour
- Ecosure 2016, *Addendum to Statutory Ecological Assessment, Arrawarra Caravan Park,* Report to Keiley Hunter Planning, Coffs Harbour

RFI 1:

The addendum report disregards the potential for the presence of Littoral Rainforest in the NSW North Coast Bioregion on the basis that the remnant vegetation has canopy cover of less than 70%. However, under the NSW *Threatened Species Conservation Act 1995* (TSC Act) there is no minimum threshold for canopy cover for determining if the community is Littoral Rainforest and the scientific determination states that '*some stands may be regrowth or in the process of regenerating*' which implies that canopy cover could be less than 70% within viable stands of the Endangered Ecological Community (EEC).

As such, the site should be reassessed to determine if any of the vegetation meets the description on the Littoral Rainforest in the NSW North Coast Bioregion EEC, and if it is concluded that the EEC is present an Assessment of Significance (AoS) (7-part test) should be undertaken.

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Response to RFI 1:

The *Addendum to Statutory Ecological Assessment – Arrawarra Caravan Park* (prepared by Ecosure 2016) identifies that within the site boundaries, a small area of potential littoral rainforest occurs in the northern part of the site and consists of four trees with a disturbed understorey, i.e. Ribbonwood Sandpaper Fig and Port Jackson Fig. The Littoral rainforest community in the northern section of the site is approximately 600 m^2 in size. The community is degraded and comprises of four trees. Two larger Littoral rainforest communities are mapped to the north and east of the site (on the opposite sides of the creek).

The area of occurrence on the site covers an area of less than 0.1 hectares so does not meet the criteria under the EPBC Act for the critically endangered Littoral rainforests and coastal vine thickets of eastern Australia threatened ecological community (TEC). In addition, one of the criteria in order for an area of vegetation to qualify as this TEC is at least 70% canopy cover. With only four trees in an area of around 600 m^2, we do not consider that is meets this EPBC criterion.

There is no minimum size for Littoral Rainforest in the South East Corner, Sydney Basin and NSW North Coast bioregions EEC under the TSC Act. There is also no minimum threshold for canopy cover when determining if the community is Littoral Rainforest under the NSW TSC Act. In addition, the scientific determination states that '*some stands may be regrowth or in the process of regenerating*' which implies that canopy cover could be less than 70% within viable stands of the EEC. Because of these factors, a 7 part test was undertaken (refer to Attachment 1).

The 7 part test found that it is not expected that the removal of the trees will have a negative impact on the surrounding EEC in the locality given the small number of trees being removed. A Species Impact Statement is not recommended.

The conceptual vegetation management plan incorporates species to replicate the littoral rainforest in the zone where the four trees typical of this community will be removed.

RFI 2:

The addendum report has incorrectly defined the local occurrence of the Coastal Saltmarsh EEC. The OEH Threatened Species Assessment Guidelines define the local occurrence of an EEC as '*the ecological community that occurs in the study area. However the local occurrence may include adjacent areas if the ecological community on the study area forms part of a larger contiguous area if that ecological community and the movement of individuals and exchange of genetic material across the boundary of the study area can be clearly demonstrated'.* Based on this definition, the local occurrence of Coastal Saltmarsh EEC would extend no further than the coastal saltmarsh remnants contained within the Arrawarra Creek estuary. Alternatively based on the premise that saltmarsh patches greater than 30m are effectively isolated, as inferred in the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) conservation advice, the local population could be further reduced to only include the saltmarsh patches on the subject land. In any event, the extent

of the saltmarsh within the estuary is far less than the 231 hectares quoted in the 7-part test, which is the extent of saltmarsh in the Coffs Harbour Local Government Area.

As such, the AoS for the coastal saltmarsh EEC should be done again, with reference to the OEH Threatened Species Assessment Guidelines and relevant definition of a local population. The assessment should look at both direct impacts i.e. removal, but also indirect impacts, i.e. changes to hydrology from the sea wall.

Response to RFI 2:

Approximately 0.002 ha Coastal Saltmarsh will be removed by the proposal. Alterations in the hydrological regime of the area are expected to be small, and therefore unlikely to significantly impact adjacent patches of this EEC. Patches of Coastal Saltmarsh that remain in Arrawarra Estuary will not be significantly impacted by the proposal. The small size of the two patches to be cleared (collectively approximately 0.002 ha) are likely to be less productive and more likely to be prone to degradation (TSSC 2013). Furthermore, the habitat potentially affected by the proposal is not considered to be of importance to the long-term survival of the EEC within the locality, given they are not considered to contribute to the sharing of propagules.

It is considered that the Coastal Saltmarsh EECs within the Arrawarra estuary are unlikely to be significantly affected by the proposed action as the two small isolated patches do not form part of the community. A Species Impact Statement is not recommended.

Refer to Attachment 2 for the detailed assessment.

RFI 3:

The report has not addressed the likelihood of the presence of the Oxleyan pygmy perch (OPP) for which both arms of Arrawarra Creek have been identified by Department of Primary Industries (DPI) as potential habitat. OPP is listed as Endangered under the *Fisheries Management Act 1994* (FM Act), and Endangered under the EPBC Act. Although the proposal does not directly impact on the habitat, any changes to the hydrology from the development may affect the habitat and needs to be assessed via a 7-part test.

Response to RFI 3:

The Oxleyan pygmy perch (*Nannoperca oxleyana*) is a freshwater fish with niche habitat requirements, and is typically restricted to acidic (pH 4.2 – 6.7) freshwater (<300 µs/cm) within both lentic and lotic systems, where their occurrence is commonly associated with coastal lowland 'wallum' ecosytems (Pusey et al. 2004). They prefer quite dense riparian vegetation cover and very low flow conditions (DPI 2005).

Threats to the species include habitat destruction, lack of riparian vegetation and erosion resulting in siltation and a decline in water quality (DPI 2007).

Impacts that would affect the OPP in relation to the proposed seawall include:

- any actions resulting in changes to physicochemical water quality parameters (pH and conductivity) within the freshwater reaches of both creek arms
- changes to water levels/flow regimes that would either reduce the amount of freshwater habitat available upstream, or potentially degrade the quality of habitat through higher stream velocities.

A review of available literature in regard to putative impacts associated with a previous design of the proposed sea wall indicates that any putative impacts would be restricted to the estuarine reaches of Yarrawarra and Arrawarra Creeks (Martens Consulting Engineers 2007). Although no hydrological study exists for the current design, a coastal engineering design report also provides no evidence of upstream impacts (Water Technology 2016). It was therefore considered that a 7-part test was not required.

RFI 4:

To provide certainly as to the level of impact, and the offsets required, Council requests clear details as to the number, species, locations and values (i.e. size, hollow bearing, koala feed trees) of all trees to be removed. The number of offset trees should then be calculated as per section E1.2 of the Development Control Plan (DCP). Known areas/trees on the site that require offsetting include (but are not limited to) hollow bearing trees, koala habitat, riparian lands, land zoned E2 Environmental Conservation and EECs. Details on the size of any hollows to be removed should be provided and hollow replacement rates given, as per E1.2 of the DCP.

Details of as to the location of where the offset trees will be planted are required (including density) to ensure that an adequate area is available to meet the offset requirements. These details are required to be provided as part of a conceptual Vegetation Management Plan (VMP). As part of the concept VMP further information that demonstrates how the land zoned E2, proposed for a community lot, can accommodate the proposed compensatory planting is required, noting the location of the proposed seawall and associated rock armouring. As part of demonstrating the capacity of the E2 zoned land, it is requested that a surveyed plan for the site, which clearly depicts the current location of all site boundaries is provided.

Response to RFI 4:

The conceptual vegetation management plan is provided as Attachment 3. It provides an overview of the number of trees that could potentially require removal as part of the proposed development. The tree removal will be offset by planting within the E2 environmental conservation area. The findings of the additional tree survey and preparation of the conceptual VMP demonstrate that compensatory planting within the site will meet the objectives of Section E1.2 of the Biodiversity DCP to:

- offset impacts associated with the removal (or other specified action) of high conservation value vegetation.
- protect and maintain important linkages between habitats.

The trees to be removed/retained are preliminary only and subject to final civil and earthworks design once approval is granted. Once the number of trees to be removed/retained have been determined, the final compensatory numbers will be calculated.

An additional survey prior to construction should be undertaken to determine the exact location of hollow bearing trees to be removed, as well as the size and number of hollows.

The implementation of measures recommended in the conceptual VMP will assist in mitigating any impacts arising from the removal of vegetation. The ecological value will be improved through the revegetation works and ongoing weed control and maintenance.

Conclusion

This response has addressed concerns raised in the RFI. It is considered that impacts associated with the proposed development have been addressed in accordance with relevant statutory requirements including the *EPBC Act 1999* and the *TSC Act 1995*. Revegetation of the site will also assist in meeting obligations under the State Environment Policy (SEPP) 44 – Koala Habitat Protection and the Coffs Harbour City Council Koala Plan of Management.

Kind regards,

Trudy Thompson
Senior Environmental Scientist

References

DPI 2005, *Oxleyan Pygmy Perch, Background paper, Supporting information to the Oxleyan pygmy perch recovery plan*, Accessed 14/9/2016 at http://www.environment.gov.au/system/files/resources/fde7b65a-446e-4aa3-b3c6-e9e3b4b9a41e/files/n-oxleyana-background.pdf

DPI 2007, *Threatened species in NSW Oxleyan pygmy perch*, PRIMEFACT 181, NSW Accessed 07/9/2016 dpi.nsw.gov.au/_data/assets/pdf_file/0014144311/oxleyan-pygmy-perch.pdf

Martens Consulting Engineers 2007, *Geomorphic Impact Assessment for Proposed Seawall Arrawarra Caravan Park, Arrawarra, NSW*, Hornsby NSW.

Pusey, BJ, Kennard, MJ and Arthington, AH 2004, *Freshwater fishes of north-eastern Australia*, CSIRO Publishing, Collingwood, Victoria.

Water Technology 2016, *Final Report – Arrawarra Beach Caravan Park: Rock-Armored Revetment,* Brisbane, Qld.

Attachment 1: Assessment of significance ('7-part test') under Section 5A of the NSW *Environmental Planning and Assessment Act 1979* for the Littoral Rainforest in the NSW North Coast, Sydney Basin and South East Corner bioregions for Arrawarra Caravan park.

Background

Littoral rainforest in NSW North Coast, Sydney Basin and South East Corner Bioregions is listed as an endangered ecological community (EEC) under Part 3 of Schedule 1 of the *Threatened Species Conservation Act 1995* and is listed as Critically Endangered ecological community under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*.

Littoral rainforest is generally a closed forest, with the structure and composition of the community changing closer to the ocean. Plants are predominately rainforest species, with evergreen mesic or coriaceous leaves, vines may be common and form a major component of the canopy (NSW Scientific Committee 2004).

The NSW Scientific Committee (2004) states that some stands may be regrowth or in the process of regenerating. Whilst the stand in question is small and only comprises of four trees, there is no minimum size or requirement for canopy cover under the TSC Act. The area of occurrence on the site covers an area of less than 0.1 hectares so does not meet the criteria under the EPBC Act for the critically endangered Littoral rainforests and coastal vine thickets of eastern Australia.

Littoral Rainforest EEC	
Assessment of Significance criterion (Seven Part Test)	
a) In the case of a threatened species, whether the action proposed is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction	n/a
b) In the case of an endangered population, whether the action proposed is likely to have an adverse effect on the life cycle of the species that constitutes the endangered population such that a viable local population of the species is likely to be placed at risk of extinction	n/a
c) In the case of an endangered ecological community or critically endangered ecological community, whether the action proposed: i. Is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or ii. Is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction	**Local occurrence and composition** A small patch of Littoral rainforest covers an area of approximately 600 m^2 in total and comprises of four trees. This small fragment is located in the northern section of the site bordering the creek. The ground cover consists of exotic grasses and there are no mid storey species. It is a highly disturbed area. Two larger communities of Littoral rainforest are mapped to the north and east of the site (on the opposite sides of the banks). **Assessment** The small patch of Littoral rainforest is highly degraded and comprises of four individual trees (encompassing a size of approximately 600 m^2). Two larger littoral rainforest communities are located to the north and east of the site (on the opposite side of the banks to the site). The removal of the trees is unlikely to place the local community at risk of extinction.
d) In relation to the habitat of a threatened species, population or ecological community: i. The extent to which habitat is likely to be removed or modified as a result of the action proposed,	**Extent of impact on habitat** The small patch comprising four trees is not connected directly to the larger areas of rainforest EEC. The habitat (approximately 600 m^2) will be removed as a result of the proposed development, however this is not considered to have a significant impact on the local occurrence of the EEC.

Littoral Rainforest EEC	
Assessment of Significance criterion (Seven Part Test)	
and ii. Whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed action, and iii. The importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species, population or ecological community in the locality.	**Habitat fragmentation** The small area of Littoral rainforest habitat in the northern section of the site will be cleared. This community at present is a small fragment which is highly degraded. The removal of this small area will not fragment the wider EEC in the local area **Importance of habitat to be impacted** The small area of Littoral rainforest habitat located in the northern section of the site will be cleared. As this patch comprises of four trees, it is not considered to provide an essential function to the survival of the wider EEC surrounding the site and is not likely to have an adverse impact.
e) Whether the action proposed is likely to have an adverse effect on critical habitat (either directly or indirectly)	To date, critical habitat has not been declared for this EEC under the TSC Act.
f) Whether the action proposed is consistent with the objectives or actions of a Recovery Plan or Threat Abatement Plan	A Recovery Plan does not exist for Littoral rainforest under the TSC Act, however the EPBC Conservation Advice (TSSC 2015) nominates the following key priority conservation topics: a) Habitat loss, disturbance and modification b) Invasive weeds c) Trampling, browsing and grazing d) Fire e) Conservation information The proposal is inconsistent with the above conservation action (a) as native vegetation is to be cleared as a result of the proposed action.
g) Whether the action proposed constitutes or is part of a Key Threatening Process (KTP) or is likely to result in the operation of, or increase the impact of, a KTP	KTPs (OEH 2016) that could be exacerbated by the proposed action include: 1. Alteration to the natural flow regimes of rivers, streams, floodplains & wetlands; 2. Clearing of native vegetation; 3. Loss and degradation of native plant and animal habitat by invasion of escaped garden plants, including aquatic plants The small patch of Littoral rainforest will be removed. The EEC communities that will remain are on the opposite side to the rockwall, with the rockwall likely locally improving local water quality through reducing erosion. The alteration to the flow regimes (if any) is not likely to have a significant impact to the surrounding communities. The clearing of native vegetation is unavoidable but is minimal (with four trees being removed). The site is highly modified and is

Littoral Rainforest EEC	
Assessment of Significance criterion (Seven Part Test)	
	currently used as a caravan park. The clearing is not expected to have a significant impact on the local occurrence of Littoral rainforest due to the small size of the patch being removed. Native vegetation will be planted in the E2 zone bordering the creek and ongoing weed management will be undertaken, therefore loss and degradation due to invasion of escaped garden plants is not expected to impact on the communities on the opposite side of the creek.

Conclusion

The Littoral rainforest community in the northern section of the site is approximately 600 m^2 in size. The community is degraded and comprises of four trees. Two larger Littoral rainforest communities are mapped to the north and east of the site (on opposite sides of the creek). It is not expected that the removal of the trees will have a negative impact on the surrounding EEC in the locality given the small number of trees being removed. A Species Impact Statement is not recommended.

The fragment of Littoral rainforest to be removed on site is of relatively low ecological value, and no significant impact on the local occurrence of the rainforest EEC is expected. Any impact will be further reduced by revegetation within the northern section of the site, which will incorporate species to replicate the Littoral rainforest being removed. Over time, this is expected to increase the size, density and functioning of the EEC.

References

NSW Scientific Committee (2004), *Littoral rainforest in the NSW North Coast, Sydney Basin and South East Corner bioregions – endangered ecological community listing NSW Scientific Committee – final determination*, OEH

OEH, 2016, *List of key threatening processes*, OEH, accessed on 16/09/2016 http://www.environment.nsw.gov.au/threatenedspecies/KeyThreateningProcessesByDoctype.htm

Threatened Species Scientific Committee (TSSC) (2015). *Approved Conservation Advice for the Littoral Rainforest and Coastal Vine Thickets of Eastern Australia ecological community*. Department of the Environment

Attachment 2: Assessment of significance ('7-part test') under Section 5A of the NSW *Environmental Planning and Assessment Act 1979* for the Coastal Saltmarsh in the NSW North Coast, Sydney Basin and South East Corner bioregions for Arrawarra Caravan

Background

Coastal Saltmarsh in the NSW North Coast, Sydney Basin and South East Corner bioregions ("Coastal Saltmarsh") is listed as an endangered ecological community (EEC) under Part 3 of Schedule 1 of the *Threatened Species Conservation Act 1995* (TSC Act) and a similar community (Subtropical and Temperate Coastal Saltmarsh) is listed as a vulnerable ecological community under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC). This assessment of significance deals only with the TSC listed community, as it does not meet the criteria under the EPBC listing.

Coastal Saltmarsh occurs within the intertidal zone along the shores of estuaries and lagoons along the NSW coast including NSW North Coast (OEH 2014, NSW Scientific Committee 2016). Species composition of this community varies with latitude and elevation however characteristic species of Coastal Saltmarsh includes *Baumea juncea*, *Juncus kraussii*, *Sarcocornia quinqueflora*, *Sporobolus virginicus*, *Triglochin striata*, *Isolepis nodosa* etc. with occasionally scattered mangrove stands (*Avicennia* spp.) scattered through the saltmarsh (OEH 2014, NSW Scientific Committee 2016). Reeds and salt pans may also occur in this vegetation community (OEH 2014).

Approximately 0.002 ha (20m^2) of Coastal Saltmarsh occurs partially within the concept design footprint for the proposed development (one small patch is just north of the mapped easternmost section of the site, whereas the second patch occurs in the northern branch of the creek in the north-eastern tip of the site). Other larger patches exist greater than 30 m away from each patch (minimum 60m away from the two small patches). As per the EPBC conservation advice for subtropical and temperate coastal saltmarsh and the Coffs Harbour City Council Information Request, patches less than 0.1 ha in size and are greater than 30 m from another patch do not form part of a mosaic and therefore do not form part of the wider ecological community (TSSC 2013). The total area of coastal saltmarsh in NSW was reported in 1985 at approximately 5700 hectares of fragmented patches (generally less than 100 hectares in size). Further reduction and fragmentation have occurred since the 1985 estimate (NSW Scientific Committee 2016).

The EPBC conservation advice further states that patches less than 0.4 ha are less productive and swamped by external nutrient sources (TSSC 2013).

Upland Swamp EEC	
Assessment of Significance criterion (Seven Part Test)	
h) In the case of a threatened species, whether the action proposed is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction	n/a
i) In the case of an endangered population, whether the action proposed is likely to have an adverse effect on the life cycle of the species that constitutes the endangered population such that a viable local population of the species is likely to be placed at risk of extinction	n/a
j) In the case of an endangered ecological community or critically endangered ecological community, whether the action proposed: iii. Is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or iv. Is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction	**Local occurrence and composition** Two small patches of Coastal Saltmarsh of approximately 0.002 ha in total occurs within the concept design footprint and will be cleared as part of the revetment works and therefore will be directly impacted by the proposal. These patches are greater than 30m away from other saltmarsh patches and therefore are considered to be in isolation from the other communities (TSSC 2013). There are five small patches of saltmarsh communities within 60m of the two patches that are the subject of this test. **Assessment** Approximately 0.002 ha of two isolated patches of Coastal Saltmarsh will be removed by the proposed action. Patches less than 0.4 ha are generally considered to be less productive and more prone to degradation through external nutrient sources (TSSC 2013). Given the small area to be cleared as part of the proposed development, it is unlikely that there will be adverse effects on the broader ecological community within the LGA, specifically given that there are patches within 60m of the two small patches to be cleared. The removal may have a moderate impact on the local occurrence of this community, but given the small area of removal, it is unlikely to be a significant impact on the regional occurrence. Potential indirect impacts to surrounding patches to remain were considered from potential changes in hydrology from the seawall. The stormwater basin outlets will be positioned away from the extant patches and the rocked sea wall are on the opposite side of the patches and will not likely have any adverse changes to hydrology. The sea wall is likely to improve the water quality by minimising erosion affects to the banks of the creek, therefore potentially contributing to improving the locally remaining patch health. The removal of the two small patches on site is not considered to have an adverse effect on either the extent or composition of the EEC such that this local occurrence within the Arrawarra estuary is placed at risk of extinction (i.e. the two local

Upland Swamp EEC	
Assessment of Significance criterion (Seven Part Test)	
	populations that are isolated will be removed, however this will not impact the surrounding communities as it is not a significant patch).
k) In relation to the habitat of a threatened species, population or ecological community: iv. The extent to which habitat is likely to be removed or modified as a result of the action proposed, and v. Whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed action, and vi. The importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species, population or ecological community in the locality.	**Extent of impact on habitat** Two small patches of Coastal Saltmarsh of approximately 0.002 ha occurs within the concept design footprint and therefore will be directly impacted by the proposal. These patches are considered isolated from the other surrounding patches. Given the size of the patches and the potential of degradation to patches less than 0.4 ha, this is not considered to have an adverse effect on the wider salt marsh communities present in the surrounding areas. **Habitat fragmentation** The proposal constitutes the clearing and subdivision of four lots at Arrawarra Caravan Park which will result in the removal of two patches of Coastal Saltmarsh of approximately 0.002 ha in total. As these small patches are considered to be in isolation of the other larger patches (given that they are more than 30 m away), they are considered isolated (i.e. already fragmented) and do not contribute to the other communities as a source of propagules. The proposed action is therefore unlikely to significantly contribute to the fragmentation and isolation of Coastal Saltmarsh habitat within the local area. **Importance of habitat to be impacted** The proposal will result in the removal of two patches of Coastal Saltmarsh of approximately 0.002 ha in total. As these small patches are considered to be in isolation of the other larger patches (given that they are more than 30 m away), they are considered isolated and do not contribute to the other communities as a source of propagules (TSSC 2013). Patches less than 0.4 ha are less likely to remain functionally viable (TSSC 2013). Furthermore, five larger patches exist within 60m of the two isolated patches. The habitat potentially affected by the proposal is not considered to be of importance to the long-term survival of the EEC within the Arrawarra estuary.
l) Whether the action proposed is likely to have an adverse effect on critical habitat (either directly or indirectly)	To date, critical habitat has not been declared for this EEC under the TSC Act.
m) Whether the action proposed is consistent with the objectives or actions of a Recovery Plan or Threat Abatement Plan	A Recovery Plan does not exist for the Coastal Saltmarsh EEC, however the EPBC Conservation Advice (DoE 2013) nominates the following key priority conservation actions: f) Avoid native vegetation clearance and destruction of the ecological community and its buffer zones g) Collate effective policies and management actions to support widely disseminate best practice and lessons learnt

Upland Swamp EEC	
Assessment of Significance criterion (Seven Part Test)	
	h) Undertake surveys to identify areas where natural retreat of Coastal Saltmarsh may be possible and actively manage them i) Undertake effective community engagement and education to promote Coastal Saltmarsh community highlighting the importance of minimising disturbance, pollution and littering j) Promote the inclusion of Coastal Saltmarsh protection and projected tidal inundation zones into coastal zone management The proposal is inconsistent with the above conservation action as native vegetation is to be cleared as a result of the proposed action.
n) Whether the action proposed constitutes or is part of a Key Threatening Process (KTP) or is likely to result in the operation of, or increase the impact of, a KTP	KTPs (OEH 2016) that are likely to be exacerbated by the proposed action include: 4. Alteration to the natural flow regimes of rivers, streams, floodplains & wetlands; 5. Clearing of native vegetation; 6. Loss and degradation of native plant and animal habitat by invasion of escaped garden plants, including aquatic plants 7. Loss of hollow-bearing trees; and 8. Removal of dead wood and dead trees. This community is mainly associated with the sandy shores of the estuary with no canopy cover. Other than (2) and (4) above, it is anticipated that each of these KTPs will be mitigated through on-site management (e.g. drainage design, weed management and habitat translocation). As the patches are going to be removed, changes to hydrology will not cause any impact, however the rocks will not likely increase flows due to their roughness (i.e. they will not create a smooth surface). Furthermore, the patches that will remain are on the opposite side to the rockwall, with the rockwall likely locally improving local water quality through reducing erosion. The clearing of native vegetation is unavoidable but is minimal as the site is highly modified and is currently used as a caravan park, however would not expected to have a significant impact on the two patches of saltmarsh if they were to remain given the open nature of the saltmarsh habitat. It is expected that only 0.002 ha of Coastal Saltmarsh vegetation will require removal.

