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Austasia Leefield Pty Limited

RESPONSE TO SUBMISSIONS: BIODIVERSITY

Pindimar Abalone Farm Project

September 2014

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Prepared by
Umwelt (Australia) Pty Limited

on behalf of
Austasia Leefield Pty Limited

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Report No.	**3430/R01/FINAL**
Date:	**September 2014**

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1.0 Introduction

Austasia Leefield Pty Ltd proposes to develop a land-based Abalone aquaculture farm at 180 Clarke Street, North Pindimar, on the northern shore of Port Stephens in coastal New South Wales. Austasia Leefield Pty Ltd is a small, Australian-owned and locally-based company. The farm's aquaculture operations are proposed to be managed by a qualified marine ecologist with over 30 years' experience in marine ecology research.

A proposal for an Abalone farm on the site was originally granted development consent (under Part 4 of the Environmental Planning & Assessment Act 1979 [EP&A Act]) by Great Lakes Council in 2006. However, an objector appealed to the Land and Environment Court under Section 98 of the EP&A Act against the granting of consent. During the Court hearing, detailed documents were requested which were not able to be immediately produced and the applicant had concerns about the financial implications of the legal proceedings. The applicant therefore agreed to the making of consent orders allowing the appeal and the proposal was withdrawn.

Since that time, a decision to make a new application was made due to the ongoing commercial viability of the proposal and the anticipated scientific, environmental, social and commercial benefits of the development. The farm proposal has been refined by the proponent and it is considered that all documents that would reasonably be required to allow determination of the Project have been produced. The proposal is essentially the same as the previously approved development, with the exception of a change in the proposed yearly production rate (i.e. to 60 tonnes) and certain amendments and improvements resulting from ongoing research and development.

A Major Project Application was lodged on 11 January 2010 and Director General's Requirements received 26 May 2010. The proposal is being assessed under the transitional Part 3A provisions of the EP&A Act as a 'Major Project'. An Environmental Assessment (EA) report was prepared for the Project and submitted to the Department of Planning and Environment (DP&E) on 28 February 2014 (reference MP10_0006).

Umwelt (Australia) Pty Limited (Umwelt) was commissioned by Austasia Leefield Pty Limited to prepare a Response to Submissions document to address issues related to biodiversity that were raised following the exhibition of the Project, as required by Section 75H(6) of the EP&A Act. With regard to biodiversity, responses were received from the NSW Government Office of Environment and Heritage (OEH) and Environment Protection Authority, Great Lakes Council and a range of individual community submissions.

For the purposes of this report, specific sections of each submission below have been noted in **bold** to ensure a clear understanding of the issues raised in the submission, followed by a response in normal type.

2.0 Office of Environment and Heritage Submission

OEH has reviewed the Environmental Assessment (EA), in particular the report titled 'Statement of Effect on threatened flora and fauna for a proposed abalone farm at Lot 2 DP 1014683, Clarke Street, Pindimar, NSW' (prepared by Wildthing Environmental Consultants in December 2013) and notes the following issues:

2.1 Biodiversity Offset Strategy

OEH acknowledges that the proponent has provided a Biodiversity Offset to compensate the loss of biodiversity, including threatened species, ecological communities and their habitat, located in the northern part of the property (i.e. to the north of the proposed development) and as schematically shown on 'Figure 29 – Northern portion of study area showing the location of the proposed offset area'). However, OEH is uncertain if the proposed offset area has been determined in accordance with OEH's offset principles, particularly in regards to quantum (i.e. size) and its 'like-for-like' nature with respect to vegetation types.

The proposed offset area comprises 5.14 hectares and encompasses two ephemeral drainage lines within the Pig Station Creek catchment in the northern portion of the Project Area (refer to Figure 29 of Wildthing (2013)). The proposed offset area contains Moist Riparian Forest; Spotted Gum – Ironbark Open Forest; Smooth-barked Apple - Stringybark Open Forest; and Swamp Mahogany – Paperbark Forest which is listed as an Endangered Ecological Community (EEC) under the Threatened Species Conservation Act.

Table 2.1 below outlines the impacts of the Project and a comparison with the conservation values of the proposed biodiversity offset area. Note the area calculations provided for the offset area are estimates only. The vegetation community mapping and biodiversity offset area was provided in hard copy format only and all boundaries were manually digitised into a GIS format.

Table 2.1 – Proposed Ecological Impact and Biodiversity Offset Comparison

Ecological Communities, Species or Habitat	Proposed Impact from Project	Outcome of Proposed Biodiversity Offset
Vegetation Communities		
Swamp Mahogany Paperbark Forest (EEC – TSC Act)	Disturbance of 0.14 hectares (likely to regenerate)	Present in Offset Area (0.21 hectares)
Ironbark - Tallowwood Open Forest	Clearing (permanent) of 0.7 hectares and disturbance(ground layer only) of 1 hectare	Not present
Spotted Gum - Ironbark Open Forest	Not present	Present in Offset Area (3.8 hectares)
Coastal Sand Apple Blackbutt Forest	Clearing of 0.35 hectares and disturbance(understorey only) of 0.1 hectare	Not present
Smooth-barked Apple - Stringybark Open Forest	Not present	Present in Offset Area (0.45 hectares)
Moist Riparian Forest	Not present	Present in Offset Area (0.67 hectares)
Saltmarsh (EEC – TSC Act; VEC – EPBC Act)	Minimal (post holes)	Not present
Mangroves	No mature mangroves (minor pneumatophores disturbance)	Not present
Total Areas	Clearing (1.16 hectares) Disturbance (1.24 hectares)	5.14 hectares
Species/Species Group		
Wallum froglet	Temporary disturbance of 0.14 hectares (likely to regenerate)	Present in Offset Area (0.21 hectares)
Little lorikeet	Clearing of approximately 1 hectare of foraging habitat and up to 13 nest trees	Approximately 5.1 hectares of foraging habitat and artificial nest boxes at ratio of 2:1
Grey-headed flying fox	Clearing of approximately 1 hectare of foraging habitat	Approximately 5.1 hectares of foraging habitat
Koala	Clearing of approximately 1 hectare of foraging habitat	Approximately 5.1 hectares of foraging habitat
Threatened micro-bats	Clearing of approximately 2.4 hectares of foraging habitat and up to 13 roost trees	Approximately 5.1 hectares of foraging habitat and artificial nest boxes at ratio of 2:1

Based on the proposed area of clearing (1.16 hectares) and the area to be modified/disturbed (1.24 hectares) the proposed offset ratio is approximately 2.1:1. The key ecological impacts of the Project include the loss of 0.14 hectares of Swamp Mahogany Paperbark Forest EEC which is proposed to be offset with 0.21 hectares of Swamp Mahogany Paperbark Forest EEC to the north of the impact area. The proposed offset is considered to comprise an adequate 'like-for-like' offset for the community at an approximate 2:1 ratio.

While the loss of remaining woodland and open forest communities are not proposed to be offset in a strictly 'like-for-like' sense, the provision of 4.92 hectares of structurally and floristically similar vegetation communities is considered to adequately compensate for the loss of these communities and is considered to be in accordance with OEH's NSW offset principles for major projects (state significant development and state significant infrastructure).

