



# Pindimar Abalone Farm

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State Significant Development Assessment SSD-7265

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Cover image: *Photographs of abalone tanks and mature Blacklip Abalone (Source: EA)*

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# Glossary

Abbreviation	Definition
<b>AHD</b>	Australian Height Datum
<b>Algal bioremediation</b>	A wastewater treatment system which includes the use of algae within settlement ponds to remove dissolved nutrients such as nitrogen and phosphorous
<b>Ammonia</b>	Unionised form of ammonia (NH <sub>3</sub> )
<b>Ammonia-N</b>	Total ammonia nitrogen including ammonia (NH <sub>3</sub> ) and ammonium (NH <sub>4</sub> <sup>+</sup> )
<b>Ammonium</b>	Ionised form of ammonia (NH <sub>4</sub> <sup>+</sup> )
<b>ANZECC</b>	Australian and New Zealand Guidelines for Fresh and Marine Water Quality 2000, Australian and New Zealand Environment and Conservation Council
<b>Applicant</b>	Austasia Leefield Pty Ltd
<b>Aquaculture</b>	Cultivating of fish or marine vegetation for the purposes of harvesting the fish or marine vegetation or their young with a view to sale
<b>BC Act</b>	<i>Biodiversity Conservation Act 2016</i>
<b>Benthic</b>	The collection of organisms living on or in the bottom of a sea, lake or estuary
<b>Broodstock</b>	A parent fish or organism
<b>CIV</b>	Capital Investment Value
<b>Commission</b>	Independent Planning Commission
<b>Council</b>	MidCoast Council
<b>Crown Lands</b>	Crown Lands, DPIE
<b>DA</b>	Development Application
<b>Department</b>	Department of Planning, Industry and Environment
<b>Demolition</b>	The removal of buildings, sheds and other structures on the site
<b>Development</b>	The development as described in the EIS, RtS and RtS Addendum for the construction and operation of a land based abalone farm at Pindimar
<b>DPI</b>	Department of Primary Industries, DPIE
<b>DPIE</b>	Department of Planning, Industry and Environment
<b>EA</b>	Environmental Assessment titled ' <i>Pindimar Abalone Farm Environmental Assessment Report MP (10_0006)</i> ' Revision 3, prepared by City Plan Services dated 28 February 2014
<b>EPA</b>	Environment Protection Authority
<b>EP&amp;A Act</b>	<i>Environmental Planning and Assessment Act 1979</i>

<b>EP&amp;A Regulation</b>	Environmental Planning and Assessment Regulation 2000
<b>EPBC Act</b>	<i>Environment Protection and Biodiversity Conservation Act 1999</i>
<b>EPI</b>	Environmental Planning Instrument
<b>EPL</b>	Environment Protection Licence
<b>ESD</b>	Ecologically Sustainable Development
<b>Grow out</b>	Stage where the cultivation of aquatic animals is undertaken from initial seeding of young fry or juveniles up to harvesting of marketable sizes
<b>High Rate Algal Pond</b>	A type of wastewater treatment system utilising algae comprised of long, narrow, shallow, lined ponds with high circulation rates
<b>Intertidal</b>	The region between the high tide mark and the low tide mark
<b>LEP</b>	Local Environmental Plan
<b>Minister</b>	Minister for Planning and Public Spaces
<b>NRAR</b>	Natural Resources Access Regulator, DPIE
<b>pH</b>	A measure of acidity or alkalinity of a substance
<b>Planning Secretary</b>	Secretary of the Department of Planning, Industry and Environment
<b>POEO Act</b>	<i>Protection of the Environment Operations Act 1997</i>
<b>Project Profile Analysis</b>	An up-front preliminary assessment of the likely level of risk to the environment from aquaculture proposals as described in the NSW Land Based Aquaculture Strategy
<b>Protein skimmer</b>	A device used to remove organic compounds from the water before they break down into nitrogenous waste
<b>Raceway</b>	Artificial channel used in aquaculture to culture aquatic organisms
<b>RMS</b>	Roads and Maritime Services, TfNSW
<b>RtS</b>	Response to Submissions titled 'Pindimar Abalone Farm Response to Submissions Report' prepared by City Plan Services dated 19 November 2014
<b>RtS Addendum</b>	A report entitled ' <i>Final Response to Submissions, An Addendum Report – August 2017, Abalone Farm, Pindimar</i> ' prepared by City Plan Services, Revision 3 – Final, dated 27 November 2020
<b>SEARs</b>	Planning Secretary's Environmental Assessment Requirements
<b>Sensitive receiver</b>	A location where people are likely to work, occupy or reside, including a dwelling, school hospital, office or public recreation area
<b>SEPP</b>	State Environmental Planning Policy
<b>SRD SEPP</b>	State Environmental Planning Policy (State and Regional Development) 2011
<b>SSD</b>	State Significant Development

**Swirl separator** A filter used in tank aquaculture to remove waste solids (e.g. uneaten feed and faeces) before they break down and releases nutrients and toxins into the culture water

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**TfNSW** Transport for NSW

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# Executive Summary

## Introduction

This report details the Department of Planning, Industry and Environment's (the Department) assessment of a State significant development (SSD) application (SSD-7265) for an abalone farm at Pindimar. Austasia Leefield Pty Ltd (the Applicant) proposes to construct and operate a land based abalone aquaculture farm with a capacity to produce up to 60 tonnes per annum (tpa) of Blacklip Abalone (*Haliotis rubra*) at 180 Clarke Street, Pindimar, in the MidCoast local government area (LGA).

Pipelines to source marine water for abalone production and to discharge treated effluent from the farm's wastewater treatment system (WWTS) would be sited in the Port Stephens estuary, which is part of the protected waters of the Port Stephens - Great Lakes Marine Park (PSGLMP).

## Background

Currently, the abalone industry in NSW relies solely on the harvest of wild abalone in NSW coastal waters. The proposal, being a land based abalone farm, would therefore be the first of its kind in NSW. On this basis and given the location of the proposal in a marine protected area, it is important for the Department to ensure the proposal establishes a high standard of environmental performance for future land based aquaculture proposals in NSW.

Throughout the assessment process, the key government authorities have raised concerns regarding the robustness of the Applicant's assessment of water quality impacts, the effectiveness of the abalone farm's WWTS and the potential for adverse impacts on the marine water quality and ecosystems of the PSGLMP. The Applicant addressed these issues by providing additional information in a Response to Submissions (RtS) and RtS Addendum, engaging its own experts and by revising the WWTS and water quality modelling. Despite this additional information, several key concerns remain unresolved.

The Department assisted in facilitating resolution of the key issues raised by seeking the advice of NSW Fisheries and engaging independent experts. This advice led the Department to recommend the Applicant consider a staged and trial approach to the development. However, the Applicant has not amended the application to reflect this suggested approach. Therefore, based on advice from the Environment Protection Authority (EPA), Marine Parks Authority (MPA), MidCoast Council (Council) and the Department's independent experts, the Department's assessment has found there is a lack of scientific certainty that the water quality of the PSGLMP receiving environment would be protected.

The Department considers there is an unacceptable risk to the marine ecology and the Applicant has not undertaken an adequate assessment of the likely environmental impacts on the Port Stephens marine environment. The proposal is also inconsistent with the principles of ecologically sustainable development (ESD) and Council's strategic water quality objectives for the MidCoast local government area and the Port Stephens estuary to achieve a neutral or beneficial effect (NorBE) on water quality. On this basis, the proposal is not in the public interest and it is recommended that it be refused.

## The Site and Environmental Setting

The site is located 40 kilometres (km) north-east of Newcastle and covers approximately 50.6 hectares (ha) of RU2 Rural Landscape zoned land under the *Great Lakes Local Environmental Plan 2014*. The pipelines would be located within the General Use Zone of the PSGLMP, which permits commercial activities such as aquaculture. Under the Land Based Sustainable Aquaculture Strategy (LBSAS), the site is located in an area identified as having the potential for development of land based aquaculture. The farm would occupy five ha on the southern portion of the broader 50.6 ha site. The nearest dwelling is located approximately 200 metres (m) from the eastern boundary of the site in the small village of Pindimar.

## Current Proposal

The proposed farm infrastructure includes tanks, sheds and ponds to accommodate the quarantine, breeding and growing out of up to 60 tpa of Blacklip Abalone. The farm would require the continuous flow of saltwater for its

operations. Saltwater would be sourced from the estuary of Port Stephens via two new pipelines extending into the estuary to a depth of around 15 metres (m). At full production, up to 50 megalitres (ML) of marine water per day would pass through the farm systems.

Wastewater (effluent) would be treated to remove solids, dissolved nutrients and pathogens via filtration, settlement and algae bioremediation before being discharged via two pipelines back into the Port Stephens estuary, at a depth of around 6 m. The discharge outlet is approximately 400 m north of a designated Sanctuary Zone and approximately 100 m east of a large area of *Posidonia* seagrass beds.

Since lodgement of the application in 2014, the design of the proposed WWTS has evolved in response to issues raised by the government authorities and the community. In particular, the Applicant has made significant design changes over the course of the assessment to attempt to address the EPA's concerns. The Applicant's final RfS Addendum describing the revised WWTS design was submitted in November 2020.

The proposed development has a capital investment value of \$3,547,000 and is expected to generate 35 construction jobs and 15 operational jobs.

#### *Statutory Context*

At the time the application was made, the proposed development was classified as one to which Part 3A of the *Environmental Planning and Assessment Act 1979* (the EP&A Act) applied, as the pipelines were to be located in an environmentally sensitive area of State significance (the PSGMLP). Part 3A of the EP&A Act has since been repealed, and on 6 February 2015, the then Minister for Planning transitioned the application to SSD.

The Independent Planning Commission is the consent authority for the proposed development under section 4.5(1) of the EP&A Act and clause 8A of the SRD SEPP because 50 or more persons duly made unique submissions by way of objection during the public exhibition period.

#### *Independent Experts*

Given the complexity of the proposal and being the first of its kind in NSW, the Department engaged Dr Daryl McPhee of Bond University as an independent expert in marine science, to assist with the assessment of the SSD. Given the specific issues raised by the EPA in relation to the performance of the proposed WWTS, in 2018, the Department also engaged Dr Pia Winberg, an expert in marine ecology and algal bioremediation (the use of algae/seaweed to remove contaminants in wastewater).