Conclusion

Approximately 0.002 ha Coastal Saltmarsh will be removed by the proposal. Alterations in the hydrological regime of the area are expected to be small, and therefore unlikely to significantly impact adjacent patches of this EEC. Patches of Coastal Saltmarsh that remain in Arrawarra Estuary will not be significantly impacted by the proposal. The small size of the two patches to be cleared (collectively approximately 0.002 ha) are likely to be less productive and more likely to be prone to degradation (TSSC 2013). Furthermore, the habitat potentially affected by the proposal is not considered to be of importance to the long-term survival of the EEC within the locality given they are not considered to contribute to the sharing of propagules.

Therefore, it is considered that the Coastal Saltmarsh EECs within the Arrawarra estuary are unlikely to be significantly affected by the proposed action as the two small isolated patches do not form part of the community. A Species Impact Statement is not recommended.

References

CHCC, 2012, *Coffs Harbour Biodiversity Action Strategy*, from the oceans to the ranges, Part B: The Landscapes of Coffs Harbour, Coffs Harbour City Council, NSW.

Day, T 2013, *Coastal Saltmarsh*. Primefact 1256. 1st Ed. NSW Department of Primary Industries, Fisheries Ecosystems Unit.

DoE, 2016, *Subtropical and Temperate Coastal Saltmarsh in Community and Species Profile and Threats Database*, Department of the Environment, Canberra. Available from http://www.environment.gov.au/sprat. Accessed 24 June 2016.

DoE, 2013, Environment Protection and Biodiversity Conservation Act 1999 s266B, Conservation Advice for Subtropical and Temperate Coastal Saltmarsh. This conservation advice was approved by the Minister/Delegate of the Minister 2013.

OEH, 2014, Coastal Saltmarsh in the New South Wales North Coast, Sydney Basin and South East Corner Bioregions – Profile, Threatened species profiles database, Office of Environment and Heritage, NSW, Sydney. Available from http://www.environment.nsw.gov.au/threatenedSpeciesApp/profile.aspx?id=10866, accessed 24 June 2016.

OEH, 2016, *Key Threatening Processes*, NSW Office of Environment and Heritage (OEH). New South Wales Government, Sydney, available from: http://www.environment.nsw.gov.au/threatenedspecies/KeyThreateningProcessesByDoctype.htm, accessed 24 June 2016.

NSW Scientific Committee, 2016, *Coastal saltmarsh in the NSW North Coast, Sydney Basin and South East Corner bioregions* - endangered ecological community listing: NSW Scientific Committee Final Determination, available from: http://www.environment.nsw.gov.au/determinations/CoastalSaltmarshEndSpListing.htm, accessed on 24 June 2016.

Threatened Species Scientific Committee (TSSC) (2013). *Commonwealth Conservation Advice for Subtropical and Temperate Coastal Saltmarsh*. Canberra: Department of Sustainability, Environment, Water, Population and Communities.

Attachment 3 Conceptual Vegetation Management Plan, Arrawarra Caravan Park

Revision history

Revision No.	Revision date	Details	Prepared by	Reviewed by	Approved by
00	19/09/2016	Response to RFI Arrawarra Caravan Park	Trudy Thompson, Senior Environmental Scientist	Beth Kramer, Senior Environmental Scientist	Beth Kramer, Senior Environmental Scientist
01	29/09/2016	Response to RFI Final Arrawarra Caravan Park, Final	Trudy Thompson, Senior Environmental Scientist	Beth Kramer, Senior Environmental Scientist	Beth Kramer, Senior Environmental Scientist

Distribution list

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1	29/09/2016	Electronic	Keiley Hunter Town Planning	Keiley Hunter
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Glossary, acronyms and abbreviations

ASS	Acid Sulfate Soils
ASSMP	Acid Sulfate Soils Management Plan
CHCC	Coffs Harbour City Council
DBH	Trunk diameter at breast height
EEC	Endangered ecological community
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999*
FFA	Flora and Fauna Assessment
LGA	Local Government Area
OEH	Office of Environment and Heritage
SEA	Statutory Ecological Assessment
SEPP	State Environmental Planning Policy
TSC Act	*Threatened Species Conservation Act 1995*

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1 Introduction

Ecosure Pty Ltd was engaged by Keiley Hunter Planning to provide an addendum to an ecological report to address a request for further information received from Coffs Harbour City Council (CHCC). The information request is related to Development Application No. 0667/16DA – Demolition of Existing Structures and Subdivision Lot 1 DP 1209371, Lot 1 DP 26125, LI 384013, Lot 2 DP 1209371, Arrawarra Caravan Park, 46 Arrawarra Beach Road, Arrawarra NSW (the site). The flora and fauna assessment contained within the Statutory Ecological Assessment (Naturecall Environmental 2015) was the basis for the information request and was reviewed as part of this addendum.

The project scope was to:

- conduct a flora survey to provide an updated species list, including primary koala trees, namely swamp mahogany (*Eucalyptus robusta*) and confirmation of planted *Syzygium moorei* and the presence of Endangered Ecological Community (EEC) Coastal Saltmarsh
- provide an assessment of significance i.e. seven-part test under the *Environmental Planning and Assessment Act 1979* for *Syzygium moorei* and Coastal Saltmarsh, if confirmed presence on site
- conduct an inspection of the mature rainforest trees located along the northern boundary of the site and determine if they are the EEC *Littoral rainforest in the NSW North Coast, Sydney Basin and South East Corner bioregions*
- provide an updated vegetation map as a result of the ground truthing
- provide advice on the likely impacts on marine/estuarine vegetation under the *Fisheries Management Act 1994*. The requirement for a permit for any vegetation removal under this act will be determined. Measures will be suggested to reduce impacts on the small tidal drain along the south of the site during the removal of marine/estuarine vegetation
- provide an assessment of impacts on the brush-tailed phascogale (*Phascogale tapoatafa*)
- provide an assessment on impacts in regard to State Environmental Planning Policy No. 26 (SEPP 26) mapped Littoral Rainforest occurring approximately 80 m north of the site
- make recommendations regarding pets in the E2 zone (Environmental Conservation)
- provide a brief report summarising the findings, as per the points above.

2 Methods

2.1 Flora survey

A flora survey of the property was conducted on 15 June 2016 and included the following components:

- the existing Tree Survey Plan (NatureCall Environmental October 2015) was re-surveyed for the site and surrounding area to take into account all trees (including native, exotic and cultivated trees)
- the vegetation communities present on the site were re-assessed taking into consideration the mapping included in the previous Flora and Fauna Assessment (FFA) and the Fine-scale Vegetation Map for the Coffs Harbour Local Government Area (LGA) (OEH 2012)
- complete flora species list for the site was compiled
- the location of both Saltmarsh and Littoral Rainforest EECs was investigated
- an assessment of the significance of the site for brush-tailed phascogale (*Phascogale tapoatafa*) was undertaken
- an assessment of the significance of the site for the planted specimen of Coolamon (*Syzygium moorei*).

The survey included a complete traverse of the site working systematically from tree to tree, with the location of each tree recorded by GPS, and attributes of tree species, height, DBH (trunk diameter at breast height), and the presence of hollows recorded. Given the largely cleared and modified nature of large portions of the site (due to development as a caravan park/camping ground), a determination was made of the origin of many of the cultivated trees present (i.e. remnant or planted).

All information collected on the tree species present was compiled into a spreadsheet and subsequently projected onto the site plan to provide a revised Tree Survey Plan (Figure 1). Please note the tree locations are indicative only as they were recorded via a hand held GPS by an ecologist. Vegetation communities were also assessed and the existing mapped boundaries of each community confirmed on the basis of the distribution of characteristic remnant tree species. The condition of the vegetation was also noted and vegetation community descriptions were subsequently collated.

2.2 Assessment of significance and impacts

Results from the flora survey were used to determine the necessity for an impact assessment under the *Threatened Species Conservation Act 1995* (TSC Act) (seven-part test) or assessment against Significant Impact Guidelines 1.1 under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) for the Coolomon (*Syzygium moorei*) and threatened ecological communities (i.e. Coastal saltmarsh and Littoral rainforest).

3 Results

3.1 Flora survey

3.1.1 Tree survey

The results of the revised tree survey, undertaken on 15 June 2016, identified 402 individual trees on or adjacent to the site. These include 237 remnant native trees, and an additional 165 cultivated or otherwise exotic tree species. A full list of all trees that were recorded on the site is listed in Appendix 3. The location of these trees is shown on the revised Tree Survey Plan (Figure 1). A full flora species list was compiled (Appendix 2).

Of the trees identified in the survey, 64 were potential koala habitat trees on (Figure 1). In addition, six isolated mature trees were also identified along the northern boundary of the site adjoining Arrawarra Creek (mainly ribbonwood (*Euroschinus falcatus*) and Port Jackson figs (*Ficus rubiginosa*), which are often characteristic of rainforest vegetation The Coolamon (*Syzygium moorei*), which is listed as vulnerable under the EPBC and TSC Acts. appears to have been planted along the south-western boundary of the site, together with a variety of other rainforest species (*Bouchardatia neurococca* and other *Syzygium* species) (Figure 1). A small number of mangroves (mostly isolated *Avicennia marina*), occur along the margins of Arrawarra Creek adjoining the site.

3.1.2 Vegetation communities

The vegetation communities present on the site consist largely of scattered mature remnant trees and regrowth native trees forming a fragmented woodland canopy within a largely modified and cultivated parkland utilised heavily for camping and caravan accommodations.

The vegetation communities present on the site and surrounding area, based on the assessment undertaken on 15 June 2016, are shown in Figure 2. Although heavily fragmented and modified by past clearing and land use, these communities are largely consistent with the CHCC fine-scale vegetation mapping (OEH 2012) which are described below.

518,600 518,800 519,000 519,200

6,674,600 6,674,400

ELLEM CLOSE

ARRAWARRA BEACH ROAD

nearmap

Tree category

- Cultivated/Exotic
- Koala habitat
- Mangrove
- Other Remnant native trees
- Syzygium moorei
- Site
- Cadastre Boundary
- Road
- Creek

518,600 518,800 519,000 519,200

Figure 1: Tree Survey Plan

Keiley Hunter Planning

SEA Arrawarra Caravan Park

ecosure

Job number: PR1795
Revision: 2
Author: ALM
Date: 27/06/2016

0 7.5 15 30
Metres

GDA 1994 MGA Zone 56
Projection: Transverse Mercator
Datum: GDA 1994
Units: Meter

518,600 518,800 519,000 519,200

6,674,600

6,674,400

Vegetation Type *

- 1 - Modified swamp sclerophyll (CH_DOF06)
- 2 - Modified swamp oak woodland (CH_FrW10)
- 3 - Saltmarsh vegetation (CH_SW01)
- 4 - Littoral rainforest (CH_RF08)
- Coastal Sheltered Dune Littoral Rainforest (CH_RF13)
- Estuarine Samphire - Saltwater Couch Saltmarsh (CH_SW07)
- Exotic tree cover (CH_EX03)

518,600 518,800 519,000 519,200

Figure 2: Vegetation communities of the site

Keiley Hunter Planning

SEA Arrawarra Caravan Park

Site Boundary

Cadastre Boundary

* As per the CHCC Fine Scale vegetation mapping, which was ground truthed and boundaries amended where required during site survey.

ecosure

Job number: PR1795
Revision: 2
Author: ALM
Date: 27/06/2016

0 7.5 15 30
Metres

GDA 1994 MGA Zone 56
Projection: Transverse Mercator
Datum: GDA 1994
Units: Meter

3.1.2.1 Vegetation community 1 – Modified Swamp Sclerophyll Woodland

This community consists of fragmented patches of tree cover and individual remnant trees forming a modified open woodland of swamp sclerophyll on coastal floodplain. It occurs as a mosaic across the cleared portions of the site (Figure 2). This vegetation community is mapped as CHDOF06- Lowlands Swamp Box - Paperbark - Red Gum Dry Forest in CHCC fine-scale vegetation mapping.

The canopy layer is dominated by mostly isolated, mature Swamp Mahogany (*Eucalyptus robusta*) and Broad-leaved Paperbark (*Melaleuca quinquenervia*) trees, and also includes lesser numbers of Swamp Oak (*Casuarina glauca*), Tallowwood (*E. microcorys*), Flooded Gum (*E. grandis*), Forest Red Gum (*E. tereticornis*) and Pink Bloodwood (*Corymbia intermedia*), especially along the northern boundary of the site.

The understorey and groundcover of this community has been extensively cleared, and most commonly consists of cultivated lawns and ornamental gardens (Figure 3). Modified swamp sclerophyll woodland along the northern boundary of the site adjoins Yarrawarra Creek as shown in Figure 4. A large fig (*Ficus rubiginosa*) can be seen growing out of the bank. It is adjacent to a large Swamp Mahogany which are more common throughout and characterise this vegetation community.

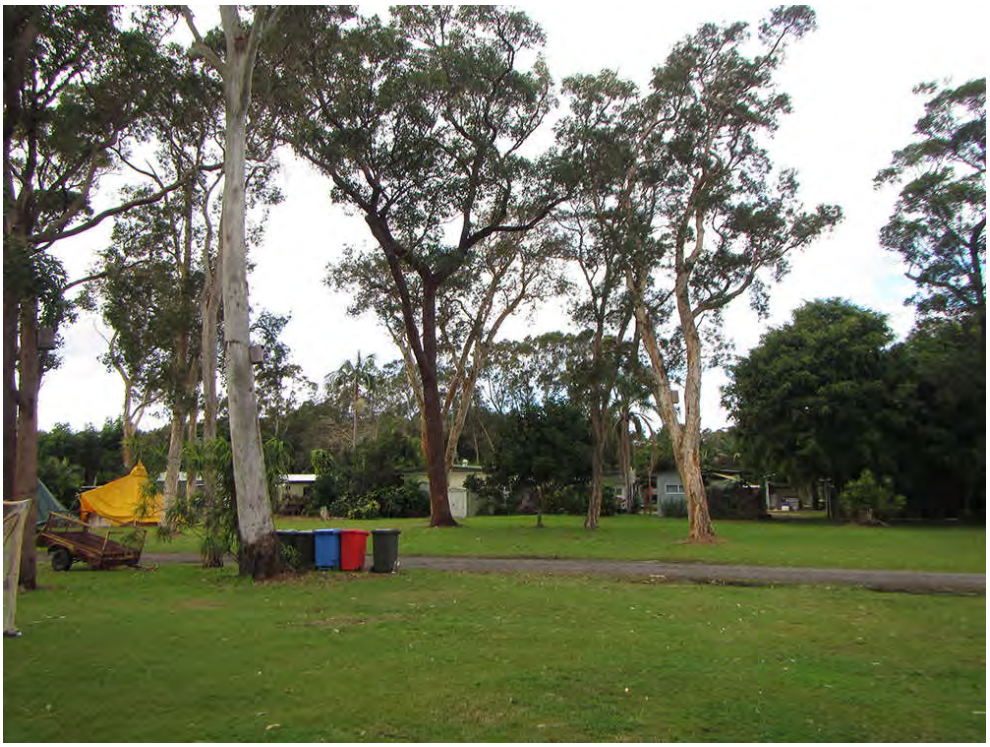

Figure 3 Modified swamp sclerophyll woodland in the central southern portion of the site

Figure 4 Modified swamp sclerophyll woodland along northern boundary

3.1.2.2 Vegetation community 2 – Modified Swamp Oak Woodland

This community consists of fragmented patches of tree cover and individual remnant trees forming a modified Swamp Oak Woodland on coastal floodplain. This community occurs on the lower sandy/alluvial terrace adjacent to the eastern bank of Arrawarra Creek, and consists mostly of isolated trees which form a woodland along the creek edge. The location of this vegetation community is shown in Figure 2.

The canopy layer of this community extends up to 30 m west of the creek bank on lower topography, and is dominated by Swamp Oak from 8 m to 20 m in height, and also includes scattered Broad-leaved Paperbark, Tuckeroo (*Cupaniopsis anacardioides*), Hard Quandong (*Elaeocarpus obovatus*) and Corkwood (*Endiandra sieberi*) trees, with several Broad-leaved Paperbark growing almost horizontally outwards into Arrawarra Creek from the creek bank.

This woodland canopy covers a series of permanent caravans and associated cabins along the creek edge, in which the native understorey has been largely removed, and ornamental garden species (particularly *Nephrolepis* ferns and *Syngonium* aroids) are common. Isolated native shrubs, such as *Rapanea variabilis* and *Clerodendrum floribundum* occur, together with the exotic Easter Cassia (*Senna pendula var glabrata*) (Figure 5 and Figure 6).

This vegetation type also occurs in parts of the drainage line to the south of the site. This drainage line enters the site further to the west where it is largely freshwater in nature, and where it enters the remnant of modified swamp sclerophyll woodland, which is dominated by Cockspur Coral Tree (*Erythrinia crus-gali*) and other exotic understorey species such as Lantana (*Lantana camara), Trandescantia sp.* and *Synogium sp.*

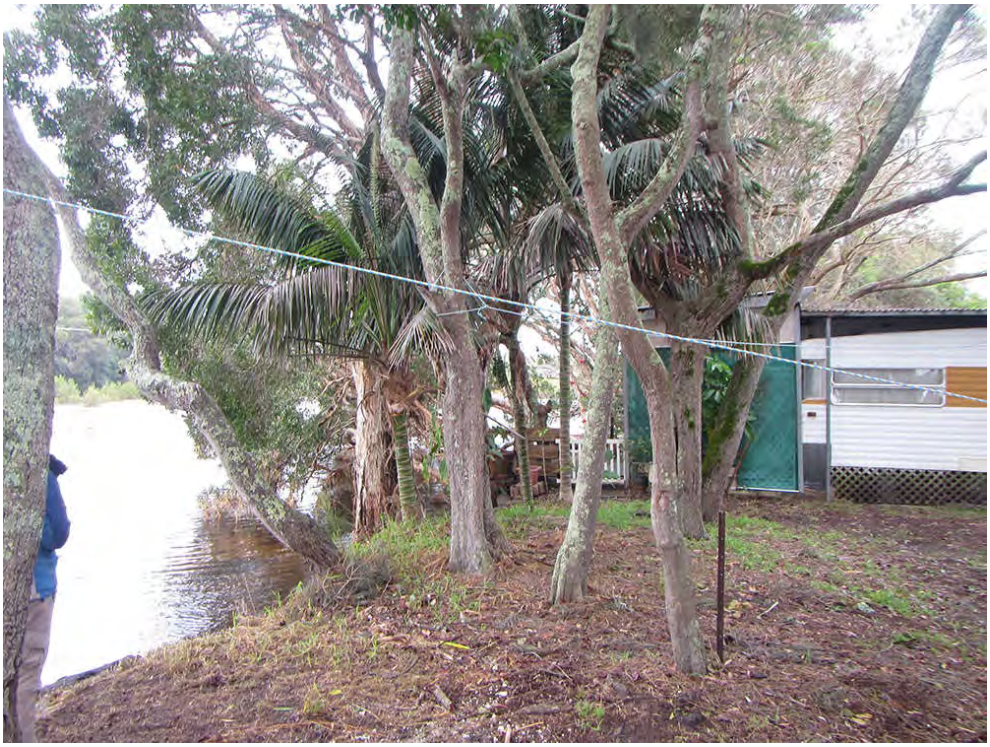

Figure 5 Modified Swamp Oak woodland along eastern boundary of the site adjoining Arrawarra Creek, showing canopy of Swamp Oak and Tuckeroo with modified grassy understorey dominated by Blue Couch (*Cynodon dactylon*)

Figure 6 Modified Swamp Oak woodland at the southern boundary of the site adjoining Arrawarra Creek, showing canopy of Swamp Oak and Hard Quandong with a modified understorey

3.1.2.3 Vegetation community 3 – Marine vegetation

Saltmarsh vegetation

This community occurs on the high intertidal banks of both creeks, particularly the opposing banks of the creek to the north (Yarrawarra Creek) and east of the site (Arrawarra Creek). These areas consist primarily of Saltwater Couch (*Sporobolus virginicus*), with isolated mangroves (*Avicennia marina*), sedges (*Juncus, Isolepis* species) and Swamp Lily (*Crinum pedunculatum*) the only other indicator species present.

Two small strips of Saltwater Couch (*Sporobolus virginicus*) also occur on the eastern and northern boundaries of the site (Arrawarra Creek and the entrance to Yarrawarra Creek) (Figure 2). These two areas both occur on the landward side of the rock gabion wall (Figure 7 and Figure 8), and are approximately 20 m^2 (0.002 ha) in total area and we have assumed will be removed as part of the proposed subdivision and seawall construction.

Mangroves

A small number of Grey Mangrove trees (*Avicennia marina subsp australasica*) were recorded on the northern bank of Yarrawarra Creek and eastern bank of Arrawarra Creek, adjacent to the saltmarsh vegetation (Figure 1). Mangroves also occur in the drainage line to the south of the site. However, this vegetation is limited to the area south and east of the lot boundary.