The proposed offset area provides a direct, 'like-for-like' offset for the threatened fauna species that are expected to be impacted as a result of the Project. The proposed offset provides approximately 5.1 hectares of foraging habitat for the affected species and the modification of existing habitat within the proposed offset area with nest boxes ensures that the loss of roosting/nesting habitat is adequately compensated.

The proposed offset strategy provides a high quality, appropriately located conservation area to compensate for the residual impacts of the Project on biodiversity, that meets the NSW offset principles for major projects policy, as discussed below.

OEH's Director General Requirements (DGRs) required any determination of an appropriate offset needed to be undertaken in accordance with OEH guidelines/policies. As such any proposed offset package should be assessed against:

(1) OEH's NSW offset principles for major projects (state significant development and state significant infrastructure); or

(2) The requirements of the BioBanking Assessment Methodology (DECC 2008) utilising the 'BioBanking Assessment Methodology and Credit Calculator Operation Manual (DECC 2009)

The Project is not seeking a BioBanking agreement due to the lack of suitable credits required by the Project being on the market and the availability of suitable BioBanking offset sites in the region. The Project is therefore subject to an assessment in accordance with the *NSW offset principles for major projects (state significant development and state significant infrastructure)*, in accordance with the DGRs.

The NSW Government is currently developing a new approach to guide how biodiversity offsets are established for major projects (state significant development and state significant infrastructure). Still in its draft form, the draft NSW Biodiversity Offsets Policy for Major Projects is designed to clarify, standardise and improve the biodiversity offsetting for major project approvals. The policy will (when formally released) be applied to all developments and infrastructure that are considered to be significant to the state under the *Environmental Planning and Assessment Act 1979*. The NSW Biodiversity Offsets Policy for Major Projects includes a credit calculator called the Framework for Biodiversity Assessment (the FBA) which calculates the number of biodiversity credits required in order to offset the project.

Currently, the OEH guidelines *Principles for the Use of Biodiversity Offsets in NSW* (DECC 2008) provide a formal approach through which biodiversity offsetting can be measured. The NSW Government has developed (August 2013) seven principles to be used in assessing impacts to biodiversity and determining acceptable offsets for state significant development and state significant infrastructure projects. The sections below outline these biodiversity offsetting principles for State Significant Development that have been taken into account in the development of the Biodiversity Offset Strategy. The Biodiversity Offset Strategy is consistent with the principles for the use of biodiversity offsets in NSW as outlined in the following section.

1. **Before offsets are considered, impacts must first be avoided and unavoidable impacts minimised through mitigation measures. Only then should offsets be considered for the remaining impacts.**

> Offsets sit within a hierarchy of 'avoid, minimise, offset'. The first priority in a development proposal is always to avoid any unnecessary impact to biodiversity. Where impacts cannot be avoided, a reasonable attempt should be made to minimise the impact as much as possible. After all feasible measures have been taken to avoid or minimise impacts to biodiversity, offsets should be used to compensate for any remaining impacts (OEH 2013).

The Project has been designed to avoid disturbance to the ecological features of the Project Area where possible, whilst maintaining the economic feasibility and practicality of the Project. Key project avoidance measures undertaken as part of the Project include the use of existing access tracks, construction of raised piping to avoid impacts to terrestrial fauna mobility, minimisation of tree and seagrass removal and avoidance of SEPP 14 wetlands.

Where impacts on ecological features were unavoidable, an impact mitigation strategy was developed that addressed the mitigation of these impacts, including sediment and erosion control, weed and feral animal control and surface water management. Additional mitigation strategies that relate to the minimisation of impacts to threatened species include supervision of hollow-bearing tree clearing, nest box installation in retained vegetation at a rate of 2:1 for every tree hollow lost, the raising of pipes to above 200 millimetres to allow free movement of the koala across the site and the minimisation of lighting to reduce impacts, particularly to threatened fauna such as micro-bats.

The impact mitigation and management strategies included as part of the Project will be detailed in a Vegetation Management Plan which will be prepared prior to construction.

2. **Offset requirements should be based on a reliable and transparent assessment of losses and gains.**

> Offsetting decisions should be based on a reliable and transparent assessment of the loss in biodiversity due to the development proposal and the likely gain in biodiversity through the offset. For terrestrial biodiversity, established assessment tools, such as the BioBanking Assessment Methodology, are considered best practice. This methodology is currently being reviewed and refined to ensure it is as robust as possible (OEH 2013).

The Biodiversity Offset Strategy has been developed through detailed consideration of predicted impacts on known records of threatened species and EECs (including their habitats), which have been identified and discussed in detail in Wildthing (2013). The impacts of the Project are considered to be well know and described in the Environmental Assessment (City Plan Services 2014)) and can be considered reliable and transparent. The selection of the biodiversity offset area took into account identified impacts, and aimed to provide a 'like-for-like' (or similar) offset for impacted vegetation communities, EECs and threatened fauna species.

The area of impact has been derived from GIS mapping of project boundaries and impact areas, and the ecological survey, mapping and impact assessments have been completed by qualified ecologists with considerable experience in the region. Extensive surveying has been undertaken at appropriate seasonal times to adequately determine the likely subject species and assess impacts.

3. Offsets must be targeted to the biodiversity values being lost or to higher conservation priorities.

> Offsets should reflect the biodiversity values, including threatened species and their habitat, that are being lost. This should be on a like-for-like basis for NSW-listed species and ecological communities that are also nationally listed. Like-for-like is preferable for ecological communities, threatened species and their habitat that are only listed in NSW. However, where offset sites that are exactly like-for-like are not reasonably available, offsets may include vegetation communities of a similar type or a type of a higher conservation priority, or threatened species of a higher conservation priority (OEH 2013).

The development of the Biodiversity Offset Strategy has been based on addressing the identified ecological impacts of the Project. These impacts have been identified via a thorough survey and assessment process, which has been described in detail within the flora and fauna assessment (Wildthing 2013). Following the identification of impact, the Biodiversity Offset Strategy has been designed to provide appropriate offset outcomes targeted at each of the major impacts on biodiversity.

The biodiversity offset area provides a direct, 'like-for-like' offset for the Swamp Mahogany Paperbark Forest EEC and all key fauna species habitats that are likely to be adversely impacted by the Project

4. Offsets must be additional to other legal requirements.

> The biodiversity protection and management requirements of an offset must be in addition to any legal requirements already in place for biodiversity on that land. This includes, for example, any existing legal restrictions on clearing under the *Native Vegetation Act 2003.* Improvements in the condition of native vegetation not currently required by other legislation would count as an offset (OEH 2013).

The land-based offsets proposed as part of the Biodiversity Offset Strategy do not overlap with any other legal requirements or government funded protection or habitat restoration program on the site. The proposed biodiversity offset area is located on currently non-reserved land and will be protected under a long-term conservation mechanism.