Despite the amendments the Applicant has made to the proposal, Dr McPhee advised there are clear uncertainties in the performance of the WWTS and its ability to achieve a consistent quality of discharge. Dr McPhee recommended a precautionary approach in considering the proposal. Dr Winberg advised the proposal does not adequately demonstrate the WWTS would be operated without considerable risks to the local marine ecosystem. Dr Winberg agrees a precautionary approach should be taken in the assessment of the proposal.

#### *Engagement*

The Department exhibited the Environmental Assessment (EA) for the development from 20 March 2014 until 29 May 2014. A total of 219 public submissions were received, including five from special interest groups and 214 from the individual members of the community. Of the 219 public submissions received, 213 objected to the development, three were in support and three provided comments.

Advice was received from six State government agencies, the former Great Lakes Council (now MidCoast Council) and Port Stephens Council (PSC). Key concerns raised related to potential impacts on marine water quality in the PSGMLP, impacts on *Posidonia* seagrass, biodiversity, effluent management, Aboriginal heritage and cumulative impacts.

The EPA has declined to recommend conditions throughout the assessment of the application and has maintained its view that the proposal presents an unacceptable risk to the sensitive receiving environment of the PSGMLP. MPA concurred with the concerns of the EPA and advised the proposal is inconsistent with the principles of

ecologically sustainable development (ESD), namely the precautionary principle, intergenerational equity and the conservation of biological diversity and ecological integrity.

MidCoast Council raised several concerns regarding on-site wastewater management, biodiversity offsets and water quality impacts early in the assessment process. However, despite additional information submitted through the course of the assessment, Council has advised the information is insufficient to complete an assessment of these issues.

The Department acknowledges the large number of concerns and issues raised in submissions from special interest groups and local residents. Key issues raised in these submissions included water quality impacts, impacts on marine flora and fauna, amenity, traffic and biodiversity.

#### *Assessment*

The Department's assessment of the application has fully considered all relevant matters under section 4.15 of the EP&A Act, the objects of the EP&A Act and the principles of ESD. To support its assessment of the application, the Department sought advice from the two independent experts and visited the site. Based on the advice of the government authorities and the independent experts and the issues raised in submissions, the key issues for assessment are the potential impacts on water quality, seagrass impacts and the public interest.

#### *Water Quality*

At full capacity, the proposed abalone farm would discharge up to 50 megalitres (ML) of treated wastewater daily into the PSGLMP. The ability of the Applicant's WWTS to effectively treat the nutrient rich discharge waters to achieve a NorBE on water quality was raised as a key issue early in the assessment process. The EPA has maintained significant concerns regarding the conservatism and robustness of the Applicant's water quality modelling and the effectiveness of the WWTS. The EPA has advised it is not confident the Applicant's WWTS can achieve the recommended discharge limit and ensure the protection of waters in the PSGLMP. Council and the Marine Parks Authority have raised similar concerns.

The Applicant has tried to demonstrate it can achieve the EPA's recommended water quality concentration limit, however, the experts have advised there is a level of uncertainty as to whether the level of nutrient reduction modelled is achievable under all operational circumstances and a lack of contingencies should the WWTS be ineffective for a significant period. Given the uncertainties, consistently meeting the relevant water quality discharge limits cannot be guaranteed. The experts have advised a precautionary approach be taken with respect to the Department's assessment, given the location and receiving marine habitat.

The Department acknowledges the PSGLMP receiving environment is ecologically significant and warrants a high standard of protection. The Applicant has not provided sufficient water quality monitoring data to establish the existing ambient water quality and has not demonstrated with scientific certainty that the water quality of the PSGLMP will be protected. The ability of the Applicant's WWTS to consistently achieve a NorBE on water quality is uncertain. The Department has recommended the Applicant trial the WWTS and stage the development, but the Applicant has not amended the application to reflect this approach.

The Department's assessment concludes there is a lack of scientific certainty regarding appropriate discharge limits, water quality impacts and the efficacy of the WWTS. Therefore, the potential for serious and irreversible impacts to occur presents an unacceptable risk. The Department advises a precautionary approach and concludes the potential benefits of the proposal do not outweigh the potential adverse environmental impacts.

#### *Seagrass Impacts*

Concerns have been raised by government authorities, the community and Dr McPhee regarding the potential for adverse impacts on Posidonia seagrass (an endangered ecological community declared under Commonwealth legislation) adjacent to the proposed abalone farm wastewater discharge location. The addition of nutrient rich wastewater to the water column can impact the health and ultimately the survival of Posidonia beds. Direct impacts may also result from construction of the proposed pipelines.

The EPA has consistently advised that the proposal is a significant threat to Posidonia as this sensitive ecological community typically exists in marine environments with low nutrient concentrations. The EPA raised concern that if the proposal goes ahead, it would set a precedent for further expansion of the industry within Port Stephens and would pose a significant threat to the viability of this species. The MPA shares the concerns raised by the EPA relating to direct disturbance of seagrass meadows and the risk of water quality impacts.

Dr McPhee confirmed the health of Posidonia can be adversely impacted by the addition of nutrients to the marine environment and this species recovers very slowly from disturbance. Dr McPhee concluded that, while the Applicant has tried to avoid disturbance of Posidonia, a residual impact will remain.

Based on the advice of the EPA, MPA and the Department's independent experts, the Department considers the proposal presents an unacceptable risk to the health of Posidonia seagrass communities and the conservation of biological diversity and ecological integrity of the PSGLMP.

### Public Interest

The Department acknowledges the proposed development has the potential to provide local social and economic benefits through the provision of employment, training and research opportunities. Furthermore, the project would contribute to the growth of the abalone industry in NSW and internationally. However, the Department, key government authorities and the independent experts are not satisfied the environmental impacts of the development can be managed or mitigated satisfactorily. The public submissions demonstrate the community has significant concerns regarding the potential environmental impacts on the PSGLMP and amenity impacts on residents in Pindimar.

The Department has considered the issue of the public interest very closely. On balance, the public benefit of the proposed abalone farm would not sufficiently outweigh the potentially serious and irreversible environmental impacts the development may have on the significant natural assets of the PSGLMP and surrounds. Consequently, the Department does not consider the proposed development is in the public interest.

### Summary

The Department's assessment has considered the objects of the EP&A Act and the matters to be considered by a consent authority listed in Section 4.15 of the EP&A Act. The Department visited the site, reviewed all assessment information, liaised with key government authorities, considered submissions and the advice of the two independent experts. The Department undertook considerable consultation with the Applicant over many years. Despite multiple revisions to the assessment documents and years of consultation the Department and several key government authorities, including the EPA and MPA, remain dissatisfied with the level of assessment provided and the validity of the Applicant's conclusions.

The views of the EPA are key to the Department's consideration of the proposal as the EPA will have a role in regulating the development through an environment protection licence if the application is approved.

The Department's assessment has concluded the proposal is not consistent with the principles of ESD, is not in the public interest and should be refused for the following reasons:

- there is scientific uncertainty that the water quality impacts can be sufficiently mitigated by the proposed WWTS and the Applicant has been unable to demonstrate there would not be serious or irreversible impacts on Posidonia seagrass communities
- the potential water quality impacts of the proposal on the PSGLMP present an unacceptable risk to marine ecology and inconsistent with strategic objectives to achieve a NorBE on water quality
- the proposed development is inconsistent with the principles of ESD, namely the precautionary principle, intergenerational equity and conservation of biological diversity and ecological integrity
- the Applicant has not undertaken an adequate assessment of the likely environmental impacts on the Port Stephens natural marine environment and concludes the application has not satisfied the requirements of section 4.15(1)(b) of the EP&A Act.

# Contents

- 1 Introduction ..... 1**
  - 1.1 The Department’s Assessment ..... 1
  - 1.2 Development Background ..... 1
  - 1.3 Proposal Overview ..... 1
  - 1.4 Site Description ..... 2
  - 1.5 Surrounding Land Uses ..... 4
  - 1.6 Surrounding Waterways ..... 5
  
- 2 Development ..... 7**
  - 2.1 Description of the Development ..... 7
  - 2.5 Traffic and Access ..... 11
  - 2.6 Applicant’s Need and Justification for the Development ..... 13
  
- 3 Strategic context ..... 14**
  - 3.1 National Aquaculture Strategy ..... 14
  - 3.2 NSW Land Based Sustainable Aquaculture Strategy (LBSAS) ..... 14
  - 3.3 Hunter Regional Plan 2036 ..... 15
  
- 4 Statutory context ..... 16**
  - 4.1 State Significance ..... 16
  - 4.2 Permissibility ..... 16
  - 4.3 Consent Authority ..... 16
  - 4.4 Other Approvals ..... 16
  - 4.5 Mandatory Matters for Consideration ..... 17
  - 4.6 Public Exhibition and Notification ..... 18
  - 4.7 Objects of the EP&A Act ..... 18
  - 4.8 Ecologically Sustainable Development ..... 19
  - 4.9 Commonwealth matters ..... 21
  
- 5 Engagement ..... 22**
  - 5.1 Consultation ..... 22
  - 5.3 Consultation by the Department ..... 22
  - 5.4 Submissions and Advice ..... 22
  - 5.5 Response to submissions ..... 26
  - 5.6 Response to Submissions Addendum ..... 27
  
- 6 Assessment ..... 29**
  - 6.1 Water Quality Impacts ..... 29
  - 6.2 Seagrass Impacts ..... 36
  - 6.3 Public Interest ..... 39
  