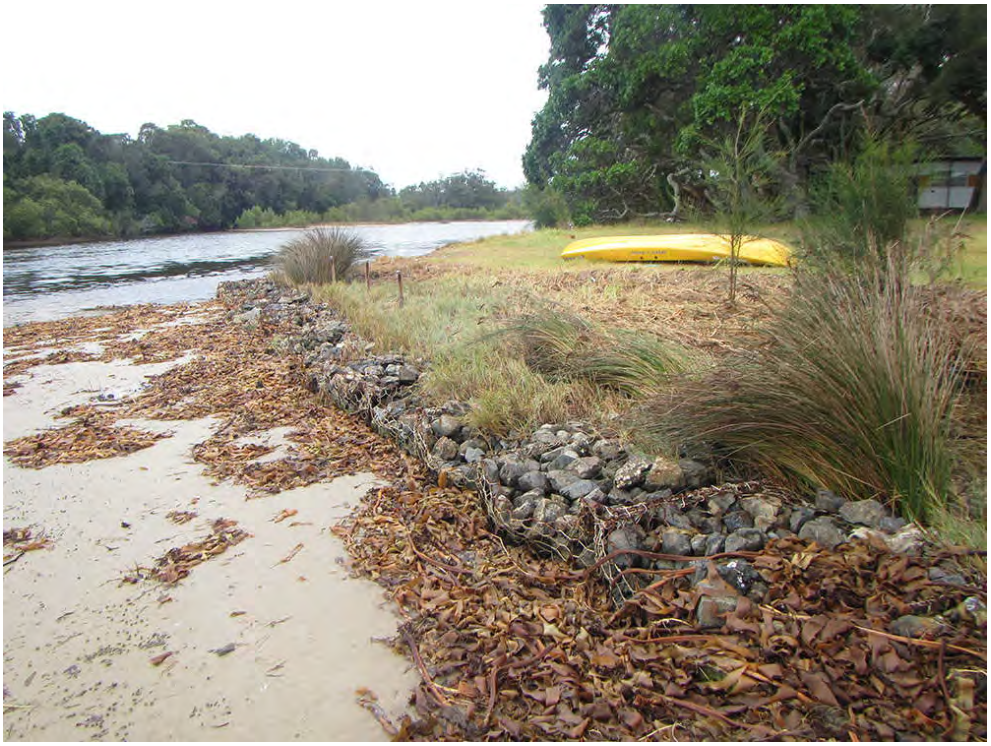

Figure 7 Saltmarsh vegetation to the east of the site on Arrawarra Creek

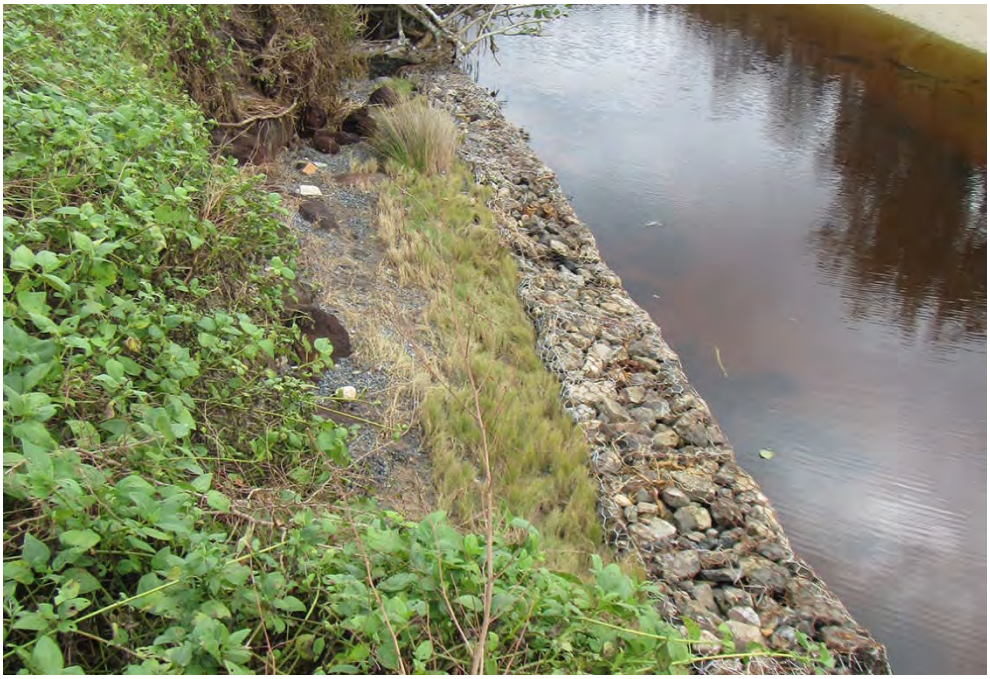

Figure 8 Saltmarsh vegetation – Yarrawarra Creek

3.1.2.4 Vegetation community 4 – Littoral Rainforest

This vegetation community is limited to the opposite banks of the creeks to the north and east of the site respectively (Figure 9 and Figure 10). Areas of this vegetation are consistent with CHCC fine-scale vegetation mapping (Figure 2).

These areas were well outside the boundary of the site, and were not surveyed or described in detail in the current assessment. This vegetation community is shown in Figure 2.

Figure 9 Littoral rainforest vegetation on the opposite bank of Yarrawarra Creek, approximately 80 m to the north of the site

Figure 10 Littoral rainforest and saltmarsh vegetation on the opposite bank of Arrawarra Creek, approximately 120 m to the east of the site

Figure 11 Drainage line at the southern boundary of the site. No marine vegetation occurs within the boundary of the site in this drainage channel. Exotic species such *as Erythrinia crus-gali*, *Lantana camara*, *Trandescantia* sp and *Synogium* sp predominate.

3.1.3 Threatened ecological communities

3.1.3.1 Coastal saltmarsh

The site contains two small patches of coastal saltmarsh of approximately 20 m^2 that will need to be removed as part of the project. These patches do not meet the criteria for inclusion under the EPBC Act listing of *Subtropical temperate coastal saltmarsh* as the areas are less than 0.4 hectares (ha) and are further than 30 metres (m) from other patches that would total 0.4 ha.

There is no minimum size for the TSC Act listed community Coastal saltmarsh in the NSW North Coast, Sydney Basin and South East Corner bioregions – endangered ecological community listing. Therefore, further assessment on the likely impacts on this community, as per a 7 part test under the TSC Act is provided as Appendix 4.

3.1.3.2 Littoral rainforest

Within the site boundaries, a small area of potential littoral rainforest occurs in the northern part of the site and consists of four trees with a disturbed understorey, i.e. Ribbonwood Sandpaper Fig and Port Jackson Fig. The area of occurrence on the site covers an area of less than 0.1 hectares so does not meet the criteria under the EPBC Act for the critically endangered *Littoral rainforests and coastal vine thickets of eastern Australia*. However, there is no minimum size for *Littoral Rainforest in the South East Corner, Sydney Basin and NSW North Coast bioregions* EEC under the TSC Act. However, one of the criteria in order for an area of vegetation to qualify as this EEC is at least 70% canopy cover. With only four trees in

an area of around 600 m^2, it is not considered to meet this criterion; therefore no further assessment is provided.

3.1.4 Floristics of the site

A total of 135 plant taxa were recorded in the revised flora survey of the site. Approximately 33% (or 45 species) are considered native to the site, with the balance represented by cultivated or exotic species. A full list of the plant species recorded on the site is provided as Appendix 2.

The only flora species listed under either the TSC Act or EPBC Act was a single specimen of Coolamon. This vulnerable species was recorded on the south western boundary of the site, occurring in what appears to be a border screen planting of Lilly Pilly (*Syzygium spp.)* and other rainforest tree species.

The Coolamon recorded within the site was a planted specimen. No records of Coolamon occurs within 5 km of the project area (BioNet 2016). Required habitat and distribution of the species include riverine and gully rainforests around sections of Richmond, Brunswick and Tweed Rivers in northern NSW (DoE 2008). Planted trees still require assessment under the TSC Act, even though this individual is at least 100 kilometres outside its naturally occurring range. An assessment under the TSC Act ("7-part test") is provided.

4 Information request

For ease of reference, the requested information from CHCC (Appendix 1) to be addressed in this Addendum has been listed below, with responses included.

1. The submitted tree survey (Newnham Karl Weir-dwg.6731A MHW) does not show a number of trees on site. In this regard, a number of Swamp Mahogany (primary Koala feed tree) and other trees are not depicted, particularly in the south-eastern corner of the site. The failure to survey and depict all trees on the site influences the ecological impacts, as cited in the submitted Flora and Fauna Assessment (FFA) in terms of loss of Koala feed trees (and hence compensation). In this regard, the FFA does not appear to have ground-truthed the tree survey plan and relies on the tree survey data supplied.

Response: Refer to Figure 1 Tree Survey Plan, Section 3.1 and Appendix 3. A detailed tree survey was carried out on 15 June 2016 and 427 trees were recorded. Sixty-four of these trees were potential koala feed trees. This compares with a total of 77 trees recorded by NatureCall in October 2015.

2. The FFA does not reference a planted Coolamon (*Syzygium moorei*) on the site (tree 47 on the tree survey plan). This species is listed as Vulnerable in the *Threatened Species Conservation Act 1995*. Further, an Assessment of Significance (7 part test) has not been completed for this tree, which presumably is proposed to be removed.

Response: Refer to Figure 1 Tree Survey Plan and Section 3.1.5 Threatened Flora and Appendix 4 for Assessment of Significance. The Coolamon is planted, and outside of its natural range and therefore its removal is not considered to represent a significant impact to the local population of this species.

3. The vegetation mapping provided in the FFA is very coarse and does not adequately discriminate between vegetation communities. The flora species list does not describe the diversity of vegetation present at the site.

Response: We have updated the vegetation mapping (Figure 2) and provided a detailed flora species list (Appendix 2).

4. The FFA does not reference or map patches of saltmarsh along the site verges adjacent to Arrawarra Creek, which are consistent with the Endangered Ecological Community (EEC) *Coastal saltmarsh in the NSW North Coast, Sydney Basin and South East Corner bioregions.* An Assessment of Significance (7 part test) was not completed for the community. Coastal saltmarsh communities are also federally listed under the *Environment Protection and Biodiversity Conservation Act 1999*.

Response: Refer to Section 3.1.2.3, Appendix 4 and Figure 2, the section of Coastal Saltmarsh is too small to meet the criteria of the TEC under the EPBC Act.

5. The FFA does not reference a number of mature rainforest trees (predominantly figs

and Ribbon wood) located along the northern boundary of the site which could be considered as characteristic of the EEC *Littoral rainforest in the NSW North Coast, Sydney Basin and South East Corner bioregions*. Littoral rainforest is also listed under the EPBC Act.

Response: Refer to Section 3.1.3.2 and Figure 1 Tree Survey Plan. The small area of trees do not meet the criteria for Littoral Rainforest, due to having less than 70% canopy cover.

6. The FFA does not address any potential removal of marine vegetation (mangroves or saltmarsh) for the proposal; the impacts of the proposal on small tidal drain along the south of the site are also not discussed.

Response: **Small tidal drain**: There is no indication of tidal influence in the section of the drain within the property boundary. The drainage line enters the site further to the west where it is largely freshwater in nature, and where it enters the remnant of modified swamp sclerophyll woodland, which is dominated by Cockspur Coral Tree (*Erythrina crus-gali*) and other exotic understorey species *(*e.g. *Lantana camara, Tradescantia* sp., *Synogium* sp).

Trees will be retained wherever possible, continuing to provide bank stabilisation. Any removal of vegetation along this drain during the construction phase could result in sediment entering the drain through runoff and erosion of the banks during heavy rainfall. Appropriate sediment and erosion control measures will be implemented during the construction phase. During the post construction phase, stormwater management has been designed for water quality and quantity leaving the site to improve on, or equal, current levels.

Response: Potential removal of marine vegetation: Refer to Item 7

7. The FFA has not addressed any potential impacts on estuarine environments which are administered under the *Fisheries Management Act 1994*. In this regard, a permit would also be required for the removal of marine vegetation.

Response: Under the *Fisheries Management Act 1994* Part 7, a permit is required for removal of, and/or harm to, marine vegetation (Appendix 5). Marine vegetation is identified as "*any species of plant that at any time in its life must inhabit water (other than fresh water)".* Harm is identified as *"in relation to marine vegetation, means gather, cut, pull up, destroy, poison, dig up, remove, injure, prevent light from reaching or otherwise harm the marine vegetation or any part of it*".

Potential removal of marine vegetation for the construction of the sea wall will occur along the northern (i.e. small patch of saltmarsh within the gabion rock), eastern (i.e. small patch of saltmarsh within the gabion rock) and south-eastern boundaries of the site (i.e. two mangroves) (Figure 1 and Section 3.1.2.3 and Section 3.1.4). Gabion rock currently exists along the eastern boundary of the site and parts of the northern boundary along Yarrawarra Creek.

The main impact on marine and estuarine environments during the construction phase relates to mobilisation of sediments which can smother aquatic habitat, delete oxygen levels, and reduce light penetration. Other impacts relate to the exposure of acid sulfate soils (ASS). Previous investigations indicate that no ASS exist on the site (Keiley Hunter Town Planning 2016). An Acid Sulfate Soil Management Plan (ASSMP) will however be implemented to manage any potential impact from exposure of ASS if they are found to exist. A summary of potential impacts to marine and estuarine environments during the construction phase, and mitigation options are provided in Table 1.

Table 1 Potential impacts and mitigation options – marine and estuarine environments

Element	Potential Impact	Mitigation Options
Waste	Transport of waste into adjacent land and water bodies	Bins, skips, and other waste receptacles should be located remote from water bodies and secured to minimise bird attraction and litter. All waste should be removed off-site for reuse, recycling or disposal. Daily inspections should be undertaken to ensure no litter on site.
	Leaking of contaminants into the environment	Any used batteries, tyres and fuel oils should be collected and sent to an appropriate recycling agent.
Flora	Unauthorised clearing of vegetation	Ensure all necessary permits are in place prior to any land clearing.
	Unnecessary clearing and destruction of native vegetation	Ensure any vegetation clearing is confined to the approved construction footprint.
	Introduction of exotic flora	Monitor for weed outbreaks and treat in appropriate manner as identified by a qualified consultant.
	Unnecessary clearing of mangroves	Prior to clearing, develop comprehensive maps delineating the extent of any mangroves to be cleared. If possible count the number of trees expected to be impacted. Have a representative mark the trees for removal either with spray paint or with white tape, according to the approved map.
Fauna	Disturbance of nesting birds	Stage works to occur during non-nesting periods.
		Check all trees for nests and other resident animals before removal. In the event a nest is found, remove in conjunction with a qualified Fauna Rescue person.
	Destruction of fauna habitat	A certified Fauna Rescue person must assess the area prior to any clearing. If fauna habitat trees are identified for removal, a certified Fauna Rescue person must be present.
	Possible injury or death to native fauna	A fauna exclusion fence should be erected prior to the construction period to prevent entry into work area.
	Trampling/destruction of fauna habitat by construction workers	An ‘exclusion area’ should be delineated around all accessible vegetated areas to ensure no entry by construction workers.

Element	Potential Impact	Mitigation Options
Soil and water	Exposure of Acid Sulfate Soils (ASS)	Develop and comply with an Acid Sulfate Management Plan (ASSMP) which should include actions such as employing suitable treatment measures.
	Degradation of soils and associated ecosystem as a result of contaminated fill	Comply with ASSMP. Actions could include ensuring any fill brought in to the site should be free of acid sulfate and contaminants.
	Sediment mobilisation into the water bodies	Comply with a Sediment and Erosion Control Plan that aims to minimise the transport of sediment and associated pollutants to the water bodies. For example, in tidal areas, vegetation removal should be staged so that the trees are removed and the disturbed area is stabilised with geotexile fabric prior to the inundation of the next high tide. Clearing of large tracks of vegetation should occur in the drier months to reduce risk of runoff into water bodies.
	Mobilisation of marine muds by mangrove removal which may create sediment plumes	Remove mangroves where possible by hand (chainsaw).
	Leaks or spills of contaminants such as fuel, oil, chemicals into the water bodies and associated environments	Ensure appropriate storage (bunding) of fuels, chemicals, oils, and other possible contaminants. Regularly inspect vehicles, containers and equipment to check for any leaks or spills. Rectify immediately and/or contain spills.

8. The FFA has not addressed potential impacts to the brush-tailed phascogale.

Response: Findings from a previous survey (Umweldt Environmental Consultants, 2004) are summarised in Table 2. There was no indication during this current survey to justify additional assessment.

Table 2 Threatened fauna assessment - *Phascogale tapoatafa* **(**taken from Umweldt Environmental Consultants, 2004)

Species	Habitat requirements	Impact assessment
Brush-tailed phascogale - *Phascogale tapoatafa*	This species has a patchy distribution around the Australian coastline, occurring up to 1500m ASL (NPWS 1999k). The southern subspecies occurs from Rockhampton in Qld to the Mount Loft Ranges in SA. In NSW, is most abundant in the NE and SE coasts. Habitat for this species is typically open forest (particularly with average rainfall of 500-2000 mm) (Cronin 1996) with sparse ground cover of herbs, grasses, scleromorphic shrubs or leaf litter (NPWS 1999k). Forages in large trees/dead branches for cockroaches, beetles, centipedes, spiders, bull ants, and is an occasional predator of small vertebrates (Strahan 1995). Nectar also forms part of its diet. Female territories are 20 – 60 ha,	Given the highly disturbed nature and regular human use of the study area and surrounds, this species is not likely to occur. As such further assessment under Part 5A of the EP&A Act is not required.

Species	Habitat requirements	Impact assessment
	while males occupy larger territories up to 100 ha (NPWS 1999m). Mating occurs between May and July. Nest sites include hollow tree limbs, rotted stumps and globular bird nests.	

9. Information in relation to potential impacts (and amelioration) to marine vegetation.

Response: Refer to Item 7 and Table 1

10. Section 7.2.1 of the submitted FFA proposes the banning of pets from the E2 (Environmental Conservation) zoned land. This is considered to be an impractical and unenforceable measure and should not be relied upon as an appropriate mitigation measure.

Response: As it is difficult to enforce the exclusion of pets from the E2 and is therefore not feasible, it is recommended that responsible pet ownership be encouraged with educational signs informing the public of the ecological values of the area and the need for: dogs on leash and cats inside between sunset and sunrise and the provision of 'doggy bags'. It is also recommended that part of this area is fenced off for nature conservation/reservation. A track could be provided in selected parts for use by residents and visitors, but then locked in the evening to stop domestic pets from getting into the area.

The application was also referred to the NSW Office of Environment and Heritage (OEH) for review and comment under the provisions of Clause 9 of *State Environmental Planning Policy No.26 – Littoral Rainforests* (SEPP 26). OEH has provided the following feedback in relation to SEPP 26: "The subject land forms part of the 100m buffer to SEPP 26 Littoral Rainforest No 45. The aim of SEPP 26 is to preserve littoral rainforest areas in their natural state. Several components of the proposed development are to be located within that part of the SEPP 26 buffer that occurs on the subject site. These include a proposed stormwater retention basin, walking paths, revetment wall and fill batters, these would alter the landform and disturb, remove, damage and destroy native flora. Such components are inconsistent with the aim of SEPP 26 and are therefore not supported by the OEH. The OEH recommends that the project design be revised to remove from the SEPP 26 buffer all components requiring alteration to the landform as well as modification, disturbance or removal of native vegetation". It is requested that you address the concerns raised by the NSW OEH in relation to SEPP 26.

Response: The buffer zone (E2) currently consists mainly of cleared land, exotic species, and cabins associated with the caravan park. As part of the construction of the sea wall, this area will be revegetated with native species which will assist in stabilising the site. Weed control works will also be carried out. The stormwater retention basin will assist in filtering runoff from impervious surfaces, improving the ecological value of the site and reducing input of sediments from surrounding land use.

5 Conclusion

Findings from the site survey conducted on 15 June 2016 and subsequent information review have been summarised to address the information request issued by CHCC.

The site, although highly disturbed still retains moderate ecological value. Two assessments of significance under the TSC Act were carried out for the Coolomon and Coastal Saltmarsh. No assessment of significance was carried out for the Brush-tailed Phascogale (*Phascogale tapoatafa*), as we agreed with the assessment made by Naturecall Environmental (2015), that it was highly unlikely to occur or be impacted.The proposed development is unlikely to have a significant effect on Coastal Saltmarsh or Coolomon.

A review of several mature trees along the northern boundary of the site, i.e. Ribbonwood, Sandpaper Fig, and Port Jackson Fig did not meet the criteria under the EPBC Act or TSC Act due to a lack of size of the remnant and lack of canopy cover respectively.

Potential impacts associated with removal of marine vegetation (mangroves and saltmarsh) were addressed and it is recommended that a permit is sought for clearing of this area.

All issues raised by CHCC in relation to flora and fauna matters as part of the scope of this Addendum have been addressed.

References

Naturecall Environmental 2015, Statutory Ecological Assessment of Residential Subdivision of Arrawara Beach Caravan Park, Arrawarra, Report for Keiley Hunter Planning, Coffs Harbour

BioNet, 2016, The website for the Atlas of NSW Wildlife, Office of Environment and Heritage, NSW Government. Available from http://www.bionet.nsw.gov.au/ . Accessed on 23 June 2016

DoE, 2008, Approved Conservation Advice for *Syzygium moorei* (Rose Apple). S266B of the Environment Protection and Biodiversity Conservation Act 1999. This conservation advice was approved by the Minister/Delegate of the Minister on 3 July 2008.

DoE, 2016, *Syzygium moorei* in Species Profile and Threats Database, Department of the Environment, Canberra. Available from: http://www.environment.gov.au/sprat. Accessed 23 June 2016

Keiley Hunter Town Planning 2016, Statement of Environmental Effects, Arrawarra Caravan Park, Arrawarra, Coffs Harbour

OEH 2012, Spatial Data Online Access, Fine-scale vegetation mapping of the Coffs Harbour Local Government Area, 2012.VIS ID 4189, Spatial Data Online Access, NSW Office of Environment and Heritage, NSW Government

Umweldt Environmental Consultants 2004, Flora and Fauna Assessment for Proposed Construction of Gabion Sea Wall, Arrawarra Caravan Park Arrawarra, Sydney

Appendix 1 Letter - Coffs Harbour City Council

COFFS HARBOUR CITY COUNCIL

Our ref: (0667/16DA)

13 May 2016

ARRAWARRA BEACH PTY LTD
PO BOX 6215
PYMBLE NSW 2073

Dear Sir/Madam

Development Application No. 0667/16DA – Demolition of Existing Structures and Subdivision (Community Title - 24 residential lots and 1 community parcel)
Lot 1 DP 1209371, Lot 1 DP 26125, LI 384013, Lot 2 DP 1209371, ARRAWARRA CVAN PARK 46 ARRAWARRA BEACH ROAD ARRAWARRA

I refer to your development application as described above.

A review of the application has been undertaken. This review has included referral to several sections of Council and to various government departments. It is considered that the following additional information is necessary to enable proper assessment of the application.

- Please provide information that clarifies how the boundaries of the land have been defined and that demonstrates that the proposed development is wholly located on land owned by the landowner of land described above.