5. Offsets must be enduring, enforceable and auditable.

> Offset sites must be subject to good governance arrangements to ensure they are not inadvertently developed in the future. This includes having an appropriate plan of management, resourcing for management, legal security and accountability mechanisms. For terrestrial offsets, a BioBanking Agreement or addition to the NSW national parks system are the preferred mechanisms for securing an offset site. The purchase and retirement of biodiversity credits under the BioBanking Scheme, where appropriate credits are available, also meets the requirement for good governance arrangements.
>
> Suitable offsets must be determined prior to approval. However the offset does not need to be finalised (e.g. be purchased or have relevant protection over it) prior to approval, providing it is subject to a suitable mechanism that will remain enforceable after the project has been completed (OEH 2013).

The biodiversity offset area will be secured for long-term conservation. The mechanism for securing this conservation will be determined in consultation with the relevant government agencies.

6. Supplementary measures can be used in lieu of offsets.

> For terrestrial offsets, supplementary measures can be used in lieu of offsets in situations where land based offsetting is not feasible or practical. The supplementary measure must be relevant to the biodiversity value being impacted. The monetary value of a supplementary measure is to be determined by an appropriate method that is repeatable and transparent. Examples of supplementary measures include the provision of funds for:
>
> - Biodiversity research or surveys
> - Recovery of threatened species
> - Community education and awareness programs
>
> Supplementary measures may also be used to compensate for impacts on aquatic biodiversity (OEH 2013).

The Biodiversity Offset Strategy does not propose supplementary measures.

7. Offsets can be discounted where significant social and economic benefits accrue to NSW as a consequence of the proposal.

> While an outcome in which biodiversity values are improved or maintained is preferred, it is acknowledged that in some circumstances flexibility may be required, especially in the context of a project providing significant social or economic benefits to NSW (OEH 2013).

The Biodiversity Offset Strategy has not been discounted.

Summary of Biodiversity Offset Strategy

The proposed Project will result in the clearing of 5.14 hectares of high conservation value vegetation and fauna habitat, including threatened fauna habitat and an EEC. The key ecological impacts of the Project include the loss of 0.14 hectares of Swamp Mahogany Paperbark Forest EEC which is proposed to be offset with 0.21 hectares of Swamp Mahogany Paperbark Forest EEC to the north of the impact area, which is considered to comprise an adequate 'like-for-like' offset at an approximate 2:1 ratio.

While the loss of remaining woodland and open forest communities are not proposed to be offset in a strictly 'like-for-like' sense, the provision of 4.92 hectares of structurally and floristically similar vegetation communities is considered to adequately compensate for the loss of these communities and is considered to be in accordance with OEH's NSW offset principles for major projects (state significant development and state significant infrastructure).

The proposed offset area provides a direct, 'like-for-like' offset for the threatened fauna species that are expected to be impacted as a result of the Project. The proposed offset provides approximately 5.1 hectares of foraging habitat for the affected species and the modification of existing habitat within the proposed offset area with nest boxes ensures that the loss of roost/nesting trees is adequately compensated.

The proposed offset strategy provides a high quality, appropriately located conservation area to compensate for the residual impacts of the Project on biodiversity, which meets the NSW offset principles for major projects policy, as discussed in detail above.

2.2 Impacts of the Project on Coastal Saltmarsh EEC

OEH also notes that the proposed pipeline route across the area of Coastal Saltmarsh endangered ecological community (EEC), appears to now involve the placement of this infrastructure underground, thus resulting in a greater impact to this threatened vegetation type. Previously OEH was of the understanding the pipeline was to be laid on the ground surface resulting in minimal disturbance. If this has now changed and the pipeline will be buried, OEH would expect that an appropriate additional offset, in accordance with the above mentioned policies, be provided specifically for the Coastal Saltmarsh EEC.

It is not proposed to place the proposed pipeline route underground and adverse impacts to Coastal Saltmarsh EEC are not predicted as a result of the Project. The impact of the Project on Coastal Saltmarsh EEC is limited to the construction of pylon locations for the emergency egress across Pig Station Creek as discussed in Section 1.2 in the Wildthing (2013) report.

Additional offsets for Coastal Saltmarsh EEC are therefore not required.

2.3 Conservation of Proposed Offsets

OEH acknowledges that the proponent intends to apply an appropriate mechanism to conserve and manage any offset lands in perpetuity, as outlined in Section 5.8.3 of the EA and Section 10 of the flora and fauna report. Both these documents state: 'the legal mechanism to manage the land shall be determined with government agency stakeholders should the project gain approval'. OEH is of the opinion that the proposed mechanism for the conservation should be provided pre-approval. As such OEH requests the proponent to identify the conservation mechanisms to be used to ensure the long term protection and management of the offset sites.

With respect to managing and conserving any proposed offset in perpetuity, OEH considers and supports the following as appropriate conservation mechanisms:

- ***the establishment of BioBanking Sites with BioBanking agreements under the TSC Act;***
- ***the dedication of the land under the National Parks and Wildlife Act 1974 (NPWS Act);***
- ***a Conservation Agreement under the NPW Act;***
- ***a Planning Agreement under Section 93F of the Environmental Planning and Assessment Act 1979 (EP&A Act); and***
- ***A trust agreement under the Nature Conservation Act 2001.***

The Project is not seeking a BioBanking agreement due to the lack of suitable credits required by the Project being on the market and the availability of suitable BioBanking offset sites in the region and OEH note that that they are currently unlike to support a Conservation Agreement under the NPW Act.

Austasia Leefield Pty Ltd will determine the most appropriate mechanism for the long-term conservation of the site in consultation with OEH and the Department of Planning.

2.4 Vegetation Management Plan

The DGRs specified that an appropriate Management Plan (such as vegetation of habitat) be developed as a key amelioration measure. These plans should be prepared prior to any potential approval of the development. OEH acknowledges that the EA indicates that a Vegetation Management Plan or similar will be prepared, but this has not been included in the EA. OEH is of the opinion such plans should be incorporated in the EA or provide pre-approval.

A Vegetation Management Plan will be prepared, outlining protocols for the management of retained vegetation within the site, including the conservation area. This will include the mitigation measures for vegetation management across the site including reducing impacts on tree root zones, weed management for lantana (*Lantana camara*) and bitou bush (*Chrysanthemoides monilifera*) and the transplanting (where required) of mangrove seedlings from within the trenching footprint. This plan will encompass measures applicable during the construction and operational phases.

The structure of the Vegetation Management Plan would be guided by the (former) DIPNR's guidelines (2004), and would generally incorporate the following elements:

- **Background**: including introduction, project description, environmental policy;
- **Environmental Management**: including environmental management structure and responsibility, approval and licensing requirements, emergency contacts and response;
- **Implementation**: including risk assessments, environmental management activities and controls, and environmental schedules; and
- **Monitor and Review**: including environmental monitoring measures, corrective actions and provisions for the Vegetation Management Plan review.

The Vegetation Management Plan will be prepared in consultation with OEH and the Department of Planning and Environment and will consider the range of factors identified in OEH's submission on the Project. The site issues are not considered unmanageable and therefore, it is considered appropriate that the Vegetation Management Plan will be prepared post approval but prior to construction.