- 7 Evaluation ..... 41**
  
- Appendices ..... 42**

# 1 Introduction

## 1.1 The Department's Assessment

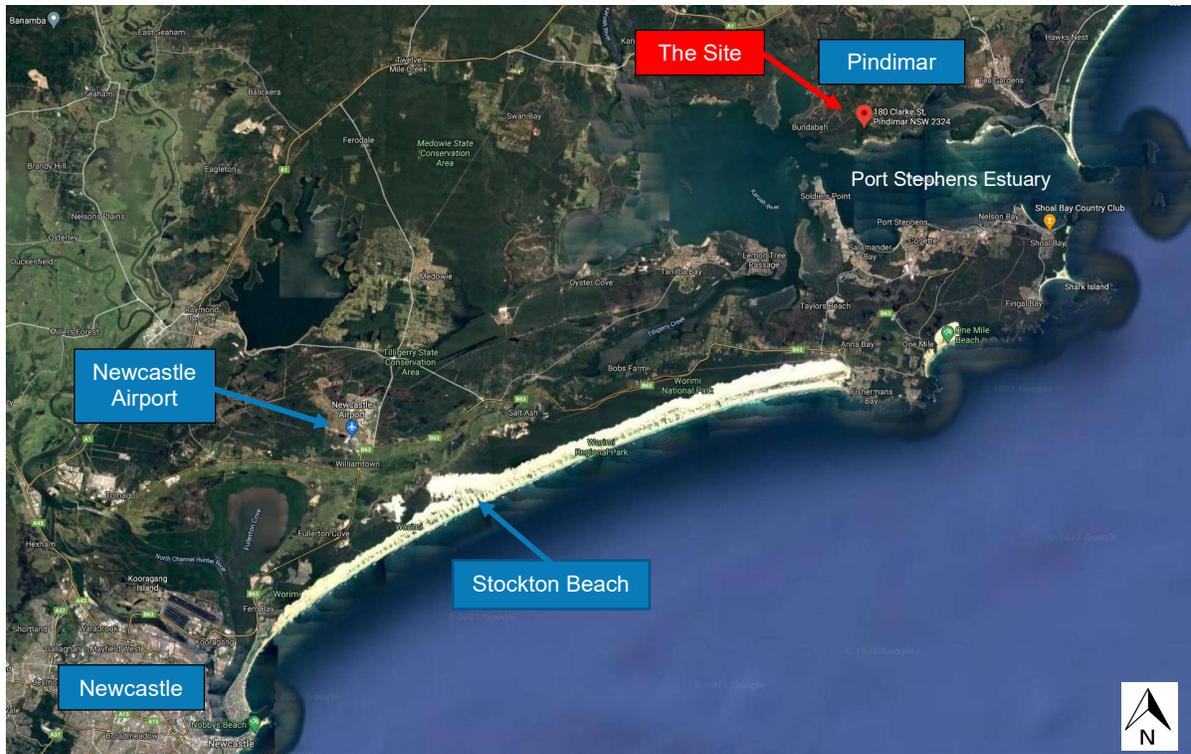
- 1.1.1 This report details the Department of Planning, Industry and Environment's (the Department) assessment of the State significant development application (SSD-7265) for the Pindimar Abalone Farm (the proposed development). Austasia Leefield Pty Ltd (the Applicant) seeks development consent for the construction and operation of a land based abalone aquaculture farm at Pindimar in the MidCoast local government area (LGA). The proposed farm would have a capacity to produce up to 60 tonnes per annum (tpa) of Blacklip Abalone (*Haliotis rubra*), a large marine edible snail.
- 1.1.2 If approved, the proposal would be the first of its kind in NSW, with the current abalone industry solely reliant on the harvesting of wild abalone populations within coastal waters.
- 1.1.3 The Department's assessment has considered all documentation submitted by Austasia Leefield Pty Ltd (the Applicant), including the Environmental Assessment (EA), Response to Submissions (RtS) and RtS Addendum, advice received from government authorities and the Department's independent marine ecology experts and submissions from the public and other stakeholders. The Department's assessment also considers the legislation and planning instruments relevant to the site and the development.
- 1.1.4 Given the complexity of the proposal and being the first of its kind in NSW, in 2013, prior to lodgment of the development application, the Department engaged Dr Daryl McPhee of Bond University as an independent expert in marine and environmental science, to assist with the assessment of the proposal. Dr McPhee is an Associate Professor of Environmental Science, Sustainable Environments and Planning at Bond University.
- 1.1.5 In response to ongoing concerns raised by the Environment Protection Authority (EPA) during the assessment in relation to the effectiveness and robustness of the Applicant's proposed wastewater treatment system (WWTS), in 2018, the Department also engaged Dr Pia Winberg an independent marine ecology expert with specialist knowledge in algal bioremediation (use of algae/seaweed to remove contaminants).
- 1.1.6 This report describes the development, surrounding environment, relevant strategic and statutory planning provisions and the issues raised in submissions. The report evaluates the key issues associated with the development and provides a recommendation for determining the application.

## 1.2 Development Background

- 1.2.1 An application to build an abalone farm on the same site was approved by the former Great Lakes Council (GLC) in 2006 (DA 313/2003) under Part 4 of the *Environmental Planning and Assessment Act 1979* (the EP&A Act). The approval was subject to a third-party appeal in the NSW Land and Environment Court (L&E Court) against the granting of the development consent. During the L&E Court hearing, detailed plans and documents were requested which were not able to be produced by the Applicant. The Applicant subsequently withdrew the application.
- 1.2.2 In October 2007, a new proposal for an abalone farm was declared a Major Project under the now repealed Part 3A of the EP&A Act. The application was lodged with the Department in March 2014 under the provisions of Part 3A and subsequently transitioned to State significant development (SSD) in 2015 following the repeal of Part 3A of the EP&A Act.

## 1.3 Proposal Overview

- 1.3.1 The proposed abalone farm comprises tanks, sheds and ponds to accommodate the quarantine, breeding and growing out of the abalone. The land based components of the proposed development would be positioned over a five hectare (ha) area adjacent to the Port Stephens estuary (see [Figure 1](#)).



**Figure 1 | Regional Context**

- 1.3.2 The farm would require the continuous flow of saltwater for its operations. Saltwater would be sourced from the Port Stephens estuary via two new intake pipelines extending into the estuary. At full production, up to 50 megalitres (ML) of marine water per day would pass through the farm systems. Wastewater (effluent) from the farm operations would be treated to remove solids, dissolved nutrients and pathogens via filtration, settlement and algal bioremediation before being discharged via a further two outlet pipelines back into the Port Stephens estuary. When fully grown, the abalone would be harvested and transported to market as live product. No post-harvest processing is proposed on-site.
- 1.3.3 It is proposed the farm will operate 24 hours a day, seven days a week.
- 1.3.4 The development has a capital investment value of \$3,547,000 and is expected to generate 35 jobs during construction and 15 operational jobs.

## **1.4 Site Description**

- 1.4.1 The irregular shaped site comprises approximately 51 ha of RU2 Rural Landscape zoned land under the Great Lakes Local Environmental Plan 2014 (Great Lakes LEP) at 180 Clarke Street, Pindimar. The site is legally described as Lot 2 DP 1014683. The waterway itself from the Mean High Water Mark (MHWM) (in which the two water intake and two outlet pipelines are to be located) is zoned 'W2 Recreational Waterways' under the Port Stephens Local Environmental Plan 2013 (Port Stephens LEP). The northern shoreline of the Port Stephens waterbody forms the boundary between the two LGAs (see **Error! Reference source not found.**).





**Figure 3 | Existing Site**

- 1.4.6 The development site is bushfire prone and partially flood affected. Most of the subject site is located within the catchment of Pig Station Creek, which runs across the northern part of the site then along the eastern boundary to the waters of Port Stephens. The remainder of the site drains directly to Port Stephens.
- 1.4.7 A strip of mangrove trees lines the foreshore area immediately to the south of the subject site. A shallow intertidal area of mudflats extends for approximately 200 metres (m) from the foreshore. A seagrass meadow of *Posidonia australis* (Posidonia) is present beyond the intertidal zone. A likely Aboriginal shell midden is located along the foreshore of Port Stephens at the southern boundary of the site.

## 1.5 Surrounding Land Uses

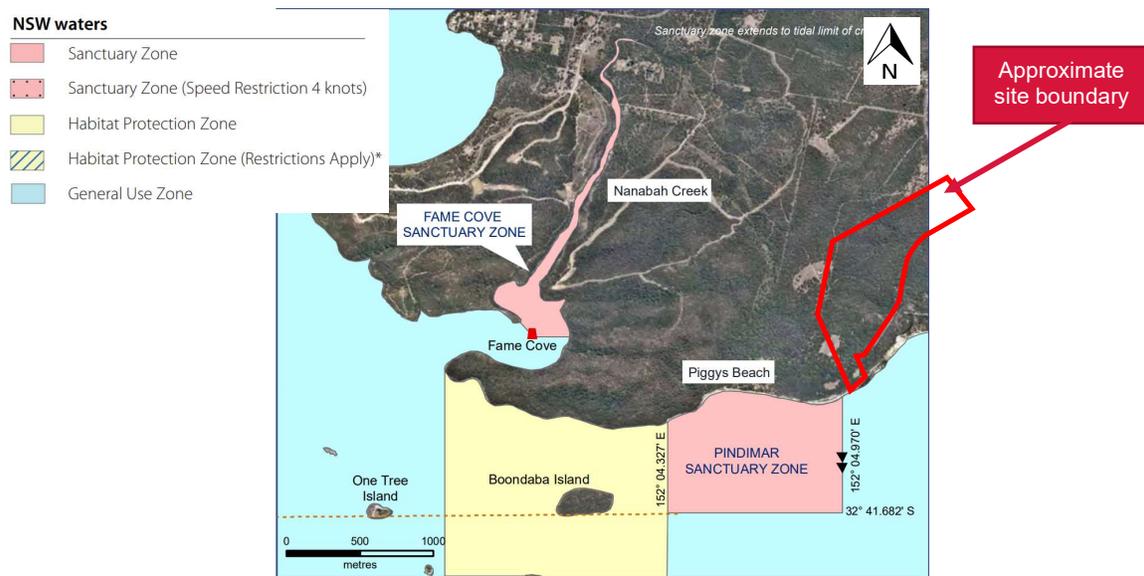
### Surrounding Land

- 1.5.1 The closest dwelling is separated from the site by dense vegetation and is located approximately 200 m from the site's eastern boundary in the village of Pindimar. The village itself is zoned RU5 Village under the Great Lakes LEP and was once considered a possible site for the national capital before Canberra was chosen. There are many dirt roads and undeveloped lots through the bushland around the village that date from the original subdivision in 1918.
- 1.5.2 The land immediately surrounding the site is zoned RU2 Rural Landscape consisting of heavily vegetated bushland with some scattered cleared areas to the east and west, partially cleared agricultural land to the north-west and a heavily vegetated rural residential property to the north-east, known as Tallowfield.
- 1.5.3 Two coastal wetlands listed under State Environmental Planning Policy (Coastal Management) 2018 (Coastal Management SEPP) are located approximately 55 m and 110 m to the south-east and south-west of the development site, respectively. However, no development is within the mapped wetland boundaries.
- 1.5.4 The southern side of the Port Stephens estuary contains more densely populated residential areas including Nelson Bay, Salamander Bay and Soldiers Point.