- Flora and fauna matters:

  A review of the submitted information and a site inspection has identified the following concerns:

  - The submitted tree survey (Newnham Karl Weir - dwg. 6731A MHW) does not show a number of trees on the site. In this regard, a number of Swamp Mahogany (primary Koala feed tree) and other trees are not depicted, particularly in the south-eastern corner of the site. The failure to survey and depict all trees on the site influences the ecological impacts, as cited in the submitted Flora and Fauna Assessment (FFA) in terms of the loss of Koala feed trees (and hence compensation). In this regard, the FFA does not appear to have ground-truthed the tree survey plan and relies on the tree survey data supplied (e.g. Figure 13).

  - The FFA does not reference a planted Coolamon (*Syzygium moorei*) on the site (tree 47 on the tree survey plan). This species is listed as Vulnerable in the *Threatened Species Conservation Act 1995*. Further, an 'Assessment of Significance' (7 part test) has not been completed for this tree, which presumably is proposed to be removed.

  - The vegetation mapping provided in the FFA is very coarse and does not adequately discriminate between vegetation communities. The flora species list does not describe the diversity of vegetation present at the site.

- The FFA does not reference or map patches of saltmarsh along the site verges adjacent to Arrawarra Creek, which are consistent with the Endangered Ecological Community (EEC) *Coastal saltmarsh in the NSW North Coast, Sydney Basin and South East Corner bioregions*. Further, an 'Assessment of Significance' (7 part test) was not completed for community. Coastal saltmarsh communities are also federally listed under the *Environment Protection and Biodiversity Conservation Act 1999*.

- The FFA does not reference a number of mature rainforest trees (predominantly figs and Ribbonwood), located along the northern boundary of the site which could be considered as characteristic of the EEC *Littoral rainforest in the NSW North Coast, Sydney Basin and South East Corner bioregions*. Littoral rainforest is also federally listed under the *Environment Protection and Biodiversity Conservation Act 1999*.

- The FFA does not address any potential removal of marine vegetation (mangroves or saltmarsh) for the proposal; the impacts of the proposal on the small tidal drain along the south of the site are also not discussed.

- The submitted survey plans for the proposal do not depict the top of bank around the entire perimeter of the site adjacent to Arrawarra Creek and hence the E2 Environmental Conservation zone depicted may not necessarily comprise terrestrial land capable of supporting the proposed compensation plantings.

- Proposed lots 20 – 25, located in the north-western part of the site divide land zoned E2 Environmental Conservation and place it in separate ownerships. A more appropriate environmental outcome would involve the E2 zoned land being contained within a single consolidated lot. This would provide for a situation that is more conducive to the long-term management and protection of the E2 zoned land.

- While the sea wall is not part of the current application, the design submitted for information as part of the development application, appears to show substantial rock armouring and a rip rap layer in some areas. The rip rap layer appears to extend into the E2 zoned land. Planting and revegetation of trees in these areas (as compensation for vegetation loss) will not be possible.

- The FFA has not addressed any potential impacts on estuarine environments, which are administered under the *Fisheries Management Act 1994*. In this regard, a permit would also be required for the removal of marine vegetation.

- The FFA has not addressed potential impacts to the brush-tailed phascogale.

Noting the above, it is requested that the following information be provided to Council for consideration in relation to flora and fauna:

- The deficiencies observed above are corrected by further survey and/or an amended assessment FFA.

- Details of compensatory plantings, as required by Section E1.2 (1) and E1.2 (5) of the Coffs Harbour Development Control Plan 2015.

- A concept Vegetation Management Plan (VMP) for the land zoned E2. The VMP should be consistent with the practice notes for riparian restoration, as required as part of Controlled

Activity Approvals – *Guidelines for vegetation management plans on waterfront land* and *Guidelines for riparian corridors on waterfront land* (NSW Office of Water 2012).

As part of the VMP Further information that demonstrates how the land zoned E2, proposed for a community lot, can accommodate the proposed compensatory plantings, noting the location of the proposed seawall and associated rock armouring. It should be noted that it is likely that compensation requirements will also increase once the tree survey is completed appropriately and it is apparent that a greater number of Koala feed trees would need to be removed. As part of demonstrating the capacity of the E2 zoned land, it is requested that a surveyed plan for the site, which clearly depicts the current location of all site boundaries is provided.

- Information in relation to any potential impacts (and amelioration) to marine vegetation.

- Section 7.2.1 of the submitted FFA proposes the banning of pets from the E2 zoned land. This is considered to be an impractical and unenforceable measure and should not be relied upon as an appropriate mitigation measure.

- The application was also referred to the NSW Office of Environment and Heritage (OEH) for review and comment under the provisions of Clause 9 of *State Environmental Planning Policy No.26 – Littoral Rainforests* (SEPP 26). OEH has provided the following feedback in relation to SEPP 26:

> The subject land forms part of the 100 metre buffer to SEPP 26 Littoral Rainforest No. 45. The aim of SEPP 26 is to preserve littoral rainforest areas in their natural state. Several components of the proposed development are to be located within that part of the SEPP 26 buffer that occurs on the subject site. These include a proposed stormwater retention basin, walking paths, revetment wall and fill batters. These would alter the landform and disturb, remove, damage and destroy native flora. Such components are inconsistent with the aim of SEPP 26 and are therefore not supported by the OEH. The OEH recommends that the project design be revised to remove from the SEPP 26 buffer all components requiring alteration to the landform as well as modification, disturbance or removal of native vegetation.

It is requested that you address the concerns raised by the NSW OEH in relation to SEPP 26.

- Water Sensitive Urban Design (WSUD):
  - The submitted information refers to a now superseded version of the WSUD Policy. It is requested that the submitted information be amended to refer to the correct version of the Policy;
  - A copy of the MUSIC model, which demonstrates how the proposal complies with relevant water quality improvement targets;
  - Proposed lots 20 to 25 appear to have no WSUD treatment. It is requested that the application be amended to ensure that these lots have WSUD treatment;
  - The submitted plans indicate that some of the bio-retention basins are proposed to be located either within or in close proximity to the rock batter to the seawall. It is requested that you demonstrate that the basins will operate successfully in this environment, noting that it is likely to be a highly saline, subject to acid sulfate soils and possibly subject to inundation by flooding.

- Acid sulfate soils:
  - A copy of the report referred to on page 48 of the submitted Statement of Environmental Effects, prepared by de Groot & Benson;

- As above, details relating to the proposed bio-retention basins and the likelihood of encountering acid sulfate soils during construction and maintenance activities; and
- Details of any excavation required for the proposed demolition works.

- Access to foreshore area:

  Parts of the pedestrian access, as proposed, go through areas of the site that are located within 100 metres of an area mapped as SEPP 26 (see comments above from OEH relating to the potential impacts resulting from the placement of the pedestrian path within the buffer to SEPP 26). Should this matter be resolved, the following comments are provided in relation to the location and type of any access path provided to the foreshore area:

  - The submitted information indicates that the proposed pedestrian access through the community parcel will be of gravel construction, 1.2 metres wide. It is further noted that this path is proposed to benefit Council, providing for public access through the land to the foreshore area. Under this arrangement Council would be responsible for maintaining the access path.

    To ensure that appropriate access to the foreshore area can be achieved and maintained, Council would require that the access path be of concrete construction, 2 metres in width (for shared use), with an easement width of 3 metres to allow for maintenance.

  - It is noted that the exit point for the access path is proposed to come out some metres from the existing footbridge, which is located to the west. Submissions received as part of the exhibition period suggest that the proposed exit point for the access path would not provide for safe access to the existing footbridge at certain times of the year due to tidal movements. It is requested that you clarify whether the proposed access path is able to provide access to the footbridge all year round.

- To assist Council with assessing the application in accordance with the requirements of Clause 5.5 'Development within the coastal zone' of the Coffs Harbour Local Environmental Plan 2013, the application was referred to the Solitary Islands Marine Park Authority (SIMPA) for review and comment. The SIMPA have raised a number of concerns relating to the development. A copy of their correspondence has been attached for your information. It is requested that you provide a response to the matters raised (those that relate to the proposed subdivision).

- Submissions received as part of the exhibition period suggest that the proposed development would result in the loss of an important affordable housing and tourist accommodation option. Please provide further information to address this issue.

- Aboriginal cultural heritage:

  The submitted assessment does not provide adequate detail to enable the assessment of known sites, the potential presence of unidentified Aboriginal objects and the cultural significance of the land. The NSW Office of Environment & Heritage has identified a number of inconsistencies and omissions have been identified within the submitted cultural heritage assessment and it is requested that the assessment be amended to detail the following:

  - the known sites in the area and any relationship between those sites and the project area;
  - the potential for currently unidentified Aboriginal objects to be present subsurface within the project area;
  - the cultural significance of the project area; and
  - any correlation between the geo-tech investigations and the Aboriginal cultural heritage assessment.

- The application was referred to the NSW Rural Fire Service as 'integrated development' for General Terms of Approval. They have identified several issues that require resolution prior to further assessment of the application. The RFS's correspondence is attached.

- In accordance with Clause 9 of SEPP 26 the application was referred to the NSW Department of Planning & Environment (DPE) for concurrence. Following review of the application DPE have advised that they are not in a position to provide concurrence until such times as further information in relation to 'vegetation removal on the site' is provided.

- Council's previous correspondence dated 26 April requested further information relating to flooding and coastal processes. Council's assessment of coastal processes to date indicates that the proposed subdivision could not be supported without the seawall, currently the subject of a separate development application. Given this, Council would not be in a position to support the current application unless the NSW Coastal Panel had already approved the application for the seawall. Please advise how you consider that the development can proceed given this.

This information is required prior to further assessment of the application being undertaken.

Pursuant to Part 6, Division 11 of the *Environmental Planning and Assessment Regulation*, the period between the date of this letter and the date on which the requested information is provided, is not considered part of the development application assessment period.

When submitting additional information please ensure that reference is made to the relevant development application number and that information is submitted by post, lodged over the counter with Council's Customer Service staff or sent to Council's general email account: coffs.council@chcc.nsw.gov.au.

For further information please contact Renah Givney on 6648 4647.

Yours faithfully

Renah Givney
Senior Development Assessment Officer

Appendix 2 Flora species list

No	Family	Genus	Species	Remnant	Cultivated	Outside	Umwelt	Common Name
	Agavaceae	Aloe	saponaria		x			Aloe
	Agavaceae	Kalanchloe	tomentosa		x			a succulent
	Agavaceae	Agave	americana		x			Agave
	Amaranthaceae	Alternanthera	denticulata		x			Lesser Joyweed
x	Amaryllidaceae	Crinum	pedunculatum			x		Swamp Lily
x	Anacardiaceae	Euroschinus	falcata var falcata	x				Ribbonwood
	Anacardiaceae	Mangifera	indica		x			Mango Tree
	Anacardiaceae	Rhodosphaera	rhodanthema		x			Deep Yellowwood
	Apiaceae	Hydrocotyle	bonariensis			x	x	Kurnell Curse
	Apocynaceae	Catharanthus	roseus		x			Pink Periwinkle
	Araceae	Monstera	delicosa		x			Monsterio
	Araceae	Syngonium	podophyllum	i	x			Syngonium
	Araliaceae	Schefflera	actinophylla	i				Umbrella Tree
	Araliaceae	Schefflera	arboricola		x			Arbor Tree
	Araucariaceae	Araucaria	heterophylla		x			Norfolk Island Pine
	Arecaceae	Archontophoenix	alexandrae		x			Alexander Palm
	Arecaceae	Archontophoenix	cunninghamiana		x			Bangalow Palm
	Arecaceae	Caryota	mytis		x			Clumping Fishtail palm
	Arecaceae	Cocos	nucifera		x			Coconut Palm
	Arecaceae	Dyptiis	lutescens		x			Golden Cane Palm
	Arecaceae	Howea	forsteriana		x			Kentia Palm
	Arecaceae	Livistona	sp cv		x			Cabbage Palm
	Arecaceae	Ravenala	madamgascariensis		x			Traveller's Palm
	Arecaceae	Syagrus	romanzoffiana	i	x			Cocos Palm
	Arecaceae	Wodyetia	bifurcata		x			Foxtail Palm
	Asparagaceae	Asparagus	aethiopicus cv Sprengeri	i				Asparagus Fern
	Asparagaceae	Asparagus	plumosus	i				Climbing Asparagus Fern
	Aspleniaceae	Asplenium	australasicum	x				Bird's Nest Fern
	Asteraceae	Ageratum	houstonianum	i				Blue Billygoat Weed
	Asteraceae	Baccharis	halimifolia	i		x		Groundsel Bush
	Asteraceae	Bidens	bipinnata	i				Beggar's Ticks
	Asteraceae	Chrysanthemoides	monilifera subsp rotundata				x	Bitou Bush
	Asteraceae	Crassocephalum	crepidioides	i				Thickhead
	Asteraceae	Gamochaeta	pensylvanica	i				a Cudweed
	Asteraceae	Hypochaeris	radicata	i			x	Catsear, Flatweed
	Asteraceae	Soliva	sessilis					Bindy Eye
x	Avicenniaceae	Avicennia	marina subsp australasica	x			x	Grey Mangrove
	Bignoniaceae	Jacaranda	mimosifolia		x			Jacaranda
	Bignoniaceae	Pandorea	pandorana		x			Wonga Vine
	Bignoniaceae	Tecoma	stans					Tecoma
	Cactaceae	Opuntia	stricta		x		x	Prickly Pear
	Caesalpiniaceae	Bauhinia	variegata		x			Butterfly Tree

No	Family	Genus	Species	Remnant	Cultivated	Outside	Umwelt	Common Name
	Caesalpiniaceae	Senna	pendula var glabrata				x	Easter Cassia
x	Casuarinaceae	Casuarina	glauca	x			x	Swamp Oak
	Commelinaceae	Tradescantia	fluminensis				x	Wandering Jew
	Convolvulaceae	Dichondra	repens				x	Kidney Weed
	Convolvulaceae	Ipomoea	indica				x	Morning Glory
x	Cyatheaceae	Cyathea	australis	x				Rough Treefern
x	Cyperaceae	Baumea	juncea			x		Bare Twig-rush
x	Cyperaceae	Isolepis	nodosa			x		Knobby Club-rush
	Davidsoniaceae	Davidsonia	priens		x			Davidson's Plum
x	Dennstaedtiaceae	Histiopteris	incisa					Batswing Fern
	Dennstaedtiaceae	Pteridium	esculentum				x	Braken
	Dracaenaceae	Cordyline	rubra	x				Red-fruited Palm Lily
	Dracaenaceae	Sansevieria	trifasciata	i	x			Mother-in-Laws Tongue
x	Elaeocarpaceae	Elaeocarpus	obovatus	x				Hard Quandong
	Elaeocarpaceae	Elaeocarpus	reticulatus		x			Blueberry Ash
	Euphorbiaceae	Croton	sp cv		x			
x	Euphorbiaceae	Glochidion	ferdinandi var. ferdinandi	x				Cheese Tree
x	Euphorbiaceae	Glochidion	sumatranum	x				Umbrella Cheese Tree, Buttonwood
	Fabaceae	Erythrina	cristi-gali	i				
	Fabaceae	Erythrina	x sykesii				x	
	Fabaceae	Trifolium	repens var. repens	i	x		x	White Clover
	Geraniaceae	Geranium	sp cv		x			
x	Juncaceae	Juncus	kraussii	x		x		Broad-leaved Rush
x	Lamiaceae	Clerodendrum	floribundum	x				Lolly Bush
	Lauraceae	Cinnamomum	camphora		x		x	Camphor Laurel
x	Lauraceae	Cryptocarya	triplinervis var. triplinervis	x				Three-veined Cryptocarya
x	Lauraceae	Endiandra	sieberi	x				Corkwood
	Liliaceae	Lilium	formosanum				x	Formosa Lily
	Malvaceae	Hibiscus	sp cv		x			
	Meliaceae	Synoum	glandulosum subsp. glandulosum		x			Scentless Rosewood
	Mimosaceae	Acacia	longifolia				x	Sydney Golden Wattle
x	Mimosaceae	Acacia	maidenii	x				Maiden's Wattle
	Moraceae	Ficus	benjamina		x			
x	Moraceae	Ficus	coronata	x				Creek Sandpaper Fig
x	Moraceae	Ficus	macrophylla subsp. macrophylla	x			x	Moreton Bay Fig
x	Moraceae	Ficus	rubiginosa	x				Rusty Fig
x	Moraceae	Ficus	watkinsiana	x				Strangler Fig
	Moraceae	Morus	nigra		x			
x	Myrsinaceae	Rapanea	variabilis	x				Muttonwood
	Myrtaceae	Acmena	smithii		x			Lilly Pilly
x	Myrtaceae	Callistemon	salignus var. salignus	x				White Bottlebrush
x	Myrtaceae	Corymbia	intermedia	x			x	Pink Bloodwood
	Myrtaceae	Corymbia	torelliana	i	x			Cadaghi
x	Myrtaceae	Eucalyptus	grandis	x				Flooded Gum, Rose Gum

No	Family	Genus	Species	Remnant	Cultivated	Outside	Umwelt	Common Name
	Myrtaceae	Eucalyptus	pilularis				x	Blackbutt
x	Myrtaceae	Eucalyptus	propinqua		x			Small-fruited Grey Gum
x	Myrtaceae	Eucalyptus	robusta	x			x	Swamp Mahogany
	Myrtaceae	Eucalyptus	saligna subsp. saligna	x				Sydney Blue Gum
x	Myrtaceae	Eucalyptus	tereticornis	x				Forest Red Gum
x	Myrtaceae	Lophostemon	confertus				x	Brush Box
x	Myrtaceae	Melaleuca	quinquenervia	x			x	Broad-leaved Paperbark
x	Myrtaceae	Syncarpia	glomulifera subsp. glomulifera	x			x	Turpentine
	Myrtaceae	Syzygium	australe		x			Scrub Cherry, Brush Cherry
x	Myrtaceae	Syzygium	francisii	x	x			Giant Water Gum
	Myrtaceae	Syzygium	luehmannii		x			Riberry
	Myrtaceae	Syzygium	oleosum		x			Blue Lilly Pilly
	Nephrolepidaceae	Nephrolepis	cordifolia	i			x	Fishbone Fern
	Nephrolepidaceae	Nephrolepis	exaltata		x			Sword Fern
	Ochnaceae	Ochna	serrulata	i				Mickey Mouse Bush
	Oleaceae	Ligustrum	sinense				x	Small-leaved Privet
	Orchidaceae	Dendrobium	speciosum var. hilli					King Orchid
x	Philesiaceae	Eustrephus	latifolius	x			x	Wombat Berry
	Pinaceae	Pinus	elliottii		x			Slash Pine
x	Pittosporaceae	Pittosporum	revolutum	x				Hairy Pittosporum
	Poaceae	Axonopus	compressus	i				Broad-leaved Carpet Grass
	Poaceae	Nandina	sp.		x			Sacred Bamboo
	Poaceae	Chloris	gayana	i				Rhodes Grass
	Poaceae	Cynodon	dactylon	x	x		x	Couch
x	Poaceae	Imperata	cylindrica	x			x	Blady Grass
	Poaceae	Paspalum	mandiocanum	x				Broad-leaf Paspalum
	Poaceae	Pennisetum	clandestinum				x	Kikuyu
x	Poaceae	Sporobolus	virginicus	x		x	x	Marine Couch
	Polygonaceae	Persicaria	decipiens	x				Slender Knotweed, Smartweed
x	Proteaceae	Banksia	integrifolia subsp. integrifolia	x			x	Coastal Banksia
	Proteaceae	Banksia	robur				x	Swamp Banksia
x	Rhizophoraceae	Bruguiera	gymnorhiza			x		Orange Mangrove
	Rosaceae	Rhaphiolepis	indica	i				Indian Hawthorn
	Rubiaceae	Ixora	sp cv	i				Lipstick Plant
x	Rutaceae	Acronychia	imperforata			x		Beach Acronychia
	Rutaceae	Bouchardatia	neurococca		x			Union Nut
	Sapindaceae	Cupaniopsis	anacardioides	x	x			Tuckeroo
x	Sapindaceae	Guioa	semiglauca	x				Wild Quince
x	Smilacaceae	Smilax	australis	x			x	Austral Sarsaparilla
x	Smilacaceae	Smilax	glyciphylla	x				Sweet Sarsaparilla
	Solanaceae	Solanum	mauritianum	i			x	Wild Tobacco
	Solanaceae	Solanum	nigrum	i				Blackberry Nightshade
	Solanaceae	Solanum	seaforthianum	i				Brazilian Nightshade
	Verbenaceae	Lantana	camara var. camara	i			x	Lantana
x	Violaceae	Viola	hederacea subsp.	x			x	Native Violet

No	Family	Genus	Species	Remnant	Cultivated	Outside	Umwelt	Common Name
			hederacea					
x	Vitaceae	Cissus	antarctica	x				Kangaroo Vine
x	Vitaceae	Cissus	hypoglauca	x				Giant Water Vine
	Xanthorrhoeaceae	Lomandra	hystrix		x			River Mat-rush
x	Xanthorrhoeaceae	Lomandra	longifolia	x			x	Long-leaved Mat-rush

Legend

x = plant species is present in area indicated in the column descriptions below

i = introduced plant species is present in remnant vegetation (see column descriptions below)

Column Descriptions

Remnant = plant species is present in patches of remnant tree cover present over the subject site

Cultivated = plant species has been cultivated in ornamental plantings in the cleared areas of the subject site

Outside = plant species was recorded outside the boundaries of the subject site

Umwelt = plant species was recorded in a previous survey of the site (Umwelt 2004)

Appendix 3 Tree survey data

Wpt	Scientific_Name	Common_Name	Category	x	y	Date	Time	am
191	Howea forsteriana	Kentia Palm	Cultivated	518951	6674583	15/06/2016	9:08:20	AM
190	Banksia integrifolia	Coastal Banksia	Remnant	518961	6674574	15/06/2016	9:05:33	AM
192	Howea forsteriana	Kentia Palm	Cultivated	518951	6674583	15/06/2016	9:08:32	AM
193	Howea forsteriana	Kentia Palm	Cultivated	518951	6674583	15/06/2016	9:08:40	AM
194	Howea forsteriana	Kentia Palm	Cultivated	518950	6674584	15/06/2016	9:08:45	AM
195	Melaleuca quinquenervia	Broad-leaved Paperbark	Koala	518947	6674584	15/06/2016	9:08:53	AM
196	Casuarina glauca	Swamp Oak	Remnant	518949	6674581	15/06/2016	9:09:07	AM
197	Casuarina glauca	Swamp Oak	Remnant	518947	6674581	15/06/2016	9:09:29	AM
198	Casuarina glauca	Swamp Oak	Remnant	518949	6674578	15/06/2016	9:09:54	AM
199	Casuarina glauca	Swamp Oak	Remnant	518947	6674577	15/06/2016	9:10:03	AM
200	Eucalyptus robusta	Swamp Mahogany	Koala	518942	6674573	15/06/2016	9:11:26	AM
201	Howea forsteriana	Kentia Palm	Cultivated	518943	6674565	15/06/2016	9:15:04	AM
202	Howea forsteriana	Kentia Palm	Cultivated	518944	6674565	15/06/2016	9:15:36	AM
203	Howea forsteriana	Kentia Palm	Cultivated	518945	6674567	15/06/2016	9:15:43	AM
204	Howea forsteriana	Kentia Palm	Cultivated	518947	6674567	15/06/2016	9:15:48	AM
205	Howea forsteriana	Kentia Palm	Cultivated	518948	6674567	15/06/2016	9:15:54	AM
206	Howea forsteriana	Kentia Palm	Cultivated	518943	6674563	15/06/2016	9:16:16	AM
207	Howea forsteriana	Kentia Palm	Cultivated	518944	6674562	15/06/2016	9:16:31	AM
208	Howea forsteriana	Kentia Palm	Cultivated	518945	6674561	15/06/2016	9:16:37	AM
209	Howea forsteriana	Kentia Palm	Cultivated	518946	6674561	15/06/2016	9:16:41	AM
210	Howea forsteriana	Kentia Palm	Cultivated	518947	6674560	15/06/2016	9:16:46	AM
211	Howea forsteriana	Kentia Palm	Cultivated	518945	6674553	15/06/2016	9:17:00	AM