3.0 Great Lakes Council Submission

Great Lakes Council note: a number of ecological constraints have been identified on the site including the presence of endangered ecological communities, regionally significant remnant native vegetation communities, threatened species habitats, old growth attributes and hollow-bearing trees, koala habitat (SEPP 44), seagrass beds and mangroves, foreshore lands, a Marine Park, and OEH identified key regional corridor and key regional habitat for priority forest fauna.

3.1 State Environmental Planning Policy 44 – Koala Habitat

The Flora and Fauna Report states 'a mother and young was sighted in 2012 to the north-west [north-east] of the study area on Clarke Road [Street] adjacent to the neighbouring Lot 3'. In addition, Koala scats have been recorded on the land during previous surveys of 2002 and in recent surveys of 2010. Interrogations of the Atlas of

NSW Wildlife reveal records of the Koala on the land in 1995 and in various other locations and dates nearby.

Therefore there is enough justified evidence to consider the land as Core Koala Habitat and a Koala Plan of Management should be prepared.

State Environmental Planning Policy 44 (SEPP 44) – Koala Habitat Protection defines 'Core Koala Habitat' as an area of land with a resident population of koalas, evidenced by attributes such as breeding females (that is, females with young) and recent sightings of and historical records of a population. As stated in the *Statement of Effect on Threatened Flora and Fauna* (Wildthing 2013) and reiterated in the submission, there are recent and historical records of koalas within the Project Area and surrounds. Although this species was not recorded during the targeted surveys, the sighting of the female koala with a joey near the Project Area and the recent and historical records of koalas within and surrounding the Project Area implies (according to the definition in the SEPP) that the Project Area does represent 'Core Koala Habitat'.

Therefore, in accordance with the requirements of SEPP 44, the proponent will prepare a site specific Koala Plan of Management prior to construction and in consultation with OEH.

3.2 Aquatic Health Monitoring

Baseline and ongoing aquatic health monitoring program needs to be developed to assess long term impact of the discharge.

A detailed Water Quality Monitoring Plan will be prepared to develop a water quality monitoring program that will be implemented prior to construction. The Plan will include the collection of monthly water samples from around the discharge points and analysis of a number of water quality parameters including nutrients. Key marine water quality parameters measured will include salinity, dissolved oxygen, pH and Total Nitrogen with monitoring undertaken on a regular basis, for both water intake (*into the farm*) and release (*from the farm to Port Stephens*) points.

The Water Quality Monitoring Plan will be prepared in accordance with government regulatory requirements and Project approval conditions. It would be subject to approval by relevant authorities and will identify monitoring requirements and water quality trigger values.

A detailed Seagrass Monitoring Plan will also be developed that includes monitoring of epiphyte loads as a surrogate for increased nutrient load within seagrass areas.

3.3 Impact on Hollow Bearing Trees

There are inconsistencies between the s5A assessments and other sections of the Flora and Fauna Report between the number of nesting/roosting trees to be removed.

A maximum of 13 hollow-bearing trees are proposed to be removed by the Project. There are four numerical errors in Appendix A (Considerations under Section 5A of the EP&A Act) where the total number of hollow-bearing trees impacted is documented as being four rather than 13. These errors have been made in question (g) of the seven-part tests of significance in relation to the *Key Threatening Process (KTP) – removal of hollow-bearing trees* for the turquoise parrot, masked owl, common planigale/brush-tailed phascogale and long-nosed potoroo/rufous bettong.

Umwelt has reviewed the outcomes of the Wildthing (2013) assessment and considers that the conclusions drawn from the Section 5A assessments were made in consideration of 13 hollow-bearing trees being removed. Similarly, the loss of hollow-bearing trees is not expected to be significant and the proposed impact mitigation strategy includes the installation of nest boxes at a ratio of 2:1 for every tree hollow lost as a result of the Project.

3.4 EPBC Act Assessment

The appended Matters of National Environmental Significance Report (Appendix G of the Flora and Fauna Report) is dated 18 January 2012 and is out of date.

An updated Environment Protection and Biodiversity Conservation Act (EPBC Act) Protected Matters search was undertaken on 6 August 2014. The updated report identified two additional threatened ecological communities (TECs), 13 additional threatened species and nine additional migratory species that were not identified in the January 2012 report. Although not present in the original protected matters search (dated 18 January 2012), three of the threatened species and one of the migratory species appearing on the new search were assessed in Section 9.0 of the *Statement of Effect on Threatened Flora and Fauna* (Wildthing 2013). **Tables 3.1** and **3.2** below outlines the species and communities that were identified in the new search that were not assessed in the Wildthing (2013) report.

Table 3.1 – Threatened Ecological Communities Recorded in the Updated EPBC Act Protected Matters Search (August 2014)

Ecological Community	EPBC Status	Likelihood to Occur within Project Area	Additional Assessment Required?
Lowland Rainforest of Subtropical Australia	CEEC	Low	No
Subtropical and Temperate Coastal Saltmarsh	VEC	Occurs in Project Area	No*

Table 3.2 – Additional Threatened and Migratory Species Recorded in the Updated EPBC Act Protected Matters Search (August 2014)

Scientific Name	Common Name	EPBC Status	Likelihood to Occur within Project Area	Additional Assessment Required?
Diomedea epomophora epomophora	Southern royal albatross	V/MIG	Pelagic Species – Very Low	No
Diomedea epomophora sanfordi	Northern royal albatross	E/MIG	Pelagic Species – Very Low	No
Diomedea exulans exulans	Tristan albatross	E/MIG	Pelagic Species – Very Low	No
Diomedea exulans	Wandering albatross	V/MIG	Pelagic Species – Very Low	No
Thalassarche eremita	Chatham albatross	E/MIG	Pelagic Species – Very Low	No
Thalassarche melanophris	Black-browed albatross	V/MIG	Pelagic Species – Very Low	No
Epinephelus daemelii	Black rock cod	V	Low	No
Asperula asthenes	Trailing woodruff	V	Low	No

Table 3.2 – Additional Threatened and Migratory Species Recorded in the Updated EPBC Act Protected Matters Search (August 2014) (cont.)

Scientific Name	Common Name	EPBC Status	Likelihood to Occur within Project Area	Additional Assessment Required?
Phaius australis	Lesser swamp-orchid	E	Low	No
Streblus pendulinus	Siah's backbone	E	Low	No
Manta birostris	Giant manta ray	MIG	Low	No
Sousa chinensis	Indo-pacific humpback dolphin	MIG	Low	No

Note:
CEEC Critically Endangered Ecological Community
E Endangered
MIG Migratory
V Vulnerable
VEC Vulnerable Ecological Community
* Vulnerable Ecological Communities are not listed as Matters of National Environmental Significance and are therefore not subject to an assessment of Significance under the EPBC Act.

The results of the updated EPBC Protected Matters Search are not considered to alter the outcomes of the original EPBC Act assessment in Section 9 of the *Statement of Effect on Threatened Flora and Fauna* (Wildthing 2013).