## 1.6 Surrounding Waterways

### Port Stephens - Great Lakes Marine Park (PSGLMP)

- 1.6.1 The Port Stephens estuary lies immediately to the south of the subject site and forms part of the PSGLMP. The PSGLMP is approximately 980 km<sup>2</sup> in area and includes offshore waters to the three nautical mile limit of NSW waters, and all of Port Stephens, the Karuah River, the Myall River, Myall and Smiths Lakes, and their creeks and tributaries to the tidal limit.
- 1.6.2 PSGLMP is unique as it contains a range of diverse habitats, including beaches, seagrass beds, mangroves, saltmarsh and open waters, which all support distinct groups of tropical, subtropical and temperate marine fauna and flora. The PSGLMP lies within the country of the Worimi people. The Port Stephens estuary is the largest drowned river valley in NSW. Management of the PSGLMP is guided by the PSGLMP Operational Plan (MPA, 2010).
- 1.6.3 The PSGLMP Zoning Map provides various levels of protection to certain areas while allowing for multiple uses. The four types of zones that are applied to the Marine Park are Sanctuary Zones (recognised for their high conservation value), Habitat Protection Zones, General Use Zones (GUZ) and Special Purpose Zones. An extract from the PSGLMP Zoning Map for the waterway closest to the proposed development site is provided in **Figure 4** below.



**Figure 4 | PSGLMP Zoning Map**

- 1.6.4 The proposed abalone farm includes four pipelines within the GUZ of the PSGMP. The GUZ provides for ecologically sustainable management of habitat, animals and plants, through a wide range of ecologically sustainable uses, including aquaculture and recreational and commercial fishing. A Sanctuary Zone is located to the west of the development site, around 415 m from the proposed pipelines. Sanctuary Zones provide the highest level of protection for habitats, animals and plants, as well as areas of cultural significance.

### Port Stephens Estuary

- 1.6.5 The Department's independent expert, Dr McPhee, advised the Port Stephens estuary is considered to fit the Australian and New Zealand Guidelines for Fresh and Marine Water Quality guidelines (ANZECC guidelines) definition of 'slightly to moderately disturbed system'<sup>1</sup>, based on clearing and water quality impacts caused by

<sup>1</sup> Ecosystems in which aquatic biological diversity may have been adversely affected to a relatively small but measurable degree by human activity.

urban and agricultural runoff. Nevertheless, Port Stephens benefits from good tidal flushing which helps to prevent the build-up of pollutants.

- 1.6.6 The water quality of Port Stephens generally satisfies the ANZECC water quality trigger values<sup>2</sup> for the protection of aquatic ecosystems, secondary and primary contact recreation, and the consumption of seafood. The estuary is important for recreational and commercial fishing, oyster aquaculture, scuba diving, and tourism activities including whale and dolphin watching.
- 1.6.7 The estuary contains the largest area of mangroves (2,700 ha) and the second most extensive area of seagrass (1,000 ha or 10 km<sup>2</sup>) in NSW. The estuary also includes 1,400 ha of saltmarsh and contains a resident population of around 140 bottlenose dolphins. The PSGLMP Operational Plan notes that seagrass beds are critically important to estuarine systems as they greatly enhance local primary production and biodiversity, stabilise sediment, maintain water quality and provide nursery habitat for many economically important crustaceans and fish.
- 1.6.8 There is an area of around 4 km<sup>2</sup> of seagrass, including *Posidonia*, offshore of the development site. On 7 May 2015 (one year after the Part 3A application was lodged), the '*Posidonia australis* seagrass meadows of the Manning-Hawkesbury Ecoregion' (which includes Port Stephens) were declared endangered under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). *Posidonia* meadows in the Port Stephens estuary are not listed as an Endangered Ecological Community (EEC) under the NSW *Fisheries Management Act 1994* (FM Act).
- 1.6.9 Port Stephens is a major oyster producing estuary. According to the NSW Oyster Industry Sustainable Aquaculture Strategy (OISAS), the estuary contains 861.8 ha mapped as 'priority oyster aquaculture areas'. These priority areas include actual and potential leases located within the waters to the east of the subject site, directly south of the village of Pindimar (refer [Figure 5](#)).



**Figure 5 | Priority Oyster Aquaculture Areas**

<sup>2</sup> Trigger values are concentrations that, if exceeded, would indicate a potential environmental problem, and so 'trigger' a management response.

## 2 Development

### 2.1 Description of the Development

- 2.1.1 The major components of the proposed development are summarised in Error! Reference source not found. and shown in **Figure 6** to **Figure 9** and described in full in the EA, RtS and RtS Addendum included in **Appendix A**.
- 2.1.2 The proposed WWTS design has evolved over the course of the assessment in response to the issues raised in submissions and government advice. The WWTS described below comprises the final design for which consent is being sought and is the development assessed in this report.

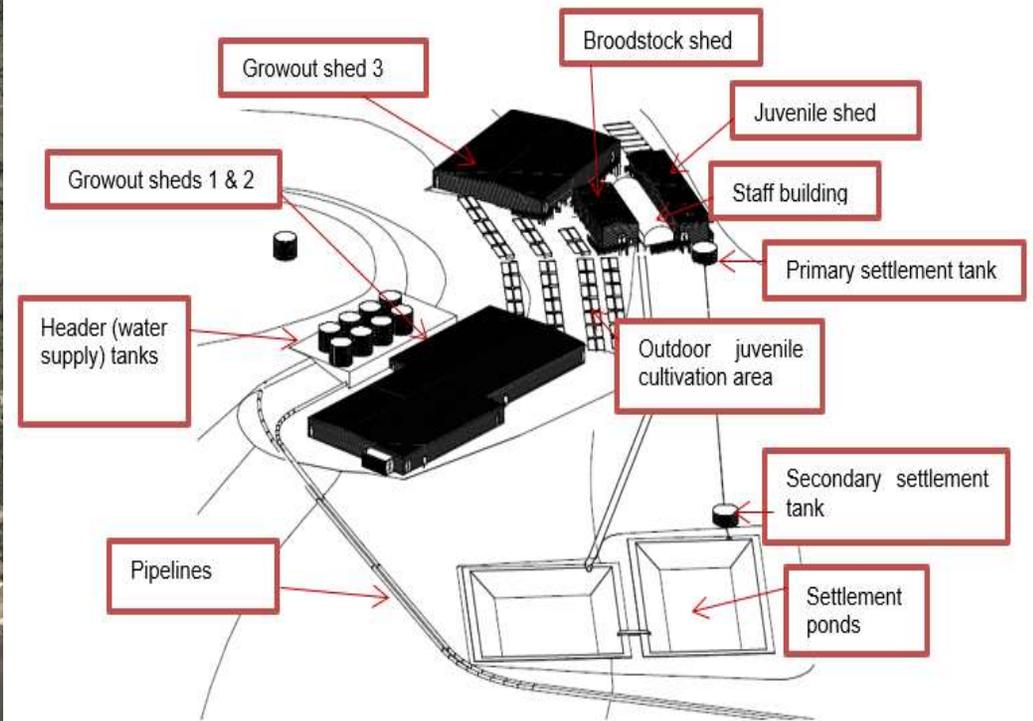
**Table 1 | Main Components of the Development**

Aspect	Description
<b>Development Summary</b>	<b>Construction and operation of a commercial Blacklip Abalone farm with a capacity to grow out up to 60 tpa of abalone for the purposes of producing an edible seafood product</b>
<b>Site area and development footprint</b>	<ul style="list-style-type: none"> <li>The site is approximately 50 ha in area</li> <li>Development footprint of approximately 5 ha</li> </ul>
<b>Farm Infrastructure</b>	<ul style="list-style-type: none"> <li>Broodstock shed (4.3 m high and 135 m<sup>2</sup>)</li> <li>Juvenile shed (3 m high and 135 m<sup>2</sup>)</li> <li>External juvenile grow out area comprised of a series of shade cloth covered plastic tanks</li> <li>Three grow out sheds (each around 3.6 m high and 750 m<sup>2</sup>)</li> <li>Facility shed and office (3.6 m high and 225 m<sup>2</sup>)</li> </ul>
<b>Stocking Rates and Annual Production</b>	<ul style="list-style-type: none"> <li>Approximately 120 wild abalone will be sourced to act as breeding stock for the farm (initially), followed by up to 24 additional individuals per year</li> <li>Approximately 31.6 tonnes of live marketable abalone every six months</li> <li>It is likely to take approximately 3.5 years to achieve full production rates</li> </ul>
<b>Marine Pipelines</b>	<ul style="list-style-type: none"> <li>Four 0.5 m diameter polypropylene pipelines extending from the site into the Port Stephens estuary, including: <ul style="list-style-type: none"> <li>two pipelines with a length of 540 m (measured from the MHWM) for the intake of up to 50 ML of seawater per day. Water inlets would be positioned at a depth of approximately 15 – 20 m</li> <li>two pipelines with a length of 450 m (measured from the MHWM) for the disposal of effluent. Water outlets would be positioned at a depth of approximately 6 m</li> </ul> </li> <li>Navigational marker buoys marking the location of the pipelines to reduce the potential for anchor entanglement</li> </ul>
<b>Header Tank area</b>	<ul style="list-style-type: none"> <li>Eight standalone cylindrical concrete tanks for the storage of fresh marine water from the intake pipelines, with a combined volume of 5 ML</li> </ul>
<b>Wastewater Management</b>	<ul style="list-style-type: none"> <li>Treatment infrastructure includes: <ul style="list-style-type: none"> <li>swirl separators and protein skimmers</li> <li>UV and ozone disinfection</li> <li>primary and secondary settlement tanks</li> <li>a series of three algae biofilter ponds</li> <li>a series of nine High Rate Algal Ponds (HRAPs)</li> </ul> </li> </ul>