Wpt	Scientific_Name	Common_Name	Category	x	y	Date	Time	am
212	Howea forsteriana	Kentia Palm	Cultivated	518951	6674551	15/06/2016	9:17:11	AM
213	Howea forsteriana	Kentia Palm	Cultivated	518955	6674550	15/06/2016	9:17:16	AM
214	Casuarina glauca	Swamp Oak	Point	518964	6674556	15/06/2016	9:17:45	AM
215	Casuarina glauca	Swamp Oak	Remnant	518966	6674555	15/06/2016	9:17:56	AM
216	Casuarina glauca	Swamp Oak	Remnant	518966	6674549	15/06/2016	9:18:30	AM
217	Casuarina glauca	Swamp Oak	Remnant	518967	6674545	15/06/2016	9:18:55	AM
218	Casuarina glauca	Swamp Oak	Remnant	518966	6674542	15/06/2016	9:19:15	AM
219	Juncus krausii	Sedge	Point	518970	6674537	15/06/2016	9:19:55	AM
220	Cupaniopsis anacardioides	Tuckeroo	Remnant	518957	6674515	15/06/2016	9:23:56	AM
221	Cupaniopsis anacardioides	Tuckeroo	Remnant	518957	6674515	15/06/2016	9:24:09	AM
222	Casuarina glauca	Swamp Oak	Remnant	518951	6674520	15/06/2016	9:24:49	AM
223	Casuarina glauca	Swamp Oak	Remnant	518948	6674519	15/06/2016	9:25:04	AM
224	Cupaniopsis anacardioides	Tuckeroo	Remnant	518947	6674517	15/06/2016	9:25:20	AM
225	Melaleuca quinquenervia	Broad-leaved Paperbark	Koala	518946	6674517	15/06/2016	9:25:32	AM
226	Casuarina glauca	Swamp Oak	Remnant	518947	6674514	15/06/2016	9:25:59	AM
227	Casuarina glauca	Swamp Oak	Remnant	518950	6674513	15/06/2016	9:26:26	AM
228	Casuarina glauca	Swamp Oak	Remnant	518951	6674512	15/06/2016	9:26:37	AM
229	Casuarina glauca	Swamp Oak	Remnant	518949	6674511	15/06/2016	9:26:45	AM
230	Casuarina glauca	Swamp Oak	Remnant	518947	6674510	15/06/2016	9:26:59	AM
231	Howea forsteriana	Kentia Palm	Cultivated	518950	6674511	15/06/2016	9:27:26	AM
232	Howea forsteriana	Kentia Palm	Cultivated	518949	6674510	15/06/2016	9:27:34	AM
233	Howea forsteriana	Kentia Palm	Cultivated	518949	6674509	15/06/2016	9:27:45	AM
234	Casuarina glauca	Swamp Oak	Remnant	518948	6674509	15/06/2016	9:27:58	AM
235	Casuarina glauca	Swamp Oak	Remnant	518949	6674509	15/06/2016	9:28:07	AM
236	Melaleuca quinquenervia	Broad-leaved Paperbark	Koala	518949	6674508	15/06/2016	9:28:24	AM

Wpt	Scientific_Name	Common_Name	Category	x	y	Date	Time	am
237	Melaleuca quinquenervia	Broad-leaved Paperbark	Koala	518949	6674510	15/06/2016	9:29:03	AM
238	Melaleuca quinquenervia	Broad-leaved Paperbark	Koala	518949	6674508	15/06/2016	9:29:13	AM
239	Casuarina glauca	Swamp Oak	Remnant	518948	6674507	15/06/2016	9:29:23	AM
240	Melaleuca quinquenervia	Broad-leaved Paperbark	Koala	518942	6674499	15/06/2016	9:34:28	AM
241	Casuarina glauca	Swamp Oak	Remnant	518943	6674499	15/06/2016	9:34:37	AM
242	Casuarina glauca	Swamp Oak	Remnant	518941	6674499	15/06/2016	9:34:44	AM
243	Avicennia marina	Grey Mangrove	Mangrove	518940	6674499	15/06/2016	9:35:08	AM
244	Avicennia marina	Grey Mangrove	Mangrove	518940	6674499	15/06/2016	9:35:17	AM
245	Erythrina crista-galli	Cockspur Coral Tree	Exotic	518942	6674501	15/06/2016	9:35:37	AM
246	Casuarina glauca	Swamp Oak	Remnant	518938	6674498	15/06/2016	9:36:08	AM
247	Erythrina crista-galli	Cockspur Coral Tree	Exotic	518938	6674499	15/06/2016	9:36:30	AM
248	Howea forsteriana	Kentia Palm	Cultivated	518938	6674498	15/06/2016	9:36:45	AM
249	Casuarina glauca	Swamp Oak	Remnant	518937	6674493	15/06/2016	9:36:57	AM
250	Casuarina glauca	Swamp Oak	Remnant	518935	6674492	15/06/2016	9:37:08	AM
251	Casuarina glauca	Swamp Oak	Remnant	518934	6674492	15/06/2016	9:37:31	AM
252	Melaleuca quinquenervia	Broad-leaved Paperbark	Koala	518934	6674491	15/06/2016	9:37:59	AM
253	Melaleuca quinquenervia	Broad-leaved Paperbark	Koala	518934	6674491	15/06/2016	9:38:12	AM
254	Callistemon salignus	Willow Bottlebrush	Remnant	518934	6674491	15/06/2016	9:38:39	AM
255	Melaleuca quinquenervia	Broad-leaved Paperbark	Koala	518935	6674489	15/06/2016	9:39:05	AM
256	Melaleuca quinquenervia	Broad-leaved Paperbark	Koala	518935	6674488	15/06/2016	9:39:23	AM
257	Casuarina glauca	Swamp Oak	Remnant	518935	6674488	15/06/2016	9:39:41	AM
258	Casuarina glauca	Swamp Oak	Remnant	518935	6674489	15/06/2016	9:39:53	AM
259	Casuarina glauca	Swamp Oak	Remnant	518935	6674488	15/06/2016	9:40:01	AM
260	Casuarina glauca	Swamp Oak	Remnant	518922	6674483	15/06/2016	9:44:17	AM
261	Casuarina glauca	Swamp Oak	Remnant	518926	6674482	15/06/2016	9:44:34	AM

Wpt	Scientific_Name	Common_Name	Category	x	y	Date	Time	am
262	Casuarina glauca	Swamp Oak	Remnant	518926	6674482	15/06/2016	9:44:37	AM
263	Casuarina glauca	Swamp Oak	Remnant	518925	6674483	15/06/2016	9:44:41	AM
264	Casuarina glauca	Swamp Oak	Remnant	518928	6674483	15/06/2016	9:45:01	AM
265	Casuarina glauca	Swamp Oak	Remnant	518927	6674478	15/06/2016	9:45:55	AM
266	Casuarina glauca	Swamp Oak	Remnant	518927	6674476	15/06/2016	9:46:01	AM
267	Banksia integrifolia	Coastal Banksia	Remnant	518927	6674476	15/06/2016	9:46:10	AM
268	Casuarina glauca	Swamp Oak	Remnant	518928	6674476	15/06/2016	9:46:23	AM
269	Banksia integrifolia	Coastal Banksia	Remnant	518927	6674476	15/06/2016	9:46:31	AM
270	Casuarina glauca	Swamp Oak	Remnant	518924	6674478	15/06/2016	9:47:18	AM
271	Avicennia marina	Grey Mangrove	Mangrove	518924	6674477	15/06/2016	9:47:40	AM
272	Schefflera arboricola	Arbour Tree	Cultivated	518909	6674476	15/06/2016	9:48:21	AM
273	Howea forsteriana	Kentia Palm	Cultivated	518918	6674469	15/06/2016	9:52:05	AM
274	Howea forsteriana	Kentia Palm	Cultivated	518917	6674468	15/06/2016	9:52:13	AM
275	Howea forsteriana	Kentia Palm	Cultivated	518916	6674466	15/06/2016	9:52:23	AM
276	Clerodendrum floribundum	Lolly Bush	Remnant	518916	6674466	15/06/2016	9:52:39	AM
277	Cupaniopsis anacardioides	Tuckeroo	Remnant	518915	6674466	15/06/2016	9:52:43	AM
278	Howea forsteriana	Kentia Palm	Cultivated	518914	6674465	15/06/2016	9:53:52	AM
279	Casuarina glauca	Swamp Oak	Remnant	518914	6674464	15/06/2016	9:54:02	AM
280	Casuarina glauca	Swamp Oak	Remnant	518911	6674463	15/06/2016	9:54:19	AM
281	Howea forsteriana	Kentia Palm	Cultivated	518911	6674457	15/06/2016	9:54:50	AM
282	Casuarina glauca	Swamp Oak	Remnant	518910	6674455	15/06/2016	9:55:03	AM
283	Howea forsteriana	Kentia Palm	Cultivated	518910	6674455	15/06/2016	9:55:18	AM
284	Casuarina glauca	Swamp Oak	Remnant	518910	6674455	15/06/2016	9:55:37	AM
285	Banksia integrifolia	Coastal Banksia	Remnant	518908	6674451	15/06/2016	9:55:59	AM
286	Avicennia marina	Grey Mangrove	Mangrove	518911	6674447	15/06/2016	9:56:20	AM

Wpt	Scientific_Name	Common_Name	Category	x	y	Date	Time	am
287	Avicennia marina	Grey Mangrove	Mangrove	518910	6674446	15/06/2016	9:56:28	AM
288	Avicennia marina	Grey Mangrove	Mangrove	518910	6674445	15/06/2016	9:56:49	AM
289	Avicennia marina	Grey Mangrove	Mangrove	518910	6674445	15/06/2016	9:57:05	AM
290	Casuarina glauca	Swamp Oak	Remnant	518908	6674446	15/06/2016	9:57:29	AM
291	Casuarina glauca	Swamp Oak	Remnant	518899	6674441	15/06/2016	9:57:44	AM
292	Banksia integrifolia	Coastal Banksia	Remnant	518898	6674442	15/06/2016	9:58:02	AM
293	Eleocarpus ovatus	Hard Quandong	Remnant	518898	6674444	15/06/2016	9:58:23	AM
294	Casuarina glauca	Swamp Oak	Remnant	518903	6674446	15/06/2016	10:00:43	AM
295	Casuarina glauca	Swamp Oak	Remnant	518902	6674447	15/06/2016	10:00:51	AM
296	Eleocarpus ovatus	Hard Quandong	Remnant	518900	6674445	15/06/2016	10:01:56	AM
297	Eleocarpus ovatus	Hard Quandong	Remnant	518902	6674445	15/06/2016	10:02:21	AM
298	Casuarina glauca	Swamp Oak	Remnant	518901	6674444	15/06/2016	10:02:41	AM
299	Casuarina glauca	Swamp Oak	Remnant	518902	6674443	15/06/2016	10:03:01	AM
300	Casuarina glauca	Swamp Oak	Remnant	518901	6674442	15/06/2016	10:03:09	AM
301	Casuarina glauca	Swamp Oak	Remnant	518902	6674442	15/06/2016	10:03:18	AM
302	Casuarina glauca	Swamp Oak	Remnant	518901	6674442	15/06/2016	10:03:28	AM
303	Casuarina glauca	Swamp Oak	Remnant	518899	6674437	15/06/2016	10:05:48	AM
304	Casuarina glauca	Swamp Oak	Remnant	518899	6674434	15/06/2016	10:06:39	AM
305	Casuarina glauca	Swamp Oak	Remnant	518899	6674434	15/06/2016	10:06:51	AM
306	Avicennia marina	Grey Mangrove	Mangrove	518898	6674432	15/06/2016	10:07:09	AM
307	Casuarina glauca	Swamp Oak	Remnant	518898	6674432	15/06/2016	10:07:16	AM
308	Casuarina glauca	Swamp Oak	Remnant	518896	6674428	15/06/2016	10:07:34	AM
309	Eleocarpus ovatus	Hard Quandong	Remnant	518896	6674428	15/06/2016	10:07:38	AM
310	Eleocarpus ovatus	Hard Quandong	Remnant	518895	6674428	15/06/2016	10:07:40	AM
311	Casuarina glauca	Swamp Oak	Remnant	518894	6674430	15/06/2016	10:08:22	AM

Wpt	Scientific_Name	Common_Name	Category	x	y	Date	Time	am
312	Casuarina glauca	Swamp Oak	Remnant	518894	6674428	15/06/2016	10:08:42	AM
313	Eleocarpus ovatus	Hard Quandong	Remnant	518894	6674428	15/06/2016	10:08:52	AM
314	Casuarina glauca	Swamp Oak	Remnant	518892	6674429	15/06/2016	10:09:12	AM
315	Casuarina glauca	Swamp Oak	Remnant	518892	6674429	15/06/2016	10:09:19	AM
316	Eleocarpus ovatus	Hard Quandong	Remnant	518892	6674428	15/06/2016	10:09:37	AM
317	Casuarina glauca	Swamp Oak	Remnant	518893	6674427	15/06/2016	10:09:47	AM
318	Casuarina glauca	Swamp Oak	Remnant	518889	6674420	15/06/2016	10:10:02	AM
319	Casuarina glauca	Swamp Oak	Remnant	518889	6674420	15/06/2016	10:10:12	AM
320	Avicennia marina	Grey Mangrove	Mangrove	518890	6674422	15/06/2016	10:10:33	AM
321	Eleocarpus ovatus	Hard Quandong	Remnant	518885	6674422	15/06/2016	10:10:57	AM
322	Casuarina glauca	Swamp Oak	Remnant	518885	6674423	15/06/2016	10:11:15	AM
323	Casuarina glauca	Swamp Oak	Remnant	518886	6674424	15/06/2016	10:11:24	AM
324	Eleocarpus ovatus	Hard Quandong	Remnant	518886	6674424	15/06/2016	10:11:45	AM
325	Eleocarpus ovatus	Hard Quandong	Remnant	518886	6674428	15/06/2016	10:11:59	AM
326	Casuarina glauca	Swamp Oak	Remnant	518886	6674428	15/06/2016	10:12:07	AM
327	Eleocarpus ovatus	Hard Quandong	Remnant	518886	6674428	15/06/2016	10:12:17	AM
328	Casuarina glauca	Swamp Oak	Remnant	518886	6674427	15/06/2016	10:12:22	AM
329	Casuarina glauca	Swamp Oak	Remnant	518886	6674425	15/06/2016	10:12:35	AM
330	Casuarina glauca	Swamp Oak	Remnant	518888	6674420	15/06/2016	10:12:45	AM
331	Avicennia marina	Grey Mangrove	Mangrove	518888	6674418	15/06/2016	10:13:04	AM
332	Casuarina glauca	Swamp Oak	Remnant	518887	6674418	15/06/2016	10:13:24	AM
333	Casuarina glauca	Swamp Oak	Remnant	518883	6674423	15/06/2016	10:13:37	AM
334	Eleocarpus ovatus	Hard Quandong	Remnant	518892	6674436	15/06/2016	10:14:28	AM
335	Casuarina glauca	Swamp Oak	Remnant	518892	6674437	15/06/2016	10:14:59	AM
336	Endiandra seiberi	Corkwood	Remnant	518893	6674437	15/06/2016	10:15:24	AM

Wpt	Scientific_Name	Common_Name	Category	x	y	Date	Time	am
337	Banksia integrifolia	Coastal Banksia	Remnant	518893	6674436	15/06/2016	10:15:43	AM
338	Eleocarpus ovatus	Hard Quandong	Remnant	518892	6674433	15/06/2016	10:16:03	AM
339	Eleocarpus ovatus	Hard Quandong	Remnant	518891	6674432	15/06/2016	10:16:06	AM
340	Eleocarpus ovatus	Hard Quandong	Remnant	518891	6674431	15/06/2016	10:16:10	AM
341	Banksia integrifolia	Coastal Banksia	Remnant	518883	6674435	15/06/2016	10:22:35	AM
342	Melaleuca quinquenervia	Broad-leaved Paperbark	Koala	518882	6674435	15/06/2016	10:22:38	AM
343	Eucalyptus robusta	Swamp Mahogany	Koala	518880	6674438	15/06/2016	10:22:41	AM
344	Eucalyptus robusta	Swamp Mahogany	Koala	518879	6674440	15/06/2016	10:22:43	AM
345	Archontophoenix cunninghami	Bangalow Palm	Remnant	518879	6674442	15/06/2016	10:22:45	AM
346	Avicennia marina	Grey Mangrove	Mangrove	518882	6674417	15/06/2016	10:29:37	AM
347	Casuarina glauca	Swamp Oak	Remnant	518880	6674422	15/06/2016	10:29:48	AM
348	Casuarina glauca	Swamp Oak	Remnant	518880	6674422	15/06/2016	10:29:50	AM
349	Casuarina glauca	Swamp Oak	Remnant	518879	6674423	15/06/2016	10:30:29	AM
350	Casuarina glauca	Swamp Oak	Remnant	518879	6674423	15/06/2016	10:30:31	AM
351	Casuarina glauca	Swamp Oak	Remnant	518881	6674422	15/06/2016	10:30:38	AM
352	Casuarina glauca	Swamp Oak	Remnant	518881	6674424	15/06/2016	10:31:36	AM
353	Casuarina glauca	Swamp Oak	Remnant	518881	6674425	15/06/2016	10:31:38	AM
354	Casuarina glauca	Swamp Oak	Remnant	518881	6674428	15/06/2016	10:31:47	AM
355	Syzygium francisii	Giant Water Gum	Remnant	518878	6674440	15/06/2016	10:34:09	AM
356	Eucalyptus robusta	Swamp Mahogany	Koala	518872	6674448	15/06/2016	10:36:31	AM
357	Eucalyptus robusta	Swamp Mahogany	Koala	518870	6674447	15/06/2016	10:37:08	AM
358	Eucalyptus robusta	Swamp Mahogany	Koala	518868	6674463	15/06/2016	10:38:42	AM
359	Ficus watkinsiana	Strangler Fig	Remnant	518861	6674449	15/06/2016	10:40:35	AM
360	Eucalyptus grandis	Flooded Gum	Koala	518855	6674456	15/06/2016	10:43:49	AM
361	Melaleuca quinquenervia	Broad-leaved Paperbark	Koala	518841	6674487	15/06/2016	10:47:18	AM

Wpt	Scientific_Name	Common_Name	Category	x	y	Date	Time	am
362	Eucalyptus robusta	Swamp Mahogany	Koala	518840	6674477	15/06/2016	10:47:43	AM
363	Eucalyptus robusta	Swamp Mahogany	Koala	518833	6674477	15/06/2016	10:49:10	AM
364	Melaleuca quinquenervia	Broad-leaved Paperbark	Koala	518834	6674475	15/06/2016	10:49:34	AM
365	Corymbia torrelliana	Cadaghi	Exotic	518845	6674472	15/06/2016	10:51:25	AM
366	Glochidion ferdinandi	Cheese Tree	Remnant	518847	6674468	15/06/2016	10:51:47	AM
367	Archontophoenix alexandrae	Alexander Palm	Remnant	518842	6674466	15/06/2016	10:52:02	AM
368	Erythrina crista-galli	Cockspur Coral Tree	Exotic	518844	6674464	15/06/2016	10:52:37	AM
369	Eucalyptus robusta	Swamp Mahogany	Koala	518844	6674464	15/06/2016	10:52:48	AM
370	Melaleuca quinquenervia	Broad-leaved Paperbark	Koala	518807	6674440	15/06/2016	10:56:09	AM
371	Erythrina crista-galli	Cockspur Coral Tree	Exotic	518830	6674457	15/06/2016	10:56:18	AM
372	Melaleuca quinquenervia	Broad-leaved Paperbark	Koala	518832	6674458	15/06/2016	10:56:30	AM
373	Erythrina crista-galli	Cockspur Coral Tree	Exotic	518832	6674458	15/06/2016	10:56:32	AM
374	Ficus coronata	Sandpaper Fig	Remnant	518831	6674462	15/06/2016	10:56:36	AM
375	Eucalyptus robusta	Swamp Mahogany	Koala	518820	6674473	15/06/2016	10:59:50	AM
376	Erythrina crista-galli	Cockspur Coral Tree	Exotic	518825	6674466	15/06/2016	10:59:54	AM
377	Erythrina crista-galli	Cockspur Coral Tree	Exotic	518828	6674463	15/06/2016	10:59:56	AM
378	Erythrina crista-galli	Cockspur Coral Tree	Exotic	518832	6674464	15/06/2016	11:02:01	AM
379	Erythrina crista-galli	Cockspur Coral Tree	Exotic	518827	6674462	15/06/2016	11:02:14	AM
380	Eucalyptus robusta	Swamp Mahogany	Koala	518826	6674463	15/06/2016	11:02:21	AM
381	Eucalyptus robusta	Swamp Mahogany	Koala	518825	6674463	15/06/2016	11:02:26	AM
382	Erythrina crista-galli	Cockspur Coral Tree	Exotic	518822	6674463	15/06/2016	11:02:31	AM
383	Erythrina crista-galli	Cockspur Coral Tree	Exotic	518820	6674460	15/06/2016	11:03:57	AM
384	Erythrina crista-galli	Cockspur Coral Tree	Exotic	518822	6674463	15/06/2016	11:04:10	AM
385	Erythrina crista-galli	Cockspur Coral Tree	Exotic	518818	6674464	15/06/2016	11:04:25	AM
386	Survey boundary		Point	518853	6674466	15/06/2016	11:09:14	AM