3.5 Impact on Aquatic Features and Values

The findings of the Flora and Fauna Report are ambiguous and do not explicitly identify the type and degree of impacts to mangroves. In the executive summary it states 'no mangroves are required to be removed for the boardwalk. A small amount of pneumatophores may be affected.' However later in the report it states 'the boardwalk is to be constructed without the removal of any <u>mature</u> Mangrove Trees [emphasis added]. Howeve a small number of branches may be required to be removed.'

No mature mangroves will be removed during the construction of the boardwalk as a single vehicle track already exists in this area. Some pneumatophores will be disturbed during the drilling of the post holes but this disturbance is considered to be minimal. Additionally, mitigation measures including the transplantation of small mangrove seedlings (<1 metre) from the trench footprint into other locations will be undertaken (where required).

3.6 Proposed Conservation Area

A 5.14 hectare conservation area has been proposed that follows vegetation associated with Pig Station Creek on the subject land. This equates to a 2:1 offset ratio. No evaluation appears to be provided to validate the offset area in respect of the BioBanking Assessment Methodology or similar for both ecosystem and threatened species credit values.

The proposed offset area is 5.14 hectares and encompasses two ephemeral drainage lines within the Pig Station Creek catchment in the northern portion of the Project Area (refer to Figure 29 of Wildthing (2013)). The proposed offset area contains Moist Riparian Forest, Spotted Gum – Ironbark Open Forest, Smooth-barked Apple - Stringybark Open Forest and Swamp Mahogany – Paperbark Forest EEC.

An assessment of the proposed biodiversity offset area against the OEH guidelines *Principles for the Use of Biodiversity Offsets in NSW* (DECC 2008) is included in **Section 2.1.2** above which details the Biodiversity Offset Strategy policy framework. The proposed biodiversity offset area provides a direct, 'like-for-like' offset for the Swamp Mahogany Paperbark Forest EEC and all key threatened fauna species habitats that are likely to be adversely impacted by the Project. The Biodiversity Offset Strategy has been developed in accordance with the NSW Government *Principles for the Use of Biodiversity Offsets in NSW* (DECC 2008).

This offset area is apparently supported by the Office of Environment and Heritage (OEH) during consultation. The most heavily impacted vegetation communities on the development site and Ironbark/Tallowwood Open Forest and Coastal Sands Apple Blackbutt Open Forest. Approximately 24 Tallowwoods will be removed, which are a preferred local Koala Food Tree species and potentially utilised by Koalas on the subject land. These two communities do not occur in the proposed Conservation Area.

Although the proposed Biodiversity Offset Area does not contain Ironbark - Tallowwood Open Forest and Coastal Sands Apple Blackbutt Open Forest, it contains two structurally and floristically similar communities. The Spotted Gum – Ironbark Open Forest and Smooth-barked Apple - Stringybark Open Forest communities within the proposed biodiversity offset area are considered to adequately represent the various habitat types known to occur in the Ironbark - Tallowwood Open Forest and Coastal Sands Apple Blackbutt Open Forest communities. In addition, Tallowwood (*Eucalyptus microcorys*) is listed as a co-dominant canopy species in the Spotted Gum Ironbark Forest community of which there is 3.8 hectares within the proposed Biodiversity Offset Area that will provide suitable koala habitat.

Therefore the size, relevance (i.e. like for like) and functional appropriateness of the proposed conservation area in compensating impacts on vegetation communities and threatened species habitat caused by the proposed development is not considered to be sufficient.

The proposed Project will result in the clearing of 2.4 hectares of high conservation value vegetation and fauna habitat, including threatened fauna habitat and EEC. The key ecological impacts of the Project include the loss of 0.14 hectares of Swamp Mahogany Paperbark Forest EEC which is proposed to be offset with 0.21 hectares of Swamp Mahogany Paperbark Forest EEC to the north of the impact area, which is considered to comprise an adequate 'like-for-like' offset at an approximate 2:1 ratio.

While the loss of remaining woodland and open forest communities are not proposed to be offset in a strictly 'like-for-like' sense, the provision of 4.92 hectares of structurally and floristically similar vegetation communities is considered to adequately compensate for the loss of these communities and is considered to be in accordance with OEH's NSW offset principles for major projects (state significant development and state significant infrastructure).

The proposed offset area provides a direct, 'like-for-like' offset for the threatened fauna species that are expected to be impacted as a result of the Project. The proposed offset provides approximately 5.1 hectares of foraging habitat for the affected species and the modification of existing habitat within the proposed offset area with nest boxes ensures that the loss of roost/nesting trees is adequately compensated.

The proposed offset strategy provides a high quality, appropriately located conservation area to compensate for the residual impacts of the Project on biodiversity, that meets the NSW offset principles for major projects policy, as discussed in detail above.

Wallum Froglet habitat has also not been confirmed in the proposed Conservation Area.

The wallum froglet (*Crinia tinnula*) was not recorded within the proposed offset area, however the area was not surveyed for amphibians during the flora and fauna surveys. The vegetation community in which the wallum froglet was recorded in the Project Area (Swamp Mahogany Paperbark Forest) does occur within the proposed Offset Area and it is considered likely that this species will occur in the proposed offset area.

It is noted that an earlier proposal for the Abalone Farm on this land (DA313/2003) was associated with a 26.5 hectare proffered for 1 hectare of clearing for the development. In comparison, the current proposal offers only 5.14 hectares of habitat to be conserved for 2.4 hectares of clearing without appropriate conservation of like-for-like habitat.

Therefore the proposed Conservation Area is considered to be of an insufficient area and an inadequate off-set to the cleared and impacted habitat. In addition, no detail is provided on the effective mechanism associated with long-term conservation management.

As discussed above, the proposed offset strategy is considered to provide a high quality, appropriately located conservation area to compensate for the residual impacts of the Project on biodiversity, that meets the NSW offset principles for major projects policy.

Austasia Leefield Pty Ltd will determine the most appropriate mechanism for the long-term conservation of the site in consultation with OEH and the Department of Planning and Environment.

A proper assessment to be undertaken on the impact upon the Glossy Black Cockatoo and the Green Turtle.

Glossy Black-cockatoo

Wildthing (2013) identified potentially suitable foraging habitat in the form of *Allocasuarina torulosa* (Forest Oak), *Allocasuarina littoralis* (Black sheoak) and to a lesser extent *Casuarina glauca* (Swamp Oak) within the Project Area. Suitable large nesting hollows were also observed. Targeted surveys for the species did not identified any secondary indications of the species through the presence of chewed cones of *Allocasuarina* spp. beneath potential feed trees.

Umwelt has prepared a 7 Part Test, in accordance with Section 5A of the Environmental Planning & Assessment Act 1979 to determine the impact of the Project on this species.