Aspect	Description
<b>Pumphouse</b>	<ul style="list-style-type: none"> <li>Concrete building containing pumping equipment for marine water intake and discharge</li> </ul>
<b>Traffic</b>	<ul style="list-style-type: none"> <li>20 daily vehicle movements during the construction period</li> <li>12 daily vehicle movements during the operational period</li> </ul>
<b>Road and associated works</b>	<p>The following road upgrade works are proposed:</p> <ul style="list-style-type: none"> <li>upgrading of the internal road network by levelling and grading</li> <li>designation of approximately five passing areas along the road network</li> <li>construction of an eight space car parking area, comprising levelled rock and graded dirt and a loading bay area adjacent to the proposed office</li> </ul>
<b>Vegetation clearing and offset</b>	<ul style="list-style-type: none"> <li>Clearing of approximately 2.4 ha of native vegetation, including 0.5 ha of Saltmarsh EEC, 0.32 ha of Swamp Oak Forest EEC, Swamp Mahogany-Paperbark Forest EEC</li> <li>Removal of 40 m<sup>2</sup> of Posidonia seagrass (no offsets)</li> <li>On-site biodiversity offset area of approximately 5.14 ha</li> </ul>
<b>Bushfire Management</b>	<ul style="list-style-type: none"> <li>Pedestrian boardwalk for emergency egress</li> <li>Hazard protection zone around the farm infrastructure</li> <li>Water supplies for firefighting</li> </ul>
<b>Hours of operation</b>	24 hours, 7 days a week
<b>Capital investment value</b>	\$3,547,000
<b>Employment</b>	35 full-time equivalent construction jobs and 15 operational jobs.



**Figure 6 | Proposed Abalone Farm Development Layout**



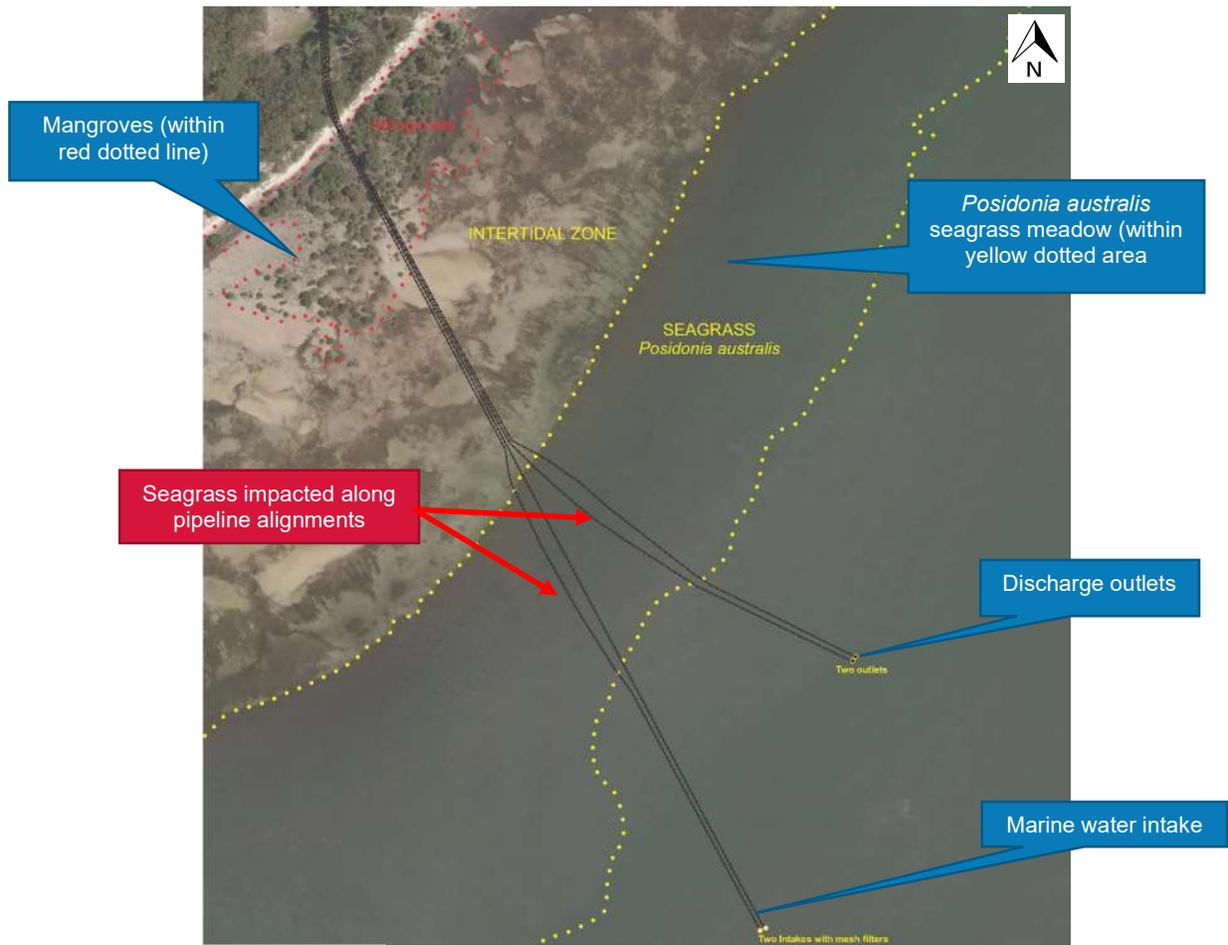
**Figure 7 | Proposed Abalone Farm Key Components**

## 2.2 Staging

- 2.2.1 The farm is proposed to be constructed in three stages over approximately three years, as follows:
- Stage 1: road upgrade works, installation of servicing infrastructure, construction of the broodstock shed, office, header tank area, settlement ponds, pumphouse and intake/ outlet pipes
  - Stage 2: construction of the juvenile shed and external juvenile area (as demand requires)
  - Stage 3: construction of grow out sheds 1, 2 and 3, as demand requires.
- 2.2.2 Abalone cultivation is expected to begin at the conclusion of Stage 1.

## 2.3 Pipelines

- 2.3.1 The four proposed intake / outlet pipelines would be located above ground on 0.2 m high concrete supports between the header tanks and pumphouse. As the pipes are flexible, the pipelines would be laid to avoid existing trees, therefore minimising vegetation clearing. Within the intertidal area, the pipelines would be located within trenches underground to minimise impacts on beach access and visual amenity. In the area below the low tide mark (i.e. underwater), the pipes are proposed to be raised on supports approximately 0.5 m high above the seabed to minimise impacts on benthic organisms and seagrasses. **Figure 8** illustrates the location of the proposed pipelines in relation to the intertidal zone, mangroves and Posidonia seagrass beds.



**Figure 8 |** Location of Posidonia Seagrass Meadows and Proposed Pipelines

## 2.4 Wastewater Treatment System

- 2.4.1 Land based abalone farms require an open flow-through system with high volumes of water. For the proposed development, 50 ML of marine water per day is required to move through the farm rapidly to meet the

physiological requirements of the abalone. Effluent is proposed to be treated and filtered to remove suspended solids and dissolved nutrients prior to release back into the Port Stephens estuary.

- 2.4.2 The WWTS includes an initial wastewater treatment stage that would sterilise bacteria and/or other pathogens that may be present in wastewater leaving the broodstock shed using ozone and UV treatment and remove suspended solids through:
- filtration (using swirl separators for larger particles such as waste food and excrement and foam fractionation for smaller particles)
  - physical settlement in settlement tanks and two settlement ponds.
- 2.4.3 Wastewater would be held in the settlement ponds for approximately two hours in total, before release via gravity (occasionally supported by pumps in the pumphouse). Wastewater would then pass through a three-stage algae biofilter in the settlement ponds. This would involve introducing multiple species of green and red algae dominated by a local green algal species, *Ulva* (sea lettuce), to a series of three ponds through which the wastewater would be passed prior to discharge to remove nutrients.
- 2.4.4 A series of nine High Rate Algal Ponds (HRAPs) form the final stage of wastewater treatment. The HRAP system is made up of three groups of three ponds that will treat abalone farm wastewater prior to being discharged into the estuary through an oyster mesh. Each pond is a long, narrow, shallow lined structure with a central island and power-driven paddle wheel to promote high circulation rates. **Figure 9** shows the HRAP design for a single pond and **Figure 10** illustrates the complete WWTS design.



**Figure 9 | High Rate Algal Pond**

- 2.4.5 The HRAPs will be stocked with unattached green algae, likely *Ulva sp.* The Applicant stated *Ulva sp.* successfully removes inorganic nutrients from water and is a species commonly used in biofilters. The nine HRAP ponds would cover an area of approximately 4,000 m<sup>2</sup> of previously cleared land on the site. Harvesting of the algae would take place on a regular basis to ensure algal density does not result in die-off which would reduce its effectiveness. The Applicant has not described the proposed disposal arrangements for the harvested algae.

## **2.5 Traffic and Access**

- 2.5.1 Access to the site will be directly from Challis Avenue (comprising compacted gravel) only. Internally, the farm will be accessed via the existing road network within the site. A pedestrian boardwalk is also proposed to connect the farm area to an existing track at the end of Cambage Street, in order to provide emergency pedestrian egress from the farm (e.g. in the case of bushfire).