Wpt	Scientific_Name	Common_Name	Category	x	y	Date	Time	am
387	Melaleuca quinquenervia	Broad-leaved Paperbark	Koala	518838	6674470	15/06/2016	11:12:25	AM
388	Erythrina crista-galli	Cockspur Coral Tree	Exotic	518803	6674462	15/06/2016	11:17:29	AM
389	Survey boundary		Point	518805	6674474	15/06/2016	11:18:06	AM
390	Eucalyptus robusta	Swamp Mahogany	Koala	518807	6674469	15/06/2016	11:18:16	AM
391	Eucalyptus robusta	Swamp Mahogany	Koala	518813	6674473	15/06/2016	11:21:51	AM
392	Davidsonia pruriens	Davidson's Plum	Cultivated	518819	6674484	15/06/2016	11:22:27	AM
393	Corymbia torrelliana	Cadaghi	Cultivated	518826	6674494	15/06/2016	11:23:12	AM
394	Davidsonia pruriens	Davidson's Plum	Cultivated	518826	6674494	15/06/2016	11:23:44	AM
395	Syzygium moorei	Durobby	Syzygium moorei	518826	6674494	15/06/2016	11:24:04	AM
396	Syzygium luehmanii	Riberry	Cultivated	518826	6674494	15/06/2016	11:24:23	AM
397	Bouchardatia neurococca	Onion Nut	Cultivated	518826	6674495	15/06/2016	11:25:34	AM
398	Unknown tree	Unknown tree	Cultivated	518826	6674495	15/06/2016	11:26:03	AM
399	Corymbia torrelliana	Cadaghi	Cultivated	518828	6674498	15/06/2016	11:26:43	AM
400	Archontophoenix cunninghami	Bangalow Palm	Cultivated	518828	6674499	15/06/2016	11:27:38	AM
401	Bouchardatia neurococca	Onion Nut	Cultivated	518827	6674500	15/06/2016	11:27:58	AM
402	Syzygium australe	Brush Cherry	Cultivated	518830	6674503	15/06/2016	11:28:08	AM
403	Syzygium francisii	Giant Water Gum	Cultivated	518835	6674503	15/06/2016	11:28:24	AM
404	Eucalyptus propinqua	Grey Gum	Koala	518835	6674506	15/06/2016	11:28:46	AM
405	Bouchardatia neurococca	Onion Nut	Cultivated	518829	6674501	15/06/2016	11:29:39	AM
406	Banksia integrifolia	Coastal Banksia	Remnant	518836	6674503	15/06/2016	11:29:54	AM
407	Melaleuca quinquenervia	Broad-leaved Paperbark	Koala	518836	6674502	15/06/2016	11:30:14	AM
408	Acmena smithii	Lilly Pilly	Cultivated	518837	6674505	15/06/2016	11:30:49	AM
409	Archontophoenix cunninghami	Bangalow Palm	Cultivated	518842	6674513	15/06/2016	11:31:08	AM
410	Jacaranda mimosifolia	Jacaranda	Cultivated	518842	6674513	15/06/2016	11:31:35	AM
411	Plumifera sp cv	Frangipanni	Cultivated	518840	6674510	15/06/2016	11:32:05	AM

Wpt	Scientific_Name	Common_Name	Category	x	y	Date	Time	am
412	Plumifera sp cv	Frangipanni	Cultivated	518840	6674510	15/06/2016	11:32:10	AM
413	Acmena smithii	Lilly Pilly	Cultivated	518850	6674525	15/06/2016	11:35:24	AM
414	Corymbia torrelliana	Cadaghi	Cultivated	518852	6674528	15/06/2016	11:36:30	AM
415	Corymbia torrelliana	Cadaghi	Cultivated	518854	6674530	15/06/2016	11:36:48	AM
416	Archontophoenix alexandrae	Alexander Palm	Cultivated	518855	6674531	15/06/2016	11:36:56	AM
417	Eucalyptus tereticornis	Forest Red Gum	Koala	518864	6674526	15/06/2016	11:37:21	AM
418	Wodyetia bifurcata	Foxtail Palm	Cultivated	518862	6674542	15/06/2016	11:38:28	AM
419	Archontophoenix alexandrae	Alexander Palm	Cultivated	518862	6674543	15/06/2016	11:38:44	AM
420	Howea forsteriana	Kentia Palm	Cultivated	518862	6674543	15/06/2016	11:39:03	AM
421	Archontophoenix alexandrae	Alexander Palm	Cultivated	518864	6674546	15/06/2016	11:39:24	AM
422	Howea forsteriana	Kentia Palm	Cultivated	518864	6674545	15/06/2016	11:39:31	AM
423	Howea forsteriana	Kentia Palm	Cultivated	518864	6674547	15/06/2016	11:39:43	AM
424	Howea forsteriana	Kentia Palm	Cultivated	518864	6674547	15/06/2016	11:39:49	AM
425	Jacaranda mimosifolia	Jacaranda	Cultivated	518869	6674546	15/06/2016	11:40:00	AM
426	Howea forsteriana	Kentia Palm	Cultivated	518867	6674552	15/06/2016	11:40:26	AM
427	Howea forsteriana	Kentia Palm	Cultivated	518867	6674553	15/06/2016	11:40:30	AM
428	Howea forsteriana	Kentia Palm	Cultivated	518868	6674554	15/06/2016	11:40:35	AM
429	Howea forsteriana	Kentia Palm	Cultivated	518868	6674553	15/06/2016	11:40:42	AM
430	Howea forsteriana	Kentia Palm	Cultivated	518868	6674552	15/06/2016	11:40:47	AM
431	Lophostemon confertus	Brush Box	Remnant	518873	6674554	15/06/2016	11:41:14	AM
432	Eucalyptus microcorys	Tallowood	Koala	518873	6674524	15/06/2016	11:42:15	AM
433	Eucalyptus microcorys	Tallowood	Koala	518867	6674520	15/06/2016	11:42:34	AM
434	Callistemon salignus	Willow Bottlebrush	Remnant	518870	6674516	15/06/2016	11:42:48	AM
435	Eucalyptus grandis	Flooded Gum	Koala	518865	6674515	15/06/2016	11:43:03	AM
436	Melaleuca quinquenervia	Broad-leaved Paperbark	Koala	518871	6674500	15/06/2016	11:45:00	AM

Wpt	Scientific_Name	Common_Name	Category	x	y	Date	Time	am
437	Eucalyptus robusta	Swamp Mahogany	Koala	518875	6674479	15/06/2016	11:45:38	AM
438	Ficus benjamina	Benjamin's Fig	Cultivated	518880	6674474	15/06/2016	11:45:55	AM
439	Ficus benjamina	Benjamin's Fig	Cultivated	518886	6674479	15/06/2016	11:46:07	AM
440	Ficus rubinogosa	Port Jackson Fig	Remnant	518880	6674475	15/06/2016	11:46:26	AM
442	Cupaniopsis anacardioides	Tuckeroo	Remnant	518883	6674502	15/06/2016	11:49:21	AM
443	Eucalyptus robusta	Swamp Mahogany	Koala	518885	6674506	15/06/2016	11:49:40	AM
444	Melaleuca quinquenervia	Broad-leaved Paperbark	Koala	518892	6674505	15/06/2016	11:49:50	AM
445	Melaleuca quinquenervia	Broad-leaved Paperbark	Koala	518900	6674516	15/06/2016	11:50:14	AM
446	Cupaniopsis anacardioides	Tuckeroo	Remnant	518903	6674519	15/06/2016	11:50:23	AM
447	Melaleuca quinquenervia	Broad-leaved Paperbark	Koala	518903	6674520	15/06/2016	11:50:35	AM
448	Glochidion ferdinandi	Cheese Tree	Remnant	518908	6674507	15/06/2016	11:51:25	AM
449	Archontophoenix cunninghami	Bangalow Palm	Cultivated	518910	6674506	15/06/2016	11:51:47	AM
450	Syagrus romanzoffiana	Queen Palm	Cultivated	518911	6674506	15/06/2016	11:52:14	AM
451	Ficus macrophylla	Moreton Bay Fig	Remnant	518911	6674506	15/06/2016	11:52:36	AM
452	Syagrus romanzoffiana	Queen Palm	Cultivated	518904	6674508	15/06/2016	11:52:58	AM
453	Syagrus romanzoffiana	Queen Palm	Cultivated	518894	6674489	15/06/2016	11:53:27	AM
454	Eucalyptus robusta	Swamp Mahogany	Koala	518892	6674521	15/06/2016	11:54:08	AM
455	Eucalyptus robusta	Swamp Mahogany	Koala	518892	6674527	15/06/2016	11:54:16	AM
456	Archontophoenix alexandrae	Alexander Palm	Cultivated	518911	6674554	15/06/2016	11:55:15	AM
457	Archontophoenix alexandrae	Alexander Palm	Cultivated	518917	6674558	15/06/2016	11:55:23	AM
458	Ravenala madagascariensis	Traveller's Palm	Cultivated	518929	6674571	15/06/2016	11:55:54	AM
459	Livistona sp	Cabbage Palm	Cultivated	518929	6674572	15/06/2016	11:56:03	AM
460	Archontophoenix alexandrae	Alexander Palm	Cultivated	518929	6674572	15/06/2016	11:56:15	AM
461	Archontophoenix alexandrae	Alexander Palm	Cultivated	518929	6674572	15/06/2016	11:56:21	AM
462	Livistona sp	Cabbage Palm	Cultivated	518929	6674572	15/06/2016	11:56:31	AM

Wpt	Scientific_Name	Common_Name	Category	x	y	Date	Time	am
463	Eucalyptus robusta	Swamp Mahogany	Koala	518928	6674570	15/06/2016	11:56:40	AM
464	Eleocarpus ovatus	Hard Quandong	Remnant	518930	6674524	15/06/2016	11:58:39	AM
465	Eleocarpus ovatus	Hard Quandong	Remnant	518928	6674526	15/06/2016	11:58:45	AM
466	Dypsis lutescens	Golden Cane Palm	Cultivated	518913	6674498	15/06/2016	11:59:20	AM
467	Callistemon sp cv	Ornamental Bottlebrush	Cultivated	518912	6674496	15/06/2016	12:00:07	PM
468	Ficus benjamina	Benjamin's Fig	Cultivated	518893	6674463	15/06/2016	12:00:44	PM
469	Eleocarpus ovatus	Hard Quandong	Remnant	518894	6674462	15/06/2016	12:00:57	PM
470	Melaleuca quinquenervia	Broad-leaved Paperbark	Koala	518896	6674461	15/06/2016	12:01:09	PM
471	Casuarina glauca	Swamp Oak	Remnant	518897	6674454	15/06/2016	12:01:31	PM
472	Melaleuca quinquenervia	Broad-leaved Paperbark	Koala	518891	6674457	15/06/2016	12:02:24	PM
473	Ficus benjamina	Benjamin's Fig	Cultivated	518895	6674456	15/06/2016	12:03:23	PM
474	Eucalyptus robusta	Swamp Mahogany	Koala	518885	6674446	15/06/2016	12:04:38	PM
475	Veg boundary Swamp Oak to Euc robusta		Point	518896	6674466	15/06/2016	12:07:19	PM
476	Veg boundary Swamp Oak to Euc robusta		Point	518906	6674484	15/06/2016	12:07:40	PM
477	Veg boundary Swamp Oak to Euc robusta		Point	518912	6674492	15/06/2016	12:07:46	PM
478	Veg boundary Swamp Oak to Euc robusta		Point	518925	6674513	15/06/2016	12:07:59	PM
479	Veg boundary Swamp Oak to Euc robusta		Point	518931	6674525	15/06/2016	12:08:17	PM
480	Veg boundary Swamp Oak to Euc robusta		Point	518936	6674544	15/06/2016	12:08:34	PM
481	Veg boundary Swamp Oak to Euc robusta		Point	518939	6674561	15/06/2016	12:08:46	PM
482	Veg boundary Swamp Oak to Euc robusta		Point	518944	6674571	15/06/2016	12:08:55	PM

Wpt	Scientific_Name	Common_Name	Category	x	y	Date	Time	am
483	Veg boundary Swamp Oak to Euc robusta		Point	518949	6674579	15/06/2016	12:09:03	PM
484	Howea forsteriana	Kentia Palm	Cultivated	518939	6674583	15/06/2016	12:38:23	PM
485	Eucalyptus robusta	Swamp Mahogany	Koala	518941	6674585	15/06/2016	12:38:41	PM
486	Melaleuca quinquenervia	Broad-leaved Paperbark	Koala	518941	6674586	15/06/2016	12:39:06	PM
487	Howea forsteriana	Kentia Palm	Cultivated	518940	6674586	15/06/2016	12:39:25	PM
488	Howea forsteriana	Kentia Palm	Cultivated	518944	6674586	15/06/2016	12:39:31	PM
489	Archontophoenix alexandrae	Alexander Palm	Cultivated	518940	6674589	15/06/2016	12:39:42	PM
490	Howea forsteriana	Kentia Palm	Cultivated	518943	6674598	15/06/2016	12:40:03	PM
491	Howea forsteriana	Kentia Palm	Cultivated	518942	6674598	15/06/2016	12:40:10	PM
492	Howea forsteriana	Kentia Palm	Cultivated	518940	6674597	15/06/2016	12:40:15	PM
493	Howea forsteriana	Kentia Palm	Cultivated	518937	6674596	15/06/2016	12:40:19	PM
494	Archontophoenix cunninghami	Bangalow Palm	Cultivated	518934	6674601	15/06/2016	12:40:34	PM
495	Howea forsteriana	Kentia Palm	Cultivated	518933	6674607	15/06/2016	12:40:46	PM
496	Howea forsteriana	Kentia Palm	Cultivated	518933	6674618	15/06/2016	12:40:55	PM
497	Howea forsteriana	Kentia Palm	Cultivated	518932	6674627	15/06/2016	12:41:03	PM
498	Howea forsteriana	Kentia Palm	Cultivated	518934	6674603	15/06/2016	12:41:32	PM
499	Howea forsteriana	Kentia Palm	Cultivated	518936	6674603	15/06/2016	12:41:36	PM
500	Howea forsteriana	Kentia Palm	Cultivated	518938	6674603	15/06/2016	12:41:39	PM
501	Howea forsteriana	Kentia Palm	Cultivated	518941	6674603	15/06/2016	12:41:43	PM
502	Howea forsteriana	Kentia Palm	Cultivated	518944	6674615	15/06/2016	12:42:00	PM
503	Howea forsteriana	Kentia Palm	Cultivated	518942	6674615	15/06/2016	12:42:07	PM
504	Howea forsteriana	Kentia Palm	Cultivated	518941	6674615	15/06/2016	12:42:11	PM
505	Howea forsteriana	Kentia Palm	Cultivated	518939	6674615	15/06/2016	12:42:14	PM
506	Howea forsteriana	Kentia Palm	Cultivated	518935	6674623	15/06/2016	12:42:33	PM
507	Howea forsteriana	Kentia Palm	Cultivated	518936	6674622	15/06/2016	12:42:38	PM

Wpt	Scientific_Name	Common_Name	Category	x	y	Date	Time	am
508	Howea forsteriana	Kentia Palm	Cultivated	518939	6674621	15/06/2016	12:42:42	PM
509	Syagrus romanzoffiana	Queen Palm	Cultivated	518940	6674628	15/06/2016	12:43:04	PM
510	Syagrus romanzoffiana	Queen Palm	Cultivated	518941	6674627	15/06/2016	12:43:08	PM
511	Syagrus romanzoffiana	Queen Palm	Cultivated	518941	6674627	15/06/2016	12:43:10	PM
512	Cupaniopsis anacardioides	Tuckeroo	Remnant	518939	6674659	15/06/2016	12:43:56	PM
513	Casuarina glauca	Swamp Oak	Remnant	518939	6674665	15/06/2016	12:45:31	PM
514	saltmarsh area		Saltmarsh	518930	6674664	15/06/2016	12:54:29	PM
515	Ficus benjamina	Benjamin's Fig	Cultivated	518930	6674652	15/06/2016	12:56:04	PM
516	Eucalyptus robusta	Swamp Mahogany	Koala	518906	6674653	15/06/2016	12:56:37	PM
517	Eleocarpus ovatus	Hard Quandong	Remnant	518906	6674658	15/06/2016	12:57:04	PM
518	Ficus coronata	Sandpaper Fig	Remnant	518902	6674657	15/06/2016	12:57:39	PM
519	Schefflera actinophylla	Umbrella Tree	Exotic	518904	6674658	15/06/2016	12:58:57	PM
520	Guioa semiglauca	Wild Quince	Remnant	518904	6674658	15/06/2016	12:58:59	PM
521	Acronychia imperforata	Beach Aspen	Remnant	518904	6674658	15/06/2016	12:59:18	PM
522	Howea forsteriana	Kentia Palm	Cultivated	518903	6674658	15/06/2016	1:00:59	PM
523	Howea forsteriana	Kentia Palm	Cultivated	518903	6674658	15/06/2016	1:01:12	PM
524	Erythrina crista-galli	Cockspur Coral Tree	Exotic	518903	6674658	15/06/2016	1:01:18	PM
525	Casuarina glauca	Swamp Oak	Remnant	518903	6674658	15/06/2016	1:01:46	PM
526	Tecoma stans	Tecoma	Exotic	518897	6674654	15/06/2016	1:02:01	PM
527	Howea forsteriana	Kentia Palm	Cultivated	518901	6674652	15/06/2016	1:02:53	PM
528	Eucalyptus robusta	Swamp Mahogany	Koala	518899	6674650	15/06/2016	1:03:02	PM
529	Unknown tree	Unknown tree	Cultivated	518885	6674633	15/06/2016	1:04:11	PM
530	Rhizophora stylosa	Red Mangrove	Remnant	518879	6674648	15/06/2016	1:04:47	PM
531	Euroshinus falcata	Ribbonwood	Remnant	518877	6674648	15/06/2016	1:05:56	PM
532	Howea forsteriana	Kentia Palm	Cultivated	518874	6674648	15/06/2016	1:06:28	PM

Wpt	Scientific_Name	Common_Name	Category	x	y	Date	Time	am
533	Howea forsteriana	Kentia Palm	Cultivated	518871	6674649	15/06/2016	1:06:50	PM
534	Howea forsteriana	Kentia Palm	Cultivated	518870	6674651	15/06/2016	1:06:55	PM
535	Howea forsteriana	Kentia Palm	Cultivated	518869	6674651	15/06/2016	1:06:59	PM
536	Howea forsteriana	Kentia Palm	Cultivated	518868	6674651	15/06/2016	1:07:00	PM
537	Howea forsteriana	Kentia Palm	Cultivated	518867	6674649	15/06/2016	1:07:25	PM
538	Eleocarpus ovatus	Hard Quandong	Remnant	518859	6674646	15/06/2016	1:08:20	PM
539	Ficus rubinogosa	Port Jackson Fig	Remnant	518857	6674647	15/06/2016	1:08:25	PM
540	Ficus rubinogosa	Port Jackson Fig	Remnant	518856	6674646	15/06/2016	1:08:30	PM
541	Ficus rubinogosa	Port Jackson Fig	Remnant	518852	6674644	15/06/2016	1:08:52	PM
542	Eucalyptus robusta	Swamp Mahogany	Koala	518851	6674646	15/06/2016	1:11:38	PM
543	Eucalyptus robusta	Swamp Mahogany	Koala	518851	6674646	15/06/2016	1:11:41	PM
544	Euroshinus falcata	Ribbonwood	Remnant	518848	6674646	15/06/2016	1:13:12	PM
545	Syncarpia glomulifera	Terpentine	Remnant	518843	6674642	15/06/2016	1:13:35	PM
546	Endiandra seiberi	Corkwood	Remnant	518830	6674643	15/06/2016	1:15:10	PM
547	Glochidion ferdinandi	Cheese Tree	Remnant	518830	6674643	15/06/2016	1:15:11	PM
548	Guioa semiglauca	Wild Quince	Remnant	518830	6674643	15/06/2016	1:15:40	PM
549	Euroshinus falcata	Ribbonwood	Remnant	518830	6674644	15/06/2016	1:15:52	PM
550	Euroshinus falcata	Ribbonwood	Remnant	518833	6674644	15/06/2016	1:17:36	PM
551	Ficus rubinogosa	Port Jackson Fig	Remnant	518833	6674644	15/06/2016	1:17:43	PM
552	Erythrina crista-galli	Cockspur Coral Tree	Exotic	518832	6674644	15/06/2016	1:17:46	PM
553	Eucalyptus robusta	Swamp Mahogany	Koala	518825	6674646	15/06/2016	1:18:23	PM
554	Casuarina glauca	Swamp Oak	Remnant	518825	6674646	15/06/2016	1:18:24	PM
555	Casuarina glauca	Swamp Oak	Remnant	518820	6674649	15/06/2016	1:20:17	PM
556	Ficus coronata	Sandpaper Fig	Remnant	518820	6674649	15/06/2016	1:20:19	PM
557	Casuarina glauca	Swamp Oak	Remnant	518821	6674646	15/06/2016	1:21:23	PM

Wpt	Scientific_Name	Common_Name	Category	x	y	Date	Time	am
558	Casuarina glauca	Swamp Oak	Remnant	518817	6674647	15/06/2016	1:21:29	PM
559	Casuarina glauca	Swamp Oak	Remnant	518815	6674646	15/06/2016	1:21:37	PM
560	Casuarina glauca	Swamp Oak	Remnant	518814	6674645	15/06/2016	1:22:09	PM
561	Casuarina glauca	Swamp Oak	Remnant	518819	6674644	15/06/2016	1:23:16	PM
571	Casuarina glauca	Swamp Oak	Remnant	518808	6674648	15/06/2016	1:24:31	PM
572	Rhodosphaera rhodanthema	Red Yellow Wood	Remnant	518800	6674646	15/06/2016	1:25:06	PM
573	Eucalyptus microcorys	Tallowood	Koala	518794	6674649	15/06/2016	1:25:34	PM
574	Ficus coronata	Sandpaper Fig	Remnant	518794	6674651	15/06/2016	1:25:37	PM
575	Cupaniopsis anacardioides	Tuckeroo	Remnant	518788	6674650	15/06/2016	1:26:38	PM
576	Syagrus romanzoffiana	Queen Palm	Cultivated	518787	6674649	15/06/2016	1:26:42	PM
577	Syagrus romanzoffiana	Queen Palm	Cultivated	518785	6674650	15/06/2016	1:26:45	PM
578	Syagrus romanzoffiana	Queen Palm	Cultivated	518783	6674652	15/06/2016	1:26:47	PM
579	Syagrus romanzoffiana	Queen Palm	Cultivated	518782	6674652	15/06/2016	1:26:49	PM
580	Syagrus romanzoffiana	Queen Palm	Cultivated	518782	6674654	15/06/2016	1:27:38	PM
581	Eucalyptus robusta	Swamp Mahogany	Koala	518779	6674655	15/06/2016	1:28:14	PM
582	Eucalyptus microcorys	Tallowood	Koala	518773	6674655	15/06/2016	1:28:37	PM
583	Euroshinus falcata	Ribbonwood	Remnant	518771	6674652	15/06/2016	1:29:00	PM
584	Corymbia intermedia	Pink Bloodwood	Remnant	518771	6674652	15/06/2016	1:29:10	PM
585	Syncarpia glomulifera	Terpentine	Remnant	518769	6674651	15/06/2016	1:29:27	PM
586	Corymbia intermedia	Pink Bloodwood	Remnant	518769	6674650	15/06/2016	1:29:31	PM
587	Eucalyptus robusta	Swamp Mahogany	Koala	518767	6674643	15/06/2016	1:29:39	PM
588	Corymbia intermedia	Pink Bloodwood	Remnant	518764	6674641	15/06/2016	1:30:06	PM
589	Casuarina glauca	Swamp Oak	Remnant	518759	6674639	15/06/2016	1:30:14	PM
590	Archontophoenix alexandrae	Alexander Palm	Cultivated	518759	6674636	15/06/2016	1:30:27	PM
591	Casuarina glauca	Swamp Oak	Remnant	518759	6674634	15/06/2016	1:30:37	PM