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;

The glossy black-cockatoo (*Calyptorhynchus lathami*) is known to occur along the east coast of Australia, from Victoria through to southern Queensland and inland to the southern tablelands and central western plains. On the coast, this species Inhabits open forest and woodlands where stands of sheoak occur. Black Sheoak (*Allocasuarina littoralis*) and Forest Sheoak (*A. torulosa*) are an important food resource for this species. Wildthing (2013) identified potentially suitable foraging habitat in the form of *Allocasuarina torulosa* (Forest Oak), *Allocasuarina littoralis* (Black sheoak) and to a lesser extent *Casuarina glauca* (Swamp Oak) within the Project Area. Suitable large nesting hollows were also observed.

Targeted surveys for the species did not identify any secondary indications of the species presence through the chewed cones of *Allocasuarina* spp. beneath potential feed trees.

Allocasuarina species were identified in Coastal Sand Blackbutt Open Forest; Ironbark - Tallowwood Open Forest; Grey Gum – Tallowwood - Ironbark Open Forest; and Spotted Gum - Ironbark Open Forest within the Project Area and proposed offset area. The Project will result in the loss or modification of approximately 2.15 hectares of vegetation that contains suitable feed trees for the glossy black-cockatoo (*Calyptorhynchus lathami*), which is not expected to have an adverse effect on the life cycle of the species, such that 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;

Not applicable.

c) in the case of an endangered ecological community or critically endangered ecological community, whether the action proposed;

Not applicable.

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;

The Project will result in the loss or modification of approximately 2.15 hectares of vegetation that contains suitable feed trees for the glossy black-cockatoo.

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

The Project will not introduce significant barriers for this highly mobile species such that it will prevent movement of individuals between proximate areas of habitat. As some potential foraging habitat will be removed as part of the Project, the level of fragmentation and isolation will increase for this species. However, given the extensive area of suitable habitat in the surrounding area and the high mobility of this species, the level of fragmentation and isolation increase is unlikely to significantly impact on this species.

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;

It is likely that suitable habitat to be modified or removed in the Project Area comprises part of a much larger foraging range for the species, and this is not expected to affect the long-term survival of the species as substantial foraging and breeding habitat for this species occurs in the surrounding area.

e) whether the action proposed is likely to have an adverse effect on critical habitat (either directly or indirectly);

No critical habitat has been listed within or adjacent to the Project Area for this threatened species. The Project will not have an adverse effect on any critical habitat.

f) whether the action proposed is consistent with the objectives or actions of a recovery plan or threat abatement plan; and

A recovery plan has not been prepared for this species. There are no threat abatement plans of relevance to the Project.

g) whether the action proposed constitutes or is part of a key threatening process or is likely to result in the operation of, or increase the impact of, a key threatening process.

The Project will contribute to the operation of the following key threatening processes relevant to the species:

- clearing of native vegetation (TSC Act);
- human-caused climate change (TSC and FM Act);
- loss of hollow-bearing trees (TSC Act);
- predation by the feral cat (*Felis catus*) (TSC Act); and
- competition by feral honeybees (TSC Act).

Conclusion

Based on the information provided above, and considering the application of the precautionary principle, the Project is unlikely to result in a significant impact on the glossy black-cockatoo (*Calyptorhynchus lathami*). Further, approximately 4.92 hectares of suitable foraging habitat is provided in the proposed biodiversity offset area.

Green Turtle (*Chelonia mydas*)

The green turtle is listed as vulnerable under the Threatened Species Conservation Act and vulnerable under the Commonwealth Environment Protection and Biodiversity Conservation Act 1999. An assessment of significance under state and commonwealth legislation has been prepared below for this species, in accordance with the requirements of the GLC submission.

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;

Green turtles (*Chelonia mydas*) occur in seaweed-rich coral reefs and inshore seagrass pastures in tropical and subtropical areas of the Indo-Pacific region. This species has been recorded in Port Stephens. The construction and ongoing operation of the Abalone Farm will result in minimal impacts to aquatic species and habitats adjacent to the site or in the estuary in general (BioAnalysis 2013). There will be direct impact to approximately 40m^2 of *Posidonia australis* seagrass as a result of laying inlet and outlet pipelines into the estuary. This will not have any significant impact on the viability of the local population of *Posidonia australis* within the Port Stephens estuary or result in a net loss of *Posidonia australis* seagrasses within the coastal and estuarine waters of NSW and as such, the Project is considered unlikely to have an adverse impact on the life cycle of the green turtle, 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;

Not applicable.

c) in the case of an endangered ecological community or critically endangered ecological community, whether the action proposed;

Not applicable.

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;

The Project will result in the loss or modification of approximately 40m^2 of *Posidonia australis* seagrass as a result of laying inlet and outlet pipelines into the estuary.

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

The Project will not introduce significant barriers for this highly mobile species such that it will prevent movement of individuals between proximate areas of habitat.

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;

It is likely that suitable habitat to be modified or removed in the Project Area comprises part of a much larger range for the species, and this is not expected to affect the long-term survival of the species as substantial foraging habitat for this species occurs in the estuary.

e) whether the action proposed is likely to have an adverse effect on critical habitat (either directly or indirectly);

No critical habitat has been listed within or adjacent to the Project Area for this threatened species. The Project will not have an adverse effect on any critical habitat.

f) whether the action proposed is consistent with the objectives or actions of a recovery plan or threat abatement plan; and

A recovery plan has not been prepared for this species. There are no threat abatement plans of relevance to the Project.

g) whether the action proposed constitutes or is part of a key threatening process or is likely to result in the operation of, or increase the impact of, a key threatening process.

The Project will contribute to the operation of the following key threatening processes relevant to the species:

- clearing of native vegetation (TSC Act); and

- human-caused climate change (TSC and FM Act);

Conclusion

Based on the information provided above, and considering the application of the precautionary principle, the Project is unlikely to result in a significant impact on the green turtle (*Chelonia mydas*).

EPBC Act Assessment

Green turtles (*Chelonia mydas*) occur in seaweed-rich coral reefs and inshore seagrass pastures in tropical and subtropical areas of the Indo-Pacific region. In Australia, there are seven regional populations of green turtles that nest in different areas; the southern Great Barrier Reef, the northern Great Barrier Reef, the Coral Sea, the Gulf of Carpentaria, Western Australia's north-west shelf, the Ashmore and Cartier Reefs and Scott Reef. This species has been recorded in Port Stephens.

In this case, an *important population* is a population that is necessary for a species' long-term survival and recovery. This may include populations that are:

- key source populations either for breeding or dispersal; or
- populations that are necessary for maintaining genetic diversity, and/or
- populations that are near the limit of the species' range.

This species has been recorded in Port Stephens and a one individual is known to be a resident. However, the presence of this species does not represent an "*important population*" as it isn't considered to be a key source population either for breeding or dispersal, a population that is necessary for maintaining genetic diversity, or a population that is near the limits of the species range.

An action has, will have, or is likely to have a significant impact on threatened species if it does, will, or is likely to:

- **lead to a long-term decrease in the size of an important population of a species;**

An important population of green turtles is not considered to be present in Port Stephens. The Project is therefore considered unlikely to lead to a long-term decrease in the size of an important population of this species.

- **reduce the area of occupancy of an important population, or;**

An important population of green turtles is not considered to be present in Port Stephens. The Project is therefore considered unlikely reduce the area of occupancy of an important population of this species.