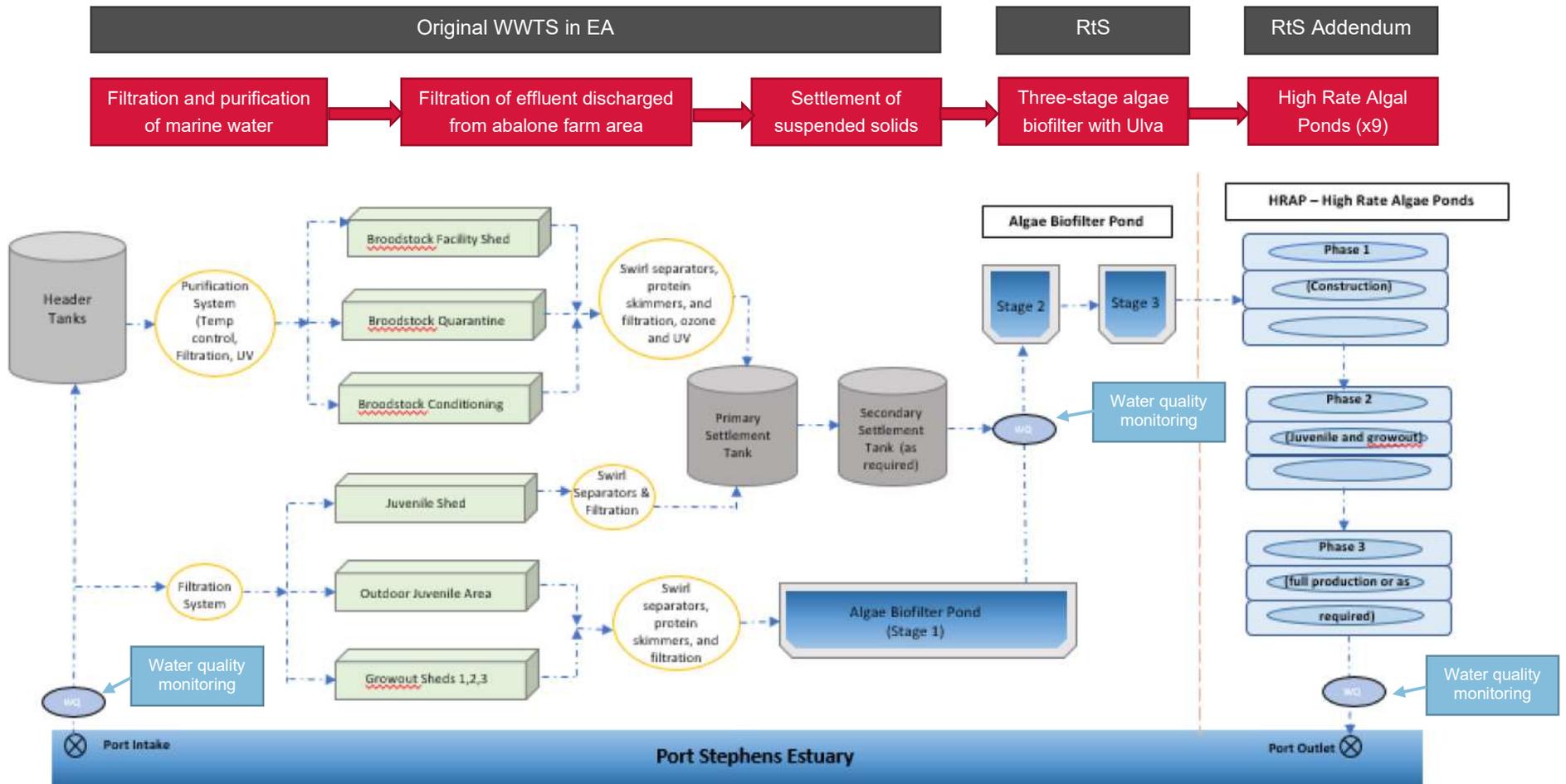


Figure 10 | Proposed Final WWTs

## **2.6 Applicant's Need and Justification for the Development**

- 2.6.1 The Applicant stated there are several key drivers for the proposal, including:
- an increasing demand for healthy, natural food products, such as abalone
  - suitability of Blacklip Abalone to farming and to the environmental parameters of the site
  - Blacklip Abalone is highly sought after as a specialty food item, particularly in the highly lucrative Asian shellfish market
  - the species has been the focus of intensive research by both the Applicant and others, is subject to very few parasites or disease and produces a manageable and treatable effluent.
- 2.6.2 The Applicant also considers the site is suitable for the development having regard to the zoning, separation from nearby sensitive land uses, topography, visual isolation, access to good quality marine water and proximity to essential infrastructure. Proximity to the arterial road network also provides good access to regional and export markets.
- 2.6.3 Up to 35 construction and 15 full-time equivalent jobs are anticipated to be generated by the proposed development. In addition, trainee positions will be created in order to introduce people to aquaculture and to facilitate and encourage further education. There are also likely to be flow-on benefits to the local economy through the purchase of construction and operational supplies and services throughout the farm's lifetime.
- 2.6.4 If approved, the proposal would be the first of its kind in NSW and would reduce reliance on the harvesting of wild abalone populations from coastal waters. While there are approximately 20 commercial land based abalone farms in the southern states of Australia, there are currently none in NSW. In South Australia the culture of 'Greenlip' abalone is recognised as a significant contributor to the State's aquaculture industry.

## 3 Strategic context

### 3.1 National Aquaculture Strategy

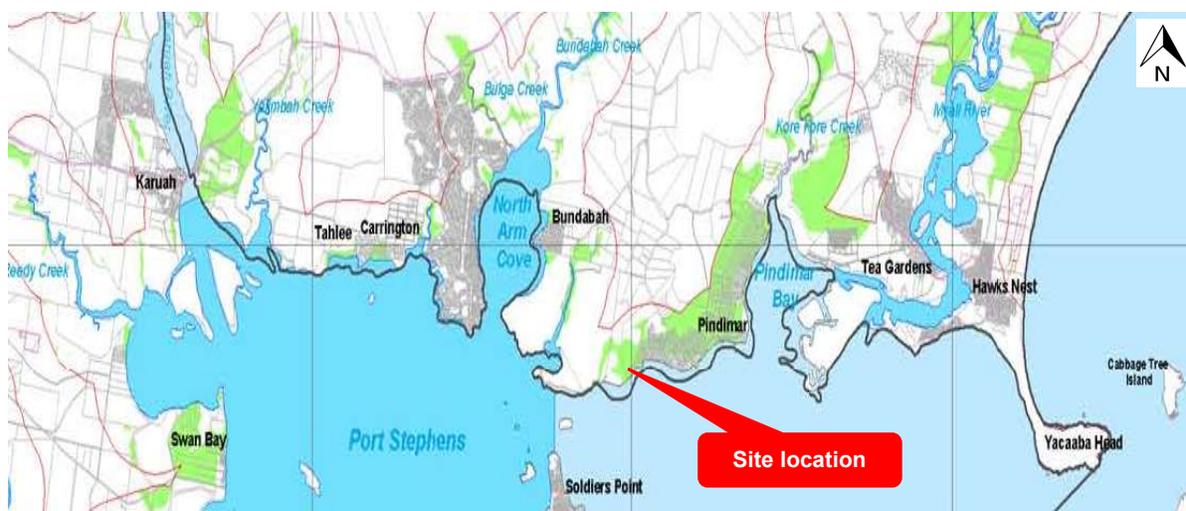
3.1.1 The former Commonwealth Department of Agriculture and Water Resources developed the National Aquaculture Strategy (2017) to support the sustainable growth of the industry. The Strategy recognises aquaculture is an important component of the Australian seafood industry, is necessary for long term food security and requires ongoing innovation and research to evolve and succeed. The Strategy sets out how Australia will achieve the goal to double the current value of our aquaculture industry to \$2 billion a year by 2027. This is consistent with the National Marine Science Plan 2015–2025, driving the development of Australia’s blue economy (National Marine Science Committee 2015). The target will be achieved by encouraging development of new industry projects and growth of existing businesses.

3.1.2 The proposal is considered to be consistent with the National Aquaculture Strategy as it would contribute toward the growth of the Australian aquaculture industry.

### 3.2 NSW Land Based Sustainable Aquaculture Strategy (LBSAS)

3.2.1 In NSW, the substantial growth in sustainable aquaculture is a long-standing goal of the NSW Government. The former State Environmental Planning Policy - 62 – (Sustainable Aquaculture) (SEPP 62) regulated aquaculture activities in NSW until it was repealed on 27 February 2019 and replaced with State Environmental Planning Policy (Primary Production and Rural Development) 2019 (Primary Production SEPP). Saving and transitional provisions are embedded into the new Primary Production SEPP that allows the continued reliance on SEPP 62 for the assessment of this application as this SEPP was in place at the time the application was submitted.

3.2.2 The LBSAS was developed to provide a focus for facilitating economic development and attracting aquaculture development to the state. It was gazetted in accordance with SEPP 62. The LBSAS has published a series of maps identifying sites and areas that have the potential for the development of land based aquaculture based on a set of minimum locational performance criteria. The development site is located within such an area (shaded green below) on the Estuarine Aquaculture Map for Port Stephens in the LBSAS and is therefore considered to be potentially suitable for aquaculture development, in accordance with the LBSAS (see **Figure 11**).



**Figure 11** | Extract of Estuarine Aquaculture Map 11 Port Stephens Estuary from the LBSAS

### 3.3 Hunter Regional Plan 2036

- 3.3.1 The Hunter Regional Plan 2036 guides the NSW Government's land use planning priorities and decisions for the Hunter Region to 2036. The Plan provides an overarching framework to guide subsequent and more detailed land use plans, development proposals and infrastructure funding decisions.
- 3.3.2 The proposal is consistent with Direction 6: Grow the economy of MidCoast and Port Stephens, of the Hunter Regional Plan as the proposal will create up to 35 construction, 15 full-time equivalent jobs and potentially some trainee positions. There are also likely to be flow-on benefits to the local economy through the purchase of construction and operational supplies and services throughout the farm's lifetime.
- 3.3.3 However, the proposal is inconsistent with the following Directions in the Plan:
- Direction 14: Protect and connect natural areas – as discussed in **Section 6** of this report, the proposal presents an unacceptable risk to the health of Posidonia seagrass communities and the conservation of biological diversity and ecological integrity of the PSGLMP. Furthermore, the Applicant has been unable to satisfy Council's concerns regarding biodiversity offsets and the Biodiversity Conservation Division (BCD) of the Department has advised the assessment of impacts on threatened species listed since lodgement of the application is insufficient.
  - Direction 15: Sustain water quality and security – as discussed in **Section 6** of this report, based on the advice of the EPA, Council and the independent experts, the Department has considerable concerns about the potential water quality impacts to the PSGLMP ecosystem. The Applicant has been unable to demonstrate a neutral or beneficial effect (NorBE) on water quality, and the proposal will not protect the water quality of the PSGLMP. As such, the proposal will not sustain high water quality in these protected waters.