Wpt	Scientific_Name	Common_Name	Category	x	y	Date	Time	am
592	Pinus ellioti	Elliot Pine	Cultivated	518773	6674642	15/06/2016	1:31:49	PM
593	Acacia maidenii	Maiden's Wattle	Cultivated	518772	6674642	15/06/2016	1:31:58	PM
594	Callistemon salignus	Willow Bottlebrush	Remnant	518772	6674641	15/06/2016	1:32:10	PM
595	Acacia maidenii	Maiden's Wattle	Cultivated	518760	6674633	15/06/2016	1:32:51	PM
596	Archontophoenix alexandrae	Alexander Palm	Cultivated	518774	6674629	15/06/2016	1:33:43	PM
597	Archontophoenix alexandrae	Alexander Palm	Cultivated	518776	6674629	15/06/2016	1:34:28	PM
598	Archontophoenix alexandrae	Alexander Palm	Cultivated	518778	6674626	15/06/2016	1:34:46	PM
599	Eucalyptus robusta	Swamp Mahogany	Koala	518779	6674622	15/06/2016	1:34:58	PM
600	Clustering Fishtail	Caryota mytis	Cultivated	518781	6674624	15/06/2016	1:35:11	PM
601	Archontophoenix alexandrae	Alexander Palm	Cultivated	518785	6674624	15/06/2016	1:35:24	PM
602	Rhodosphaera rhodanthema	Red Yellow Wood	Cultivated	518785	6674624	15/06/2016	1:35:36	PM
603	Eucalyptus robusta	Swamp Mahogany	Koala	518793	6674643	15/06/2016	1:36:25	PM
604	Eucalyptus robusta	Swamp Mahogany	Koala	518794	6674644	15/06/2016	1:36:34	PM
605	Callistemon salignus	Willow Bottlebrush	Remnant	518803	6674641	15/06/2016	1:37:01	PM
606	Euroshinus falcata	Ribbonwood	Remnant	518828	6674611	15/06/2016	1:38:01	PM
607	Araucaria heterophylla	Norfolk island Pine	Cultivated	518838	6674617	15/06/2016	1:38:22	PM
608	Syncarpia glomulifera	Terpentine	Remnant	518847	6674611	15/06/2016	1:38:40	PM
609	Livistona sp	Cabbage Palm	Cultivated	518855	6674609	15/06/2016	1:39:04	PM
610	Archontophoenix alexandrae	Alexander Palm	Cultivated	518856	6674608	15/06/2016	1:39:18	PM
611	Endiandra seiberi	Corkwood	Remnant	518863	6674603	15/06/2016	1:39:31	PM
612	Banksia integrifolia	Coastal Banksia	Remnant	518861	6674614	15/06/2016	1:40:09	PM
613	Schefflera actinophylla	Umbrella Tree	Cultivated	518862	6674616	15/06/2016	1:40:19	PM
614	Bauhina variegata	Butterfly Tree	Cultivated	518865	6674617	15/06/2016	1:40:25	PM
615	Wodyetia bifurcata	Foxtail Palm	Cultivated	518859	6674627	15/06/2016	1:40:54	PM
616	Archontophoenix alexandrae	Alexander Palm	Cultivated	518871	6674630	15/06/2016	1:41:14	PM

Wpt	Scientific_Name	Common_Name	Category	x	y	Date	Time	am
617	Archontophoenix alexandrae	Alexander Palm	Cultivated	518872	6674630	15/06/2016	1:41:22	PM
618	Archontophoenix alexandrae	Alexander Palm	Cultivated	518877	6674629	15/06/2016	1:41:31	PM
619	Ficus rubinogosa	Port Jackson Fig	Cultivated	518886	6674611	15/06/2016	1:41:57	PM
620	Eucalyptus robusta	Swamp Mahogany	Koala	518897	6674600	15/06/2016	1:42:23	PM
621	Guioa semiglauca	Wild Quince	Remnant	518890	6674591	15/06/2016	1:42:41	PM
622	Delonix regia	Poinciana	Cultivated	518899	6674567	15/06/2016	1:43:47	PM
623	Syagrus romanzoffiana	Queen Palm	Cultivated	518912	6674588	15/06/2016	1:44:21	PM
624	Syagrus romanzoffiana	Queen Palm	Cultivated	518925	6674583	15/06/2016	1:44:40	PM
625	Syagrus romanzoffiana	Queen Palm	Cultivated	518925	6674588	15/06/2016	1:44:52	PM
626	Syagrus romanzoffiana	Queen Palm	Cultivated	518924	6674590	15/06/2016	1:45:00	PM

Appendix 4 Seven-part tests for Coolamon and Coastal saltmarsh.

Assessment of significance ('7-part test') under Section 5A of the NSW *Environmental Planning and Assessment Act 1979* for the Coastal Saltmarsh in the NSW North Coast, Sydney Basin and South East Corner bioregions for Arrawarra Caravan park.

Background

Coastal Saltmarsh in the NSW North Coast, Sydney Basin and South East Corner bioregions ("Coastal Saltmarsh") is listed as an endangered ecological community (EEC) under Part 3 of Schedule 1 of the *Threatened Species Conservation Act 1995* and is listed as vulnerable under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*.

Coastal Saltmarsh occurs within the intertidal zone along the shores of estuaries and lagoons along the NSW coast including NSW North Coast (OEH 2014, NSW Scientific Committee 2016). Species composition of this community varies with latitude and elevation however characteristic species of Coastal Saltmarsh includes *Baumea juncea*, *Juncus kraussii*, *Sarcocornia quinqueflora*, *Sporobolus virginicus*, *Triglochin striata*, *Isolepis nodosa* etc. with occasionally scattered mangrove stands (*Avicennia* spp.) scattered through the saltmarsh (OEH 2014, NSW Scientific Committee 2016). Reeds and salt pans may also occur in this vegetation community (OEH 2014).

Approximately 0.002 ha of Coastal Saltmarsh occurs within the concept design footprint for the proposed development. At a broader scale, approximately 231 ha of Coastal Saltmarsh is mapped to occur within the Coffs Harbour local government area (LGA) (CHCC 2012) and 2,200 ha of this EEC within 34 estuaries remains within the Northern Rivers area (Daly, 2013).

Upland Swamp EEC	
Assessment of Significance criterion (Seven Part Test)	
a) In the case of a threatened species, whether the action proposed is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction	n/a
b) In the case of an endangered population, whether the action proposed is likely to have an adverse effect on the life cycle of the species that constitutes the endangered population such that a viable local population of the species is likely to be placed at risk of extinction	n/a
c) In the case of an endangered ecological community or critically endangered ecological community, whether the action proposed: i. Is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or ii. Is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction	Local occurrence and composition Approximately 231 ha of Coastal Saltmarsh exists within Coffs Harbour LGA (CHCC 2012). Two small patches of Coastal Saltmarsh of approximately 0.002 ha in total occurs within the concept design footprint and will be cleared as part of the revetment works and therefore will be directly impacted by the proposal. Given the small area to be cleared as part of the proposed development, it is unlikely that there will be adverse effects on the extent of the ecological community within the LGA. Some potential indirect impacts may affect surrounding patches of this EEC outside of the site, such as altered hydrology, however this will be mitigated through drainage design into the adjacent tidal drain. Assessment Approximately 0.002 ha of Coastal Saltmarsh will be removed by the proposed action and any alteration to the existing hydrological regime of an adjacent patch of the EEC would have a negligible impact on the extent or composition of the local occurrence of the EEC. Therefore, the action proposed is considered unlikely to have an adverse effect on either the extent or composition of the EEC such that this local occurrence is placed at risk of extinction.
d) In relation to the habitat of a threatened species, population or ecological community: i. The extent to which habitat is likely to be removed or modified as a result of the action proposed, and ii. Whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed action, and iii. The importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the	Extent of impact on habitat Two small patches of Coastal Saltmarsh of approximately 0.002 ha occurs within the concept design footprint and therefore will be directly impacted by the proposal. However, 231 ha of Coastal Saltmarsh occurs within Coffs Harbour LGA (CHCC 2012) resulting in the impacted area being minimal compared to the extent of the local occurrence of the EEC. Habitat fragmentation The proposal constitutes the clearing and subdivision of four lots at Arrawarra Caravan Park which will result in the removal of two patches of Coastal Saltmarsh of approximately 0.002 ha in total. As it is the only mapped areas of Coastal Saltmarsh south of the drainage line, the proposed action is therefore unlikely to result in the further fragmentation and isolation of Coastal Saltmarsh habitat. Importance of habitat to be impacted

species, population or ecological community in the locality.	Approximately 231 ha of Coastal Saltmarsh exists within Coffs Harbour LGA (CHCC 2012). Of this habitat, only approximately 0.002 ha will be directly impacted by the proposal and negligible indirect impacts to this EEC outside of the site are likely to be mitigated. Therefore, the habitat potentially affected by the proposal is not considered to be of importance to the long-term survival of the EEC within the locality.
e) Whether the action proposed is likely to have an adverse effect on critical habitat (either directly or indirectly)	To date, critical habitat has not been declared for this EEC under the TSC Act.
f) Whether the action proposed is consistent with the objectives or actions of a Recovery Plan or Threat Abatement Plan	A Recovery Plan does not exist for the Coastal Saltmarsh EEC, however the EPBC Conservation Advice (DoE 2013) nominates the following key priority conservation actions: a) Avoid native vegetation clearance and destruction of the ecological community and its buffer zones b) Collate effective policies and management actions to support widely disseminate best practice and lessons learnt c) Undertake surveys to identify areas where natural retreat of Coastal Saltmarsh may be possible and actively manage them d) Undertake effective community engagement and education to promote Coastal Saltmarsh community highlighting the importance of minimising disturbance, pollution and littering e) Promote the inclusion of Coastal Saltmarsh protection and projected tidal inundation zones into coastal zone management The proposal is inconsistent with the above conservation action as native vegetation is to be cleared as a result of the proposed action.
g) Whether the action proposed constitutes or is part of a Key Threatening Process (KTP) or is likely to result in the operation of, or increase the impact of, a KTP	KTPs (OEH 2016) that are likely to be exacerbated by the proposed action include: 1. Alteration to the natural flow regimes of rivers, streams, floodplains & wetlands; 2. Clearing of native vegetation; 3. Loss and degradation of native plant and animal habitat by invasion of escaped garden plants, including aquatic plants 4. Loss of hollow-bearing trees; and 5. Removal of dead wood and dead trees. Other than (2) and (4) above, it is anticipated that each of these KTPs will be mitigated through on-site management (eg, drainage design, weed management and habitat translocation). The clearing of native vegetation is unavoidable but is minimal as the site is highly modified and is currently used as a caravan park. It is expected that only 0.002 ha of Coastal Saltmarsh vegetation will require removal.

Conclusion

Only approximately 0.002 ha Coastal Saltmarsh will be removed by the proposal and any alteration to the existing hydrological regime of an adjacent patch of this EEC would have a negligible impact on the extent and composition of the local occurrence of the EEC. Furthermore, the habitat potentially affected by the proposal is not considered to be of importance to the long-term survival of the EEC within the locality. Therefore, it is considered that the local occurrence of the Coastal Saltmarsh EEC (approximately 231 hectares) is unlikely to be significantly affected by the proposed action. A Species Impact Statement is not recommended..

References

CHCC, 2012, *Coffs Harbour Biodiversity Action Strategy*, from the oceans to the ranges, Part B: The Landscapes of Coffs Harbour, Coffs Harbour City Council, NSW.

Day, T 2013, *Coastal Saltmarsh*. Primefact 1256. 1st Ed. NSW Department of Primary Industries, Fisheries Ecosystems Unit.

DoE, 2016, *Subtropical and Temperate Coastal Saltmarsh in Community and Species Profile and Threats Database*, Department of the Environment, Canberra. Available from http://www.environment.gov.au/sprat. Accessed 24 June 2016.

DoE, 2013, Environment Protection and Biodiversity Conservation Act 1999 s266B, Conservation Advice for Subtropical and Temperate Coastal Saltmarsh. This conservation advice was approved by the Minister/Delegate of the Minister 2013.

OEH, 2014, Coastal Saltmarsh in the New South Wales North Coast, Sydney Basin and South East Corner Bioregions – Profile, Threatened species profiles database, Office of Environment and Heritage, NSW, Sydney. Available from http://www.environment.nsw.gov.au/threatenedSpeciesApp/profile.aspx?id=10866, accessed 24 June 2016.

OEH, 2016, *Key Threatening Processes*, NSW Office of Environment and Heritage (OEH). New South Wales Government, Sydney, available from: http://www.environment.nsw.gov.au/threatenedspecies/KeyThreateningProcessesByDoctype.htm, accessed 24 June 2016.

NSW Scientific Committee, 2016, *Coastal saltmarsh in the NSW North Coast, Sydney Basin and South East Corner bioregions* - endangered ecological community listing: NSW Scientific Committee Final Determination, available from: http://www.environment.nsw.gov.au/determinations/CoastalSaltmarshEndSpListing.htm, accessed on 24 June 2016.

1 Assessment of significance ("7-part test") under Section 5A of the NSW Environmental Planning and Assessment Act 1979 for Coolamon (*Syzygium moorei*) at Arrawarra Caravan Park

1.1 Background

Coolamon (*Syzygium moorei,* Myrtaceae) is listed as a vulnerable species on Schedule 2 of the New South Wales (NSW) *Threatened Species Conservation Act 1995* (TSC Act) and as a vulnerable species under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).

Coolamon is found around sections of Richmond, Brunswick and Tweed Rivers in northern NSW (DoE 2008) where it occurs in warm and fertile soils on lowland alluvium within subtropical and riverine rainforest habitat (OEH 2014, DoE 2008). The species is often recorded as isolated trees in paddocks (OEH 2014).The flowering period occurs from November to March (The Royal Botanic Gardens and Domain Trust 2016).

The table below provides an assessment of significance "7 part test" for Coolamon in regards to the proposed development at Arrawarra Caravan Park.

Syzygium moorei	
Assessment of Significance criterion (Seven Part Test)	
a) In the case of a threatened species, whether the action proposed is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction	**Viable local population** Coolamon has not previously been recorded within a 5 kilometre radius of the centre of the site (BioNet 2016) however one specimen was recorded within the concept design footprint during the field surveys conducted by Ecosure (Ecosure 2016). The individual Coolamon specimen is likely to have been planted as it is part of a hedge along with other Syzygium species. For this reason and given that no records of this species occurs within the broader area, it is considered that a viable local population is unlikely to be present within the concept design footprint. **Life cycle factors** The flowering period of Coolamon occurs from November to March (The Royal Botanic Gardens and Domain Trust 2016) with white fleshy fruits enclosed in a single seed (DoE 2008). **Assessment** A viable local population of Coolamon is unlikely to exist within the concept design footprint or surroudns and, therefore, the life cycle of such a population would not be disrupted by the proposal. As such, the proposed action is unlikely to have an adverse effect on the life cycle of Coolamon such that a viable local population of the species is likely to be placed at risk of extinction.
b) In the case of an endangered population, whether the action proposed is likely to have an adverse effect on the life cycle of the species that constitutes the endangered population such that a viable local population of the species is likely to be placed at risk of extinction	n/a
c) In the case of an endangered ecological community or critically endangered ecological community, whether the action proposed: i. Is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or ii. Is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction	n/a

Syzygium moorei	
d) In relation to the habitat of a threatened species, population or ecological community: i. The extent to which habitat is likely to be removed or modified as a result of the action proposed, and ii. Whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed action, and iii. The importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species, population or ecological community in the locality.	**i. Extent of impact on habitat** Coolamon occurs around sections of Richmond, Brunswick and Tweed Rivers in northern NSW with isolated records occurring as far south as Byron Bay Local Government Area (DoE 2008). The site is therefore not within Coolamon's natural distribution area or natural habitat. As a viable local population is unlikely to occur within the concept design footprint, a soil seed bank is also considered unlikely to occur. Therefore, any impact on habitat for the species is considered to be negligible. **ii. Habitat fragmentation** The proposal constitutes the clearing and subdivision of four lots at Arrawarra Caravan Park and natural habitat for Coolamon is unlikely to occur within the site. The proposed action is therefore is unlikely to result in the further fragmentation or isolation of potential habitat for Coolamon. **iii. Importance of habitat to be impacted** A viable local population of Coolamon is unlikely to exist within the concept design footprint and potential habitat for the species is considered unlikely to occur within the site and therefore unlikely to affect the existence of the species. A viable local population is also unlikely to exist within the broader study area as it is not within the species' natural distribution. For these reasons, it is considered that the habitat affected by the proposal is of relative low importance to the long-term survival of Coolamon.
e) Whether the action proposed is likely to have an adverse effect on critical habitat (either directly or indirectly)	To date, critical habitat has not been declared for this species under the TSC Act.

Syzygium moorei	
f) Whether the action proposed is consistent with the objectives or actions of a Recovery Plan or Threat Abatement Plan	No Recovery Plan or Threat Abatement Plan is known for Coolamon. Therefore, the proposed action cannot be assessed against the objectives or actions of a Recovery Plan or Threat Abatement Plan. An Approved Conservation Advice under the EPBC Act for the species is available (DoE 2008) and includes the following regional and local priority actions: · Monitor known populations to identify key threats and the progress of recovery of the species. · Suitably control and manage access to known sites on public and private land · Protect areas of suitable habitat including rainforest from clearing and development · Manage disruptions to hydrology or water flows · Identify and remove weeds which could become a threat to the species using appropriate measures · Develop and implement a management plan to minimise damage to trees and their habitat and prevent grazing and trampling pressure at known sites · Develop and implement a suitable fire management strategy · Undertake seed collection and storage of the species as well as implement national translocation protocols · Raise awareness of Coolamon within the local community. The proposal is not inconsistent with the abovementioned priority actions.
g) Whether the action proposed constitutes or is part of a Key Threatening Process (KTP) or is likely to result in the operation of, or increase the impact of, a KTP	The NSW listed KTPs (OEH 2016) that are likely to be exacerbated by the proposed development include: 1. Alteration to the natural flow regimes of rivers, streams, floodplains & wetlands. 2. Clearing of native vegetation. 3. Loss and degradation of native plant and animal habitat by invasion of escaped garden plants, including aquatic plants 4. Loss of hollow-bearing trees. 5. Removal of dead wood and dead trees. Other than (2) and (4) above, it is anticipated that each of these KTPs will be mitigated through on-site management (eg, drainage design and habitat translocation). The clearing of native vegetation is unavoidable but is minimal as the site is highly modified and is currently used as a caravan park. It is expected that only approximately 0.002 ha of vegetation will require removal.

Conclusion

A viable local population of Coolamon is unlikely to exist within the concept design footprint and, therefore, the life cycle of such a population would not be disrupted by the proposal. Potential habitat for Coolamon is also unlikely to occur within the site and is therefore considered unlikely to be important to the long-term survival of the species. The action proposed is considered unlikely to have a significant impact on Coolamon. A Species Impact Statement is not recommended.

References

BioNet, 2016, The website for the Atlas of NSW Wildlife, Office of Environment and Heritage, NSW Government. Available from http://www.bionet.nsw.gov.au/ . Accessed on 23 June 2016.

DoE, 2008, Approved Conservation Advice for *Syzygium moorei* (Rose Apple). S266B of the Environment Protection and Biodiversity Conservation Act 1999. This conservation advice was approved by the Minister/Delegate of the Minister on 3 July 2008.

DoE, 2016, *Syzygium moorei* in Species Profile and Threats Database, Department of the Environment, Canberra. Available from: http://www.environment.gov.au/sprat. Accessed 23 June 2016.

Ecosure, 2016, Addendum to Statutory Ecological Assessment Arrawarra Caravan Park, Report to Keiley Hunter Planning – Coffs Harbour.

OEH, 2014, Durobby – profile, Threatened species profiles, Office of Environment and Heritage. NSW, Sydney.

OEH, 2016, Key Threatening Processes, Office of Environment and Heritage. NSW, Sydney.

The Royal Botanic Gardens and Domain Trust (2016). *Syzygium moorei*, in PlantNET - The Plant Information Network System of The Royal Botanic Gardens and Domain Trust, Sydney, Australia. http://plantnet.rbgsyd.nsw.gov.au.

Appendix 5 Permit – *Fisheries Management Act 1994* Part 7

NSW GOVERNMENT | Department of Primary Industries

APPLICATION FORM FOR A PERMIT TO DREDGE, RECLAIM, OBSTRUCT FISH PASSAGE, HARM MARINE VEGETATION, USE EXPLOSIVES OR ELECTRICAL DEVICES IN A WATERWAY IN ACCORDANCE WITH PARTS 2 & 7 OF THE *FISHERIES MANAGEMENT ACT 1994*

1. Before proceeding, please check the Policy Definition of Key Fish Habitat and the relevant Key Fish Habitat maps available at:

   http://www.dpi.nsw.gov.au/fisheries/habitat/publications/protection/key-fish-habitat-maps

   If your proposed work site is not within or adjacent to a waterway that fits the definition of Key Fish Habitat and/or is not mapped as Key Fish Habitat, you do not need a permit for dredging, reclamation, obstructing fish passage under the *Fisheries Management Act 1994*. You may still need a permit to harm marine vegetation (such as saltmarsh or mangroves) if such vegetation occurs on an unmapped waterway on public water land (please check with you local Fisheries Conservation Manager). You may still need a permit to use explosives or electrical devices as well as an approval under other legislation (such as the *Water Management Act*, *Crown Lands Act* or *Environmental Planning and Assessment Act)*.
2. When completed, email your application to: ahp.central@dpi.nsw.gov.au
   Use the following format in the Subject Line:
   Fisheries Permit Application - (Name of organisation or individual) - (Name of waterway) - (Type of Works)
   e.g. Fisheries Permit Application - Black Hills Council - Smiths Creek - Causeway Replacement
3. Do not send payment. The Department will invoice you for the permit based on the fee structure on the following page (as per Schedule 8 of the *Fisheries Management (General) Regulation 2010*). A Departmental Officer will contact you if the Assessment Fee is expected to exceed the "Moderate" category. In most cases the total permit fee consists of an Application Fee plus an Assessment Fee.
4. Permits are issued with an expiry date (generally 12 months). Requests to renew a permit before the expiry date will not incur a fee. Requests to renew a permit that has expired within the last 3 months will incur a $168 fee. Permits that have expired more than 3 months previously will need to be reapplied for.
5. Other approvals may be required. A permit issued under the provisions of the *Fisheries Management Act* may not cover all aspects of the proposed works/activity. Other licences, permits or authorisations may be required. It is the applicant's responsibility to check with Crown Lands, Office of Water, Office of Environment and Heritage, Roads and Maritime Services, Local Council etc as to what other approvals may be required.
6. Warning. Provision of inaccurate or misleading information may result in suspension or cancellation of any permit issued on the basis of that information.