- **fragment an existing important population into two or more populations, or;**

An important population of green turtles is not considered to be present in Port Stephens. The Project is therefore considered unlikely to result in the fragmentation of an important population of this species into two or more populations.

- **adversely affect habitat critical to the survival of a species, or;**

There will be direct impact to approximately 40m^2 of *Posidonia australis* seagrass which is a food source for the green turtle. The habitat to be impacted (foraging) is not considered to be habitat critical to the survival of the species.

- **disrupt the breeding cycle of an important population, or;**

An important population of green turtles is not considered to be present in Port Stephens. The Project is therefore considered unlikely to disrupt the breeding cycle of an important population of the species.

- **modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline, or;**

The loss of potential foraging habitat within the Project Area is not likely to modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline.

- **result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat;**

There are not any invasive species that are likely to become established as a result of the Project that may have an impact upon any habitat relevant to the green turtle.

- **introduce disease that may cause the species to decline; or**

There are no diseases implicated in the decline of the green turtle. The Project is not expected to introduce any diseases that may cause this species to decline.

- **interfere substantially with the recovery of the species.**

No significant effect on the recovery of the green turtle is expected to occur as a result of the Project.

Conclusion

An important population of green turtles is not considered to be present in Port Stephens. The Project is unlikely to result in a significant impact upon an *important population* of green turtle.

4.0 Environment Protection Authority Submission

At the adequacy stage of the assessment the EPA advised the most likely adverse affect, if it did occur, would be adverse impacts on nearby seagrass beds caused by localised increased nutrient levels. The contention made in the EA and Dilution Report that the proposed effluent discharge is similar to urban stormwater discharges is incorrect. Rainfall events over urban areas tend to cause brief pulses of stormwater whereas the proposed effluent would be discharged continually. Continuous discharge of effluent greatly increases the potential for impacts on the ecology surrounding the discharge location.

The EA states that:

> 'the farm will result in a more 'steady' nutrient load compared to many natural sources (which are highly intermittent) and in this regard the farm could be expected to have Total Nitrogen loads more like those from urbanised portions of the Port's catchment.'

This statement relates only to the Total Nitrogen loads expected which may be comparable over time to urbanised runoff. The EA considers that runoff from urbanised areas drain via the foreshore which is more directly onto vulnerable nearshore aquatic communities and potentially a greater source of impact than the Abalone farm which will discharge into deeper offshore waters where discharge water is more readily dispersed and diluted (as demonstrated in the EA) thereby limiting the overall impact of elevated nutrients to nearby aquatic environments.

At the adequacy stage of the assessment the EPA advised that the EA needs to provide further detail on the monitoring program to ensure that nitrogen loads and concentrations in the discharge are within limits and that impacts are acceptable. This issue has not been adequately addressed.

The EA provides information on the impact of nutrient loads into the estuary and concludes that the farm will not result in a significant increase in the overall concentration of nutrients within the Port.

Nutrients in farm water will be almost immediately diluted to well below background levels and ANZECC trigger levels once released from the farm and the overall concentration of ammonia (nitrogen) in the Port is expected to be elevated by an insignificant amount relative to the ANZECC Guidelines trigger values and background nutrient concentrations (City Plan 2014). Accordingly, if dilution effects are deemed sufficient for ammonia then dilution will be sufficient for all other nutrients (City Plan 2014). Therefore, no impacts on nearby seagrass beds, oyster farming areas or other ecological or aesthetic values are anticipated as a result of increased nutrient concentrations in the aquatic environment.

A detailed Water Monitoring Program will be developed and implemented prior to construction and is to include the collection of monthly water samples from around the discharge points that will be analysed for a number of parameters including nutrients (nitrogen compounds and total nitrogen). Indicative analytes and trigger values for water quality monitoring have been proposed in the Response to Submissions Report (City Plan 2014) and will be refined in response to agency approvals and licences.

A detailed Seagrass Monitoring Program will also be developed that includes monitoring of epiphyte loads as a surrogate for increased nutrient load within seagrass areas.

At the adequacy stage of the assessment the EPA advised that the EA needs to investigate options of tunnelling/burying the discharge pipe to prevent direct impacts on seagrass. The EA discounts any impacts of shading due to the effluent pipeline. The EPA disagrees with assessment and in any subsequent provision of conditions the EPA will recommend that a comprehensive survey of seagrass within the shading footprint of the pipeline be undertaken prior to any construction works and at regular three month intervals after construction.

The EA investigated the option of tunnelling or trenching of the pipes under the subtidal seagrass beds as an alternative method to raising the pipes above the seagrass. It was considered this option would have more significant impacts on the seagrass in the long term because of disturbance during construction, direct removal of more seagrass and the slow recovery likely within the disturbance footprint as a consequence of the species of seagrass

present. *Posidonia* recovers very slowly after disturbance taking many years to re-establish and efforts in the past to replant *Posidonia* have only had minimal success.
In addition, the proposal to raise pipelines over the seagrass beds rather than being positioned directly over the top of beds has been generally supported by Department of Primary Industries (Fisheries) officers (email - Carter, 6 June 2013).

The Aquatic Ecological Assessment recognises the impact of shading to seagrass from the placement of the pipeline (pg23) but compares the proposed pipeline to existing pipelines in similar habitats where impacts of shading were limited to the footprint of the pipeline. This implies that seagrass growing adjacent to the installed pipeline will be unaffected by shading but seagrass growing directly under the pipe may be affected if insufficient light reaches these areas.

The need for additional surveys is not considered necessary with respect to the seagrass within the shading footprint as this will be equivalent to the area immediately beneath pipeline which can be estimated from existing information.

A monitoring program will be designed for seagrass which will include parameters of seagrass density and condition in areas adjacent to the pipeline along with appropriate reference sites. The monitoring program will include collection of baseline data prior to construction for detection of changes to seagrass communities in association with the pipeline (under and adjacent).

The proponent needs to detail a network of monitoring locations within the receiving environment (and at reference sites elsewhere) in order to establish the zones of influence. In developing this monitoring program the proponent needs to give consideration to the use of deployed gels which accumulate pollutants over time (thereby providing a measure of pollutant exposure at the site).

Monitoring locations will be allocated in consultation with EPA during the formulation of comprehensive aquatic monitoring programs (water quality and seagrass) and will include a range of locations (potential impacts areas and reference sites) to ensure any adverse effects are detected early so that appropriate mitigation measures can be considered. When designing the monitoring programs the proponent will give consideration to the use of gels which accumulate pollutants over time. Consideration will be given to the appropriateness and accuracy of the measurement technique; and the cost effectiveness.

The monitoring plans will be completed and implemented prior to construction activities.