## 4 Statutory context

### 4.1 State Significance

- 4.1.1 The proposed abalone farm was declared a Major Project under the now repealed Part 3A of the EP&A Act on 17 October 2007 because it is development located in an environmentally sensitive area of State Significance (the PSGLMP). Part 3A of the EP&A Act, as in force immediately before its repeal on 1 October 2011 and as modified by Schedule 6A of the EP&A Act, applies to transitional Part 3A Developments. As an EA for the development was first submitted prior to the repeal of Part 3A, the proposed development was deemed to be a 'transitional' Part 3A development.
- 4.1.2 In line with the Government's focus to phase out Part 3A, and because the project application had not progressed sufficiently under the Part 3A system, on 6 February 2015, the Applicant was notified that the then Minister for Planning had transitioned the development to SSD under clause 6 of Schedule 6A of the EP&A Act. The proposal is now classified as a SSD under Part 4 of the EP&A Act.

### 4.2 Permissibility

- 4.2.1 The land based component of the farm is zoned RU2 Rural Landscape under the Great Lakes LEP. Aquaculture is permissible with consent in the RU2 zone. The proposed pipelines are within an intertidal area zoned W2 Recreational Waterways under the Port Stephens Local Environmental Plan 2013 (Port Stephens LEP) and within the GUZ under the PSGLMP Zoning Plan. Water supply systems and aquaculture are permissible within the W2 zone. The GUZ allows for a wide range of environmentally sustainable activities, including recreational and commercial activities. The proposed pipelines are permissible in the General Use Zone.

### 4.3 Consent Authority

- 4.3.1 The Independent Planning Commission (Commission) is designated as the consent authority for the development under section 4.5 of the EP&A Act and clause 8A of the SRD SEPP. This is because there were more than 50 unique public submissions by way of objection in accordance with the EP&A Act.

### 4.4 Other Approvals

- 4.4.1 The Applicant is required to obtain a number of other approvals including:
- an Environment Protection Licence (EPL) from the EPA under section 43 of the *Protection of the Environment Operations Act 1997* (POEO Act) for the discharge of treated wastewater, and
  - an aquaculture permit from DPI under section 144 of the *Fisheries Management Act 1994*.
- 4.4.2 Should the Commission grant development consent under Part 4 of the EP&A Act, these approvals cannot be refused by the relevant authority and must be given in a manner that is substantially consistent with that consent.
- 4.4.3 In addition to the approvals listed above, if the Commission grants consent to the application, the Applicant will also be required to obtain a number of other approvals, however, these are not required to be issued in a manner consistent with any consent under Part 4 of the EP&A Act. These include:
- a marine park permit from MPA under the *Marine Estate Management Act* (MEM Act) for damage to marine habitat
  - a licence under the *Crown Land Management Act 2016* (CLM Act) for construction of the pipeline over Crown land.
- 4.4.4 As such, the Department has consulted with the EPA and NSW DPI (including the MPA and NSW Fisheries) Crown Lands and has considered the relevant issues relating to the issue of these approvals in the assessment of the proposal (see **Section 6** of this report).

## 4.5 Mandatory Matters for Consideration

- 4.5.1 Section 4.15 of the EP&A Act sets out matters to be considered by a consent authority when determining a development application. The Department's consideration of these matters is set out in **Section 5** and **Appendix C**. In summary, the Department is satisfied the proposed development is consistent with the requirements of section 4.15 of the EP&A Act.
- 4.5.2 Under section 4.15 of the EP&A Act, the consent authority, when determining a development application, must take into consideration the provisions of any environmental planning instrument (EPI) and draft EPI (that has been subject to public consultation and notified under the EP&A Act) that apply to the proposed development.
- 4.5.3 The Department has considered the development against the relevant provisions of several key EPIs including:
- State Environmental Planning Policy (State and Regional Development) 2011 (SRD SEPP)
  - State Environmental Planning Policy No 14 - Coastal Wetlands (SEPP 14) (as in force at the time)
  - State Environmental Planning Policy No 44 – Koala Habitat Protection (SEPP 44) (as in force at the time)
  - State Environmental Planning Policy No 71 – Coastal Protection (SEPP 71) (as in force at the time)
  - State Environmental Planning Policy (Coastal Management) 2018
  - State Environmental Planning Policy (Koala Habitat Protection) 2020
  - State Environmental Planning Policy No 62 Sustainable Aquaculture (SEPP 62) (repealed)
  - State Environmental Planning Policy (Primary Production and Rural Development) 2019
  - Great Lakes Local Environmental Plan 1996 (Great Lakes LEP 1996) (as in force at the time)
  - Great Lakes Local Environmental Plan 2014 (Great Lakes LEP 2014)
  - Port Stephens Local Environmental Plan 2013 (Port Stephens LEP 2013).
- 4.5.4 It is noted that SEPP 14 and SEPP 71 have been superseded by the State Environmental Planning Policy (Coastal Management) 2018, SEPP 44 has been superseded by State Environmental Planning Policy (Koala Habitat Protection) 2020 and State Environmental Planning Policy (Koala Habitat Protection) 2021 and SEPP 62 has been superseded by State Environmental Planning Policy (Primary Production and Rural Development) 2019 since the date of this application.
- 4.5.5 However, saving and transitional provisions in the new instruments allow the subject application to continue to rely on the previous policies that were in effect at the time of the submission of the application, apart from SEPP 44. For the purposes of this assessment, Koala SEPP 2020 is the relevant policy.
- 4.5.6 Detailed consideration of the provisions of all EPIs that apply to the development is provided in **Appendix D**. With the exception of SEPP 71, the Department is satisfied the proposed development generally complies with the relevant provisions of these EPIs. The Department's consideration of SEPP 71 is outlined below.
- State Environmental Planning Policy No 71 – Coastal Protection (as in force at the time)***
- 4.5.7 The former SEPP 71 applies to the site as it is within the NSW coastal zone. In broad terms, SEPP 71 aims to ensure the natural, cultural, recreational and economic assets of the NSW coast are protected and appropriately managed. The relevant matters for consideration in clause 8 of SEPP 71 include:
- the suitability of development given its type, location and design and its relationship with the surrounding area
  - the scenic qualities of the NSW coast, and means to protect and improve these qualities
  - measures to conserve animals and plants and their habitats
  - measures to protect the cultural places, values, customs, beliefs and traditional knowledge of Aboriginals
  - likely impacts of development on the water quality of coastal waterbodies
  - the conservation and preservation of items of heritage, archaeological or historic significance.

4.5.8 The Department has considered all matters for consideration in SEPP 71. The Department considers the development is unsuitable for the location given the proposed design and its potential impacts on the protected waters of the PSGLMP and the sensitive marine ecosystem. Based on the advice of the EPA, MPA, Council and the independent experts, the Department’s assessment concludes the proposal has not demonstrated the proposal includes sufficient measures to protect Posidonia seagrass and has the potential to have significant adverse impacts on the water quality of the Port Stephens estuary. On this basis, the proposal is considered inconsistent with SEPP 71.

**4.6 Public Exhibition and Notification**

4.6.1 At the time the application was exhibited, it was a transitional Part 3A project. The EA was exhibited in accordance with the EP&A Act at that time, which required the EA to be publicly available for at least 30 days. The application was on public exhibition from 20 March 2014 until 12 May 2014. Details of the exhibition process and notifications are provided in **Section 5.1**.

**4.7 Objects of the EP&A Act**

4.7.1 In determining the application, the consent authority is to consider whether the development is consistent with the relevant objects of the EP&A Act. These objects are detailed in section 1.3 of the EP&A Act. The objects of relevance to the merit assessment of this application include:

- (a) *to promote the social and economic welfare of the community and a better environment by the proper management, development and conservation of the State’s natural and other resources,*
- (b) *to facilitate ecologically sustainable development by integrating relevant economic, environmental and social considerations in decision-making about environmental planning and assessment,*
- (c) *to promote the orderly and economic use and development of land,*
- (e) *to protect the environment, including the conservation of threatened and other species of native animals and plants, ecological communities and their habitats,*
- (f) *to promote the sustainable management of built and cultural heritage (including Aboriginal cultural heritage),*
- (i) *to promote the sharing of the responsibility for environmental planning and assessment between the different levels of government in the State,*
- (j) *to provide increased opportunity for community participation in environmental planning and assessment.*

4.7.2 The Department has fully considered the objects of the EP&A Act, including the encouragement of ecologically sustainable development (ESD), in its assessment of the application (see **Table 2**).