PERMIT TYPE & APPLICATION FEES

Please tick the permit(s) you are applying for.

Dredging and/or reclamation (Part 7) Any person, business, company or local government authority proposing to dredge, excavate or remove material (including sand, mud, large woody debris, aquatic vegetation, boulders, gravel etc) from a waterway, or reclaim or place fill within a waterway requires a permit from the Department of Primary Industries (Fisheries NSW) unless the work has been authorised under the *Crown Lands Act 1989* or by a relevant public authority (not a local government authority). Note: If you intend to obtain, or have already obtained, approval for these works from another relevant public authority (not a local government authority) such as the NSW Office of Water, you do not need to obtain a second approval from NSW DPI. However, that public authority is required to consult with NSW DPI before issuing their approval.	Fee $168 ☐
Obstruct fish passage (Part 7) Any temporary or permanent structure (such as a weir, causeway, dam, coffer dam etc) that may inhibit, obstruct or block the movement of fish within a waterway either temporarily or permanently.	☐
Harm marine vegetation (Part 7) Any damage to, or destruction of, saltmarsh, mangroves, seagrasses or seaweeds growing on public water land or the foreshore of public water land up to Highest Astronomical Tide level. Includes cutting, poisoning, removing, trimming, pulling up, gathering or shading. Includes both live and dead or detached material (e.g. shoreline wrack).	Fee $168 ☐
Use explosives or electrical devices in a waterway (Part 2)	Fee $336 ☐

ASSESSMENT TYPE & FEES

Minor assessments – takes up to 3 hours to complete	$168.00
Moderate assessments – takes between 3 to 7 hours to complete	$392.00
Major assessments – takes between 7 to 21 hours to complete	$1,402.00
Complex assessments – takes more than 21 hours to complete	$3,644.00
The Department may charge an additional fee of $70/hour (or part of) for work performed by a departmental officer in assessing the application beyond the time of the original assessment.	$70/hour

Notes

1. Most permits incur the "Minor Assessment" fee. However, if Departmental Officers need to spend time seeking additional information you may be charged the higher rate. To avoid higher charges, ensure you answer all questions comprehensively and provide all requested plans, maps and photos.
2. The assessment hours include the time taken by the Department to undertake an environmental assessment of the permit, conduct site inspections or consultations with stakeholders where necessary, and process the permit and related correspondence. Assessment hours do not include travel time to site inspections or meetings.
3. There is no Assessment Fee for permits that have been previously assessed by the Department as Integrated Development Applications in accordance with s.91 of the *Environmental Planning & Assessment Act 1979*. The Permit Application Fee(s) is still applicable.
4. Applicants for permits to harm marine vegetation may also be charged for compensation and/or an environmental bond, as outlined in s.3.3.3 of the department's "*Policy and Guidelines for Fish Habitat Conservation and Management (2013 update)*" which is available from the Fisheries NSW website at: http://www.dpi.nsw.gov.au/fisheries/habitat/publications/policies,-guidelines-and-manuals/fish-habitat-conservation

A APPLICANT DETAILS

A1 Name _____

A2 Organisation _____

_____

A3 Address (street and postal) _____

_____

A4 Responsible person (if different from above) _____

A5 Phone/fax/mobile _____

A6 Email _____

If you have prepared a separate Review of Environmental Factors or similar environmental assessment of your proposed works, then for the remainder of this application you can simply refer to the **specific section and page** of your assessment. In the event of omissions or uncertainties, you should complete this application.

B SITE IDENTIFICATION

B1 Name of river, creek, lake, waterway: _____

B2 Locality name/description: _____

IMPORTANT: Attach an up-to-date, topographic map or aerial photo image (e.g. Google Earth, NearMap) with the location & extent of proposed works and nearby towns, roads etc clearly marked.

B3 Lot & DP (Work site within or adjacent to): _____

IMPORTANT: Attach an up-to-date, cadastral plan with the location & extent of proposed works in relation to allotments clearly marked.

B4 Land status (e.g. freehold, Crown reserve): _____

B5 Who is the owner (not lessee or trustee) of the land? _____

If you are **not** the owner, please attach documentary evidence that the landowner consents to the proposed activity being carried out on their land.

C DESCRIPTION OF WORKS

Describe the works you wish to undertake. Attach copies of engineering drawings or plans if available. If not available, include a sketch diagram of proposed works including temporary structures (such as coffer dams, in-stream work platforms) that may be needed to undertake the works.

Application assessemnts will be delayed if plans are not provided. Plans should clearly show the relationship between the works and the waterway including tidal levels if appropriate.

_____

_____

_____

_____

D PLANNING CONTROLS

D1 What planning instruments (e.g. SEPPs, REPs, LEPs, DCPs) apply? Do any of these require special consideration for this proposal? _____

D2 What is the zoning? (number & name) _____

D3 Is the proposal a form of development that is prohibited in that zone? yes ☐ no ☐

If your development is prohibited, your application will not be processed.

D4 Is development consent required? yes ☐ no ☐

If development consent is required but not already granted, we will not continue to process this application. Submit your proposal as an integrated development application to Council before applying for a permit from NSW DPI.

D5 Has development consent already been granted by Council? N/A ☐ yes ☐ no ☐

If yes, please provide a full copy of the determination.

D6 Have you applied for any other permits, licenses etc. which are related to the proposed development (e.g. from Crown Lands or NSW Office of Water)? yes ☐ no ☐

D7 Have such permits, licences etc been issued? N/A ☐ yes ☐ no ☐

If yes, please provide copies of these permits or applications.
If NO, please provide details of why they were not issued

E DESCRIPTION OF SITE AND ENVIRONS

IMPORTANT: Include several colour photographs of the site from various directions (eg from the land looking towards the waterway, from the waterway looking towards the land, looking upstream, looking downstream, close-ups of the substrate etc).

E1 General site description

E2 Please describe the aquatic and riparian environment within and adjacent to the proposed works/activities footprint (e.g. width, depth, flow rate, pool/riffle sequence, substrate type, presence/absence of aquatic vegetation, riparian vegetation, slope of adjacent land etc):

E3 What are the adjoining land uses?

E4 What are the adjoining vegetation types and what is its condition?

F PROJECT DETAILS

F1 Provide additional details of the works to be undertaken.

Note: In the questions below, an asterisk* marks a compulsory field

a. Dredging (any excavation of material from the bed or banks of a waterway)

Important: Please provide details listed in Appendix 1 Part A.

* Dimensions of area to be dredged: length × width × depth (m) _____

* Volume to be dredged (m^3) _____

b. Reclamation (placement of any material into a waterway, either temporarily or permanently)

Important: Please provide details listed in Appendix 1 Part B.

* Dimensions of area to be reclaimed: length × width × depth (m) _____

* Volume of material to be used as fill (m^3) _____

c. Fish passage obstruction (placement of any material into a waterway that could obstruct fish movement)

Important: Please provide details listed in Appendix 1 Part C.

_____

_____

d. Harm marine vegetation (includes mangroves, seagrasses, seaweeds and saltmarsh growing on public water land or the foreshore of such land up to the Highest Astronomical Tide level)

Important: Please provide details listed in Appendix 1 Part D.

_____

_____

e. Use of explosives

Important: Please provide details listed in Appendix 1 Part E. Attach extra sheets if required or provide details in EIS, REF or SEE and include a copy with this application.

_____

_____

F2 What are the objectives/purpose of the works?

_____

_____

_____

F3 Expected commencement date: _____

F4 Expected completion date: _____

F5 Provide a justification of the proposal in terms of environmental, economic and social considerations. Discuss any feasible alternatives, the reasons for your preferred approach, and the consequences of not carrying out the proposed activity.

_____

_____

_____

_____

_____

F6 Describe (list) the measures you propose to take to protect the environment (including site delineation, erosion and sediment control, rehabilitation and revegetation; maintenance and monitoring) or attach a copy of the Construction Environmental Management Plan (CEMP) that will apply to works. If a CEMP is not currently available, any permit issued will include a condition requiring the preparation and submission of a CEMP two weeks prior to any works taking place.

The CEMP should consist of simple statements and diagrams of how each of the following factors will be managed on site to achieve the stated aim:

a. Site delineation and marking of 'no go' areas (with the aim of keeping the impacted area to a minimum)

b. Erosion and sediment control (with the aim of achieving an outcome of 'no visible turbid plumes reaching the waterway', for any rainfall event up to a 1 in 2 year ARI event)

c. Material storage and stockpiling (with the aim of keeping the impacted area to a minimum)

d. Site restoration and clean up (with the aim of ensuring that the impacted area recovers as soon as possible)

e. Site rehabilitation and revegetation (with the aim of ensuring that there are no long-term impacts after works are completed).

G EVALUATION OF RISK OF ENVIRONMENTAL IMPACTS

Note: The following points (G1 to G15) are paraphrased from Section 228 of the *Environmental Planning and Assessment Regulation 2000*.

Important: Risk need to be assessed in 4 ways - (1) direct/on-site, (2) indirect/off-site (i.e. downstream), (3) during construction and (4) subsequently during operation.

In each case where the risk is assessed as being high or moderate, please provide information regarding the environmental consequences.

What is the risk that there will be:		**High**	**Moderate**	**Low**	**Nil**
G1	an environmental impact on a community?	☐	☐	☐	☐
Consequences if risk is high–moderate:					
G2	a transformation of a locality	☐	☐	☐	☐
Consequences if risk is high–moderate:					
G3	an environmental impact on the ecosystems of a locality	☐	☐	☐	☐
Consequences if risk is high–moderate:					
G4	a reduction of the aesthetic, recreational, scientific or other environmental quality of value of a locality	☐	☐	☐	☐

What is the risk that there will be:		High	Moderate	Low	Nil
Consequences if risk is high–moderate:					
G5	an effect on a locality, place or building having aesthetic, anthropological, archaeological, architectural, cultural, historical, scientific or social significance or other special value for present or future generations	☐	☐	☐	☐
Consequences if risk is high–moderate:					
G6	an impact on the habitat of protected fauna (including fish)	☐	☐	☐	☐
Consequences if risk is high–moderate:					
G7	an endangering of any species of animal or plant	☐	☐	☐	☐
Consequences if risk is high–moderate:					
G8	a long-term effect on the environment	☐	☐	☐	☐
Consequences if risk is high–moderate:					
G9	a degradation of the quality of the environment	☐	☐	☐	☐
Consequences if risk is high–moderate:					
G10	a risk to the safety of the environment	☐	☐	☐	☐
Consequences if risk is high–moderate:					
G11	a reduction in the range of beneficial uses of the environment	☐	☐	☐	☐
Consequences if risk is high–moderate:					

What is the risk that there will be:		High	Moderate	Low	Nil
G12	pollution of the environment	☐	☐	☐	☐
Consequences if risk is high–moderate:					
G13	an environmental problem associated with the disposal of waste	☐	☐	☐	☐
Consequences if risk is high–moderate:					
G14	any increased demands on resources (natural or otherwise) that are, or are likely to become, in short supply	☐	☐	☐	☐
Consequences if risk is high–moderate:					
G15	a cumulative environmental effect with other existing or likely future activities	☐	☐	☐	☐
Consequences if risk is high–moderate:					
G16	any impact on coastal processes and coastal hazards, including those under projected climate change conditions	☐	☐	☐	☐
Consequences if risk is high–moderate:					

H EVALUATION OF POTENTIAL IMPACTS UPON THREATENED SPECIES AND THEIR HABITATS

H1 Are any threatened species, populations or communities of plant, mammal, bird, reptile, amphibian or fish species likely to occupy, depend upon, pass through or use the works site?

Important: Each of the following websites should be checked for species, populations or communities that may occupy or utilise the habitats that your project will affect.

- for fish and marine vegetation [1] (NSW DPI)
- for plants, mammals, birds, reptiles and amphibians [2] (NSW Office of Environment and Heritage)

[1] http://www.dpi.nsw.gov.au/fisheries/species-protection/conservation
[2] http://www.environment.nsw.gov.au/threatenedspecies

- for all species listed at the Federal level [3](federal Department of Sustainability, Environment, Water, Populations and Communities)

Please list those that could realistically be expected to occur at the site:

_____

_____

_____

_____

H2 Is the work site within an area of **critical habitat** for a threatened species or population?

yes ☐ no ☐

If yes please list:

_____

H3 Is the type of work one that could be categorised as a **key threatening process** either wholly or partly? yes ☐ no ☐

If yes please explain:

_____

_____

H4 Is the proposal likely to affect these species/populations/communities? yes ☐ no ☐

If no, explain why not:

_____

_____

If yes, you will need to assess the potential **significance of the impacts** by completing a Test of Significance (Appendix 2) for **each** species/population/community. If the Test of Significance indicates that impacts are likely to be significant, you have two choices:

1. Modify the proposal to eliminate or ameliorate the potential impacts. This may include redesigning the proposal, including additional ameliorative measures, including compensatory actions or offsets, rescheduling etc. Modifications to the original proposal require re-application of the '7 part test'. If the modified project still may cause a significant impact, then a Species Impact Statement (SIS) must be prepared for the project.
2. Prepare a Species Impact Statement (SIS) and submit it with the application. Requirements for the SIS must be obtained from NSW DPI or NSW Office of Environment and Heritage, depending upon the species group.

The Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) establishes a system of environmental assessment and approval by the Commonwealth for actions that significantly affect Matters of National Environmental Significance. Further information on the EPBC Act [4] is available from the Commonwealth Government's website.

In January 2007, the Commonwealth and NSW governments signed a Bilateral Agreement which allows the assessment regimes under the *Environmental Planning and Assessment Act 1979* (Parts 3A, 4 and 5 of the EP&A Act) to be automatically accredited under the EPBC Act. This means that separate assessment processes are not required. The Bilateral Agreement [5] only covers matters that are determined to be 'controlled actions' by the Commonwealth Government.

[3] http://www.environment.gov.au/cgi-tmp/publiclistchanges.a4634b8decb765208b3e.html

[4] http://www.environment.gov.au/epbc/index.html

[5] http://www.planning.nsw.gov.au/SettingtheDirection/GovernmentAgreementsandForums/BilateralAgreementwiththeCommonwealth/tabid/283/Default.aspx

In accordance with the NSW Assessments Bilateral Agreement, please advise NSW DPI if this proposal is likely to have an impact upon any 'Matter of National Environmental Significance' under the EPBC Act, such as:

- heritage values of World Heritage properties
- listed National Heritage places
- wetlands of international importance (Ramsar wetlands)
- Commonwealth-listed threatened species and ecological communities
- listed migratory species

If you are unsure, please refer to 'Matters of National Environmental Significance' [6] for more information.

If you believe your project will have an impact upon a Matter of National Environmental Significance, you have an obligation under the EPBC Act to refer the proposal to the Commonwealth Environment Minister for a decision as to whether the action is a 'controlled action' and therefore requires assessment and approval.

H5 Has the proposal been referred to the Commonwealth Environment Minister? yes ☐ no ☐

H6 If yes, what was the Commonwealth Environment Minister's determination?

Not a controlled action: no assessment required ☐

A controlled action: assessment required ☐

I CONSULTATION

What consultation, if any, has occurred with the following agencies and/or stakeholders, and any other relevant groups or agencies? The outcomes or results of any such consultation should be appended to this application?

I1 Local Council

_____

_____

I2 NSW Office of Water

_____

_____

I3 Adjoining landholders

_____

_____

I4 Other (excluding Commonwealth Department responsible for environment and water resources as per section G above, where relevant)

_____

_____

J DECLARATION

I/we, the applicant/s do hereby declare and affirm that the information provided on this form is accurate to the best of my/our knowledge, belief and information.

Applicant/s signature/s _____ Date _____

[6] http://www.environment.gov.au/epbc/publications/nes-guidelines.html

APPENDIX 1 ADDITIONAL DETAILS OF PROPOSED WORKS

Appendix 1 Part A: DREDGING proposals

a) For how long will the dredging works/activities occur (indicate if ongoing)?

b) For what months of the year are the dredging works/activities proposed?

c) What are the dimensions of the area(s) to be dredged?

d) What is the total volume of material to be dredged?

e) Where and how will the dredged material be disposed of?

f) To what depth below the existing bed will material be removed (give range if variable)?

g) What is the nature of the material to be dredged?

h) Is the material to be dredged likely to be contaminated by heavy metals or organohalide compounds e.g. organochlorides (give details)?

i) Does the material to be dredged have acid forming characteristics (give details)?

j) How is the area of works/activities to be marked (please note that suitable marking of the works area will be a condition of consent)?

k) What environmental safeguards will be used during and after dredging?[7]

Appendix 1 Part B: RECLAMATION proposals, including causeways, bridge approaches and retaining walls or seawalls

a) For how long will the area remain reclaimed (indicate if permanent)?

[7] Note: Environmental safeguards should include applicable provisions of "The Blue Book" Managing Urban Stormwater: Soils and Construction, 4th Edition Landcom, 2004.

b) For what months of the year are the reclamation works/activities proposed?

c) What are the dimensions of the area to be reclaimed?

d) What types of materials are to be used in reclamation?

e) Are the materials to be used in reclamation contaminated by heavy metals or organohalide compounds e.g. organochlorides (give details)?

f) Do the materials to be used in reclamation have acid forming characteristics (give details)?

g) How is the area of works/activities to be marked (please note that suitable marking of the works area will be a condition of consent)?

h) What environmental safeguards will be used during and after reclamation?[8]

[8] Note: Environmental safeguards should include applicable provisions of "The Blue Book" Managing Urban Stormwater: Soils and Construction, 4th Edition Landcom, 2004.

Appendix 1 Part C: Obstruct FISH PASSAGE proposals

1. Aquatic environment

a) How often does the waterbody contain water? (If intermittent, estimate average annual frequency)

_____

b) Are there permanent waterholes upstream or downstream? Give details:

_____

c) Are there any natural or human-made obstructions to fish passage nearby (give details)? If so, how often are these obstructions 'drowned out'?

_____

d) Are fish migrations known to occur in the area? Give details of fish species and the time(s) of migrations:

_____

2. Reason for obstructing or blocking fish passage

(a) Why is it necessary to obstruct or block fish passage?

_____

3. Characteristics of obstruction or blockage

a) For how long do you propose to obstruct or block fish passage:
3 months or less ☐ 3-6 months ☐ 7-12 months ☐
If longer, please specify number of months or years: _____

b) By how much will the proposed obstruction or blockage to fish passage reduce the cross-sectional area of the water course (tick appropriate box):
5% or less ☐
5-10% ☐
10-20% ☐
20-50% ☐
or more than 50% ☐

c) If the proposed obstruction or blockage to fish passage contains openable 'gates' or other structures (e.g. a regulator), how often and when will it be open and enable fish passage? Give details:

_____

d) What 'headloss' or 'afflux' is expected across the obstruction or blockage to fish passage under the following flow conditions:

Flow	Headloss/afflux (mm)	Water velocity (cm/s)
Average flow		
1:2 year flood		
1:5 year flood		
1:10 year flood		
1:20 year flood		

4. Restoring fish passage

a) Describe measures proposed for maintaining fish passage during the proposed works/activities (e.g. fishways, bypass channels, trapping and manual relocation):

b) If works will be removed after a time, how will fish passage be restored?

c) Will restoration of fish passage restore similar conditions to the waterbody as existed before the blocking of fish passage: yes ☐ or no ☐?

d) If not, please clearly describe any changes:

5. Environmental compensation

a) Describe environmental compensation measures for unavoidable and permanent blockage of fish passage (e.g. other improvement projects for the aquatic environment):

Appendix 1 Part D: Harm MARINE VEGETATION proposals

1. Type of marine vegetation to be harmed

Please tick relevant box(es) and insert species names:

a) Saltmarsh ☐ species (e.g. *Sporobolus virginicus,Juncus kraussii, Sarcocornis quinqueflora*)

b) Mangroves ☐ species (e.g. *Avicennia marina, Aegiceras corniculatum*)

c) Seagrasses ☐ species (e.g. *Zostera, Posidonia, Ruppia, Halophila*)

d) Marine macroalgae ☐ species/groups (e.g. kelp, coralline algae, *Ecklonia*)

2. Amount of marine vegetation to be harmed

a) Area of saltmarsh

b) Area of mangroves and/or number of trees

c) Area of seagrass

d) Area of macroalgae and/or number of plants

Appendix 1 Part E: Use of EXPLOSIVES OR ELECTRICAL DEVICES proposals

Electrical device

a) Why is the electrical device being used?_____

b) What type of electrical device will be used?_____

c) How large is the area to be affected by the electrical device?_____

Explosives

a) Why are explosives being used? _____

b) What type of explosives will be used? _____

c) How large is the area of waterway to be affected by the explosion? _____

d) What precautions will be employed to minimise the area affected e.g. bubble curtains, multiple small charges etc. _____

APPENDIX 2 TEST OF SIGNIFICANCE (7 PART TEST)

	Factor	Yes	No
1	In the case of a threatened species, whether the action proposed is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction: *Comment:*	☐	☐
2	In the case of an endangered population, whether the action proposed is likely to have an adverse effect on the life cycle of the species that constitutes the endangered population such that a viable local population of the species is likely to be placed at risk of extinction: *Comment:*	☐	☐
3	In the case of an endangered ecological community or critically endangered ecological community, whether the action proposed: i) is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction, or ii) is likely to substantially and adversely modify the composition of the ecological community such that its occurrence is likely to be placed at risk of extinction: *Comment:*	☐	☐
4	In relation to the habitat of a threatened species, population or ecological community: i) the extent to which habitat is likely to be removed or modified as a result of the action proposed, and ii) whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed action, and iii) the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species, population or ecological community in the locality: *Comment:*	☐	☐
5	Whether the action proposed is likely to have an adverse effect on critical habitat (either directly or indirectly): *Comment:*	☐	☐
6	Whether the action proposed is consistent with the objectives or actions of a recovery plan or threat abatement plan: *Comment:*	☐	☐
7	Whether the action proposed constitutes or is of a **Key Threatening Process** or is likely to result in the operation of, or increase the impact of, a **Key Threatening Process:** *Comment:*	☐	☐

Revision History

Revision No.	Revision date	Details	Prepared by	Reviewed by	Approved by
00	24/06/2016	Addendum to Statutory Ecological Assessment Arrawarra Caravan Park	Trudy Thompson Senior Environmental Scientist Jason Searle Senior Ecologist Elvira Lanham Principal Ecologist	Julie Whelan Senior Environmental Scientist	Elvira Lanham Principal Ecologist
01	27/06/2016	Addendum to Statutory Ecological Assessment Arrawarra Caravan Park	Trudy Thompson Senior Environmental Scientist	Elvira Lanham Principal Ecologist	

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