Due to the importance of the nearby seagrass beds, monitoring should also be proposed to monitor the health of Posidonia beds adjacent to the outfall and compare these beds to reference sites nearby. Parameters measured should include, but not be limited to:

- **Morphometrics (biomass, leaf area index, shoot length);**
- **Photosynthetic efficiency (measured by PAM);**
- **Epiphytic growth; and**
- **Sediment properties organic matter, nutrients, sulphides)**

A detailed Seagrass Monitoring Plan will be prepared and implemented prior to construction activities. As detailed in the Aquatic Ecology Assessment (BioAnalysis 2013) the monitoring program will be structured around a ‘Beyond BACI’ approach including samples taken at least two times before and at least two times after pipes area placed on the seabed. A

number of disturbed locations and at least two independent reference locations will be sampled. Seagrass parameters will be measured in replicate quadrats.

Parameters suggested in the Aquatic Ecology Assessment are related to changes in density and condition (shoot density, percent cover, leaf length) and are indicative only. Final parameters will be confirmed during the preparation of the detailed Seagrass Monitoring Plan. Parameters such as biomass, epiphytic growth, photosynthetic efficiency and sediment properties will be considered during this process on the basis of logistics, cost effectiveness and impact of monitoring (preference will be given to non-destructive sampling).

At the adequacy stage of the assessment the EPA advised the EA should also include details of a contingency/response action plan for unexpected increases in nutrient concentrations around the seagrass in the vicinity of the discharge location. The proponents need to make clear statements about specific remedial actions that will be implemented if the ecological impacts are greater than those predicted in the EA.

The EA states:

> 'A detailed *Water Quality Monitoring Plan* will be prepared should the Project gain approval. This Plan will be prepared in accordance with government regulatory requirements and Project approval conditions. It would be subject to approval by relevant authorities and will identify monitoring requirements and water quality trigger values.
>
> Should monitoring results indicate that water quality exceeds nominated trigger values appropriate contingency measures will be implemented. Such measures may include those listed below:
>
> - Reduce feeding of Abalone to 'maintenance levels';
> - Cease water discharge from the tank/facility temporarily (i.e. switch to 'full water recirculation');
> - Increase aeration of water;
> - Reduce stock levels; and
> - Review water quality treatment system.
>
> However the most appropriate response will be determined on a case by-case basis. Note that water monitoring frequency will increase in poor weather conditions or in response to a disease event.'

Appropriate response levels for trigger values will be developed and identified as part of the Water Quality Monitoring Plan.

5.0 Community Submissions

A range of community submission were received that related to biodiversity. These submissions were compiled and are addressed below.

Operational oyster lease is present directly in front of Cambage Street homes approximately 500m from the proposal.

Nutrients in farm water will be almost immediately diluted to well below background levels and ANZECC trigger levels once released from the farm. No impacts on nearby seagrass beds, oyster farming areas or other ecological or aesthetic values are anticipated.

The Aquatic Ecological Assessment reports that there are no operational oyster leases in near proximity to the proposed abalone farm and its discharge pipes. Any discharge of water from the farm will result in the fast dilution of any nutrients that could have the potential to impact on oysters within the port (Sanderson 2013).

Impacts on dugong, dolphin, crabs, turtles, sharks, stingrays, fish, eagles and black swans.

The Aquatic Ecological Assessment (BioAnalysis 2013) included assessments of impacts to a variety of aquatic communities including likely protected threatened species, populations, ecological communities and habitats adjacent to the site. The report assesses the impacts of the Project on the variety of aquatic habitats present within the study area including seagrasses, bethic communities, mangroves, near shore environments. The report contends that the impact of the project on these communities will be minimal and therefore the impact of the Project on the broader aquatic environment is considered to be minimal.

The Aquatic Ecological Assessment assessed the impact of the Project on the population of dolphins known to utilise the habitats of Port Stephens. The report states:

> Dolphins utilise most of the habitat types within the port including seagrass meadows. Dolphins will not be impacted by the proposal as the pipelines are either buried in the intertidal sediments or near the bottom (i.e. the pipe will be elevated 50cm above the seabed) in the seagrass or bare subtidal habitats and there will be no chance of dolphins being injured or snared by the pipes. In addition, Sanderson (2013) predicted that effects on the quality of water pumped through the aquaria and then discharged back into the estuary will be minimal. An assessment of effects on populations of Bottlenose dolphins and dolphins listed under the EPBC Act 1999 that have the potential to live within the Port Stephens estuary, has been undertaken within the section 'Threatened Species Assessment'.

The EPBC Act threatened species assessment in relation to dolphin species concluded that the Project will not have a significant impact (BioAnalysis 2013).

The threatened species assessment prepared as part of the Aquatic Ecological Assessment considered the impacts of the Project on the dugong, threatened marine turtles, sharks, whales and fish and concluded that the Project is not likely to result in a significant impact. This conclusion was based on the minimal area of direct impact associated with the emplacement of the discharge and intake pipes and the prediction that nutrients in farm water will be almost immediately diluted to well below background levels and ANZECC trigger levels once released from the farm.

The Aquatic Ecological Assessment (BioAnalysis 2013) concludes that the construction and ongoing operation of the Abalone Farm will result in minimal impacts to aquatic species and habitats adjacent to the site or in the estuary in general. There are predicted to be short-term disturbance to mangroves and intertidal sandflats as a result of trenching however these habitats will recover quickly. There will be direct impact to approximately 40m2 of *Posidonia australis* seagrass as a result of laying inlet and outlet pipelines into the estuary. This will not have any significant impact on the viability of the local population of *Posidonia australis* within the Port Stephens estuary or result in a net loss of *Posidonia australis* seagrasses within the coastal and estuarine waters of NSW. There will be minimal impacts to aquatic ecology as a result of the construction of an access boardwalk across Pig Station Creek.

No adverse impacts were detected as a result of this assessment and therefore, the Project is not considered likely to have an adverse impact on the additional species listed above.

The Project includes a comprehensive monitoring program to consider the impacts of the Project on the aquatic environment and will include seagrass and mangrove community monitoring and supervision of construction works associated with trenching and piping.

6.0 References

Bio-Analysis Sty Ltd (2013) *Aquatic Ecology Assessment for Pindimar Abalone Farm, Port Stephens*, report prepared for Reliance Holdings Pty Ltd.

City Plan Services (2014) *Environmental Assessment Report for the Pindimar Abalone Farm,* MP (10_0006), February 2014.

Department of Environment and Climate Change (DECC) (2008) *Principles for the Use of Biodiversity Offsets in NSW.*

Department of Infrastructure, Planning and Natural Resources (DIPNR) (2004), *Guideline for the Preparation of Environmental Management Plans*

Department of the Environment (2014) Protected Matters Search Tool http://www.environment.gov.au/webgis-framework/apps/pmst/pmst.jsf accessed August 2014.

Office of Environment and Heritage (OEH) (2013) *NSW Offset Principles for Major Projects (State Significant Development and State Significant Infrastructure)* http://www.environment.nsw.gov.au/biocertification/offsets.htm

Sanderson, B. G. (2013). Dilution and Transport of Discharged Material from a Proposed Abalone Farm. Report prepared for Reliance Holdings Pty Ltd.

Wildthing (2013) *Statement of Effect on Threatened Flora and Fauna for a proposed Abalone Farm at Lot 2 DP 1014683 Clarke Street, Pindimar NSW*, Wildthing Environmental Consultants

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