**Table 2 | Considerations Against the Objects of the EP&A Act**

Object	Consideration
(a)	The Department, key government authorities and the independent experts are not satisfied the environmental impacts of the development can be managed or mitigated satisfactorily. The Applicant has been unable to provide sufficient evidence to demonstrate the development would not result in serious or irreversible environmental impacts on Posidonia seagrass and the water quality of the PSGLMP, or that such impacts would be effectively avoided or mitigated. The development raises concerns regarding intergenerational equity as the proposal does not ensure the health, diversity and productivity of the environment are maintained or enhanced for the benefit of future generations.
(b)	The Department’s assessment has concluded the proposal is inconsistent with the principles of ecological sustainable development, namely the precautionary principle, intergenerational equity and conservation of biological diversity and ecological integrity (see <b>Section 4.8</b> below)

Object	Consideration
(c)	The proposal would promote the orderly and economic use of the land through the provision of a use that is compatible with the relevant zonings of the land and waterway. The proposal is located on a cleared and undeveloped parcel of land which has been identified as suitable for land based aquaculture development.
(e)	The Department's assessment has concluded there is scientific uncertainty that the water quality impacts can be sufficiently mitigated by the proposed WWTS and the Applicant has been unable to demonstrate there would not be serious or irreversible impacts on Posidonia seagrass communities. The potential water quality impacts of the proposal on the PSGLMP present an unacceptable risk to marine ecology and inconsistent with the strategic objectives to achieve a NorBE on water quality. The Applicant has not undertaken an adequate assessment of the likely environmental impacts on the natural environment.
(f)	The Applicant has consulted with the local Aboriginal community and has identified an Aboriginal midden on the site. The midden will be secured with fencing to further protect it from construction and operational activities. The Applicant proposes to prepare an Aboriginal Heritage Management Plan to protect the midden for the life of the development, and any other heritage objects that may be uncovered during construction.
(i)	The Department and the Applicant have consulted with all relevant State and local government authorities during the preparation of the EA and assessment of the application. The Department's assessment has been informed by submissions from local and State government (refer to <b>Section 5</b> ) and has considered a range of strategic studies prepared by both State and local government. The Department's assessment has promoted the sharing of the responsibility for environmental planning across different levels of government.
(j)	The Department publicly exhibited the application in March to May 2014 and has considered submissions from the public and special interest groups during its assessment of the application. There has been considerable opportunity for public involvement throughout the assessment of the application. The Applicant has also undertaken a range of community engagement activities during the preparation of the EA.

## 4.8 Ecologically Sustainable Development

4.8.1 The EP&A Act adopts the definition of ESD found in the *Protection of the Environment Administration Act 1991* (POEA Act). Section 6(2) of that Act states that ESD requires the effective integration of economic and environmental considerations in decision-making processes and that ESD can be achieved through the implementation of:

- (a) *the precautionary principle,*
- (b) *inter-generational equity,*
- (c) *conservation of biological diversity and ecological integrity, and*
- (d) *improved valuation, pricing and incentive mechanisms.*

The Department has considered the principles of ESD throughout its assessment of the application. The aspects of most relevance to the proposal include (a) the precautionary principle, (b) inter-generational equity and (c) conservation of biological diversity and ecological integrity. In this instance, the proposal is considered to be inconsistent with these principles. The Department advises a precautionary approach and concludes the potential benefits of the proposal do not outweigh the potential adverse ecological impacts. A summary of the Department's consideration is provided below.

#### The Precautionary Principle

- 4.8.2 The POEA Act states, if there are threats of serious or irreversible environmental damage, the lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation. This means that decision-makers should adopt a precautionary approach when scientific evidence about an environmental impact is uncertain and the risks are high. In the application of the precautionary principle, decisions should be guided by careful evaluation to avoid, where practicable, serious or irreversible damage to the environment and an assessment of the risk-weighted consequences of various options.
- 4.8.3 Based on the advice of the EPA, MPA and the independent experts, the Department's assessment has concluded there is a lack of full scientific certainty regarding appropriate discharge limits, the potential water quality impacts and the efficacy of the Applicant's proposed WWTS. The Department has also concluded there is the potential for serious or irreversible impacts on important Posidonia seagrass beds within the PSGLMP. These concerns were identified and raised with the Applicant as early as 2013 by the EPA in its review of the draft EA and subsequently throughout the assessment of the application by the EPA, Council, MPA and the Department's independent experts.
- 4.8.4 The Applicant has attempted to address these concerns through revisions to the water quality modelling and design of the WWTS to improve the quality of the treated discharge water. However, the Applicant's documentation has been unable to demonstrate to the satisfaction of the key government authorities and the independent experts that the potential water quality impacts can be adequately managed or mitigated to protect the PSGLMP marine ecosystem and the sensitive populations of Posidonia seagrass.
- 4.8.5 The Department advises a precautionary approach and concludes the potential benefits of the proposal do not outweigh the potential adverse environmental impacts.

#### Intergenerational Equity

- 4.8.6 The POEA Act states the present generation should ensure that the health, diversity and productivity of the environment are maintained or enhanced for the benefit of future generations. The Department's assessment has found the proposed operation of the abalone farm may have long-term water quality impacts as a result of high volumes of potentially insufficiently treated wastewater being discharged into the PSGLMP. Furthermore, the likelihood of the loss of Posidonia seagrass associated with the construction and operation of the pipelines and subsequent shading is likely to be permanent.
- 4.8.7 Based on the advice of the EPA, MPA and the Department's independent expert, the Department considers the proposal presents an unacceptable risk to the health and productivity of the PSGLMP marine waters and ecosystems and the Posidonia communities in both the short and longer term. Loss of Posidonia as a result of the pipeline construction may be permanent or take decades to recover. This raises intergenerational equity considerations as the health, diversity and productivity of the PSGLMP environment is dependent on the protection of marine water quality and the presence and abundance of the Posidonia seagrass beds.

#### Conservation of Biological Diversity and Ecological Integrity

- 4.8.8 The POEA Act states that conservation of biological diversity and ecological integrity should be a fundamental consideration in decision making. The purpose of marine parks is to conserve the biological diversity and maintain the integrity and function of ecosystems within marine bioregions in NSW. MPA advised a marine park permit cannot be provided for the development unless it is deemed an ecologically sustainable use, and in this case, MPA has advised the proposal would not conserve the biological diversity and ecological integrity of the PSGLMP.
- 4.8.9 Based on the advice of the EPA, MPA and the Department's independent experts, the Department considers the proposal presents an unacceptable risk to the health of Posidonia seagrass communities and the conservation of biological diversity and ecological integrity of the PSGLMP.

## 4.9 Commonwealth matters

### Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act)

- 4.9.1 The EPBC Act provides for the protection of the environment, especially those aspects of the environment that are considered to be matters of National Environmental Significance (NES). Under the EPBC Act, assessment and approval is required from the Commonwealth Government if a development is likely to impact on a matter of national environmental significance (MNES), as it is considered to be a 'controlled action'.
- 4.9.2 In April 2014, the Applicant referred the application to the former Commonwealth Department of Sustainability, Environment, Water, Population and Communities (DSEWPC) (EPBC Act referral 2014/7813). In May 2014, the former Minister for the Environment advised the abalone farm proposal was not a controlled action and that no further assessment is required.
- 4.9.3 On 7 May 2015, the '*Posidonia australis* meadows of the Manning-Hawkesbury Ecoregion' (which includes Port Stephens) were listed as an endangered ecological community (EEC) under the EPBC Act. The listing was made on the basis this ecological community has undergone severe decline, is estimated to occupy a total area of only 14 km<sup>2</sup> and generally found in small and fragmented patches.
- 4.9.4 As the Commonwealth listing was made after the Minister's decision in 2014, the listing does not affect the assessment process, pursuant to the transitional arrangements in section 158A of the EPBC Act.

# 5 Engagement

## 5.1 Consultation

- 5.1.1 The Applicant, as required by the Director General's Requirements (DGRs), undertook consultation with relevant local and State authorities as well as the community and affected landowners. The Department undertook further consultation with these stakeholders during the exhibition of the EA and throughout the assessment of the application. These consultation activities are described in detail in the following sections.

## 5.2 Consultation by the Applicant

- 5.2.1 The Applicant undertook a range of consultation activities throughout preparation of the EA in mid-2012 and 2013, including:
- letterbox drops (one in 2012 and one in 2013) to approximately 250 residents within Pindimar, Bundabah and selected businesses within Tea Gardens and Hawks nest
  - posting of an information letter on community noticeboards
  - delivery of letters to key stakeholder groups
  - facilitation of a community feedback session
  - distribution of a letter to local Fishing Co-operatives seeking information on local fishing grounds
  - operation of a dedicated community feedback email address
  - a community drop-in session during the exhibition of the EA in March 2014.
- 5.2.2 A summary of issues raised by the community was documented in the EA and a response provided by the Applicant to each issue.

## 5.3 Consultation by the Department

- 5.3.1 The EA was exhibited in accordance with the EP&A Act at that time, which required the EA to be publicly available for at least 30 days. After accepting the EA, the Department:
- made it publicly available from 20 March 2014 to 12 May 2014 (54 days)
    - on the Department's website
    - at the Department's Head Office Information Centre in Sydney
    - at the Nature Conservation Council
    - at Great Lakes (now MidCoast) Council, Port Stephens Council and the Tea Gardens library
  - notified landowners in the vicinity of the site about the exhibition period by letter
  - notified community groups, water-based sporting clubs, special interest and tourism groups, local environmental groups and other interested parties
  - notified relevant State government authorities and Councils by letter
  - placed the exhibition notice in the Forster Great Lakes Advocate, Hawks Nest Myall Coast NOTA and Port Stephens Examiner.
- 5.3.2 During the assessment process, the Department also made a number of documents available for download on its website. These documents included the:
- Part 3A application
  - Director-General's Environmental Assessment Requirements (DGRs)
  - EA, RtS and RtS Addendum
  - submissions received.

## 5.4 Submissions and Advice

- 5.4.1 A total of 219 public submissions were received during the public exhibition period, including five from special interest groups and 214 from the individual members of the community. Of the 219 public submissions received, 213 objected to the development, three were in support and three provided comments.

### **Public Authority Advice**

- 5.4.2 Advice was received from six State government authorities, the former Great Lakes Council (now MidCoast Council) and Port Stephens Council. Key concerns raised related to potential impacts on marine water quality in the PSGLMP, impacts on marine ecology, amenity, biosecurity, amenity and traffic.
- 5.4.3 The former **Great Lakes Council (Council)** (now MidCoast Council) raised concerns regarding potential water quality impacts, on-site effluent disposal, impacts on the existing Aboriginal midden on site, bush fire risk and biodiversity offsets. Council requested the Applicant submit an amended application to address the issues relating to on-site effluent disposal and biodiversity offsets and provide additional information relating to:
- compliance with Council's established water quality objectives and a NorBE on water quality (an objective of the Karuah River Catchment Management Plan)
  - long term water quality impacts on aquatic ecosystems in around the discharge point, particularly from the long-term discharge of ammonia and particulates
  - an appropriate mechanism to ensure the long-term conservation of the biodiversity offset area
  - impacts on species such as Koalas, Wallum Froglet and sea turtles
  - compliance with bush fire management requirements
  - the protection of the Aboriginal midden identified on site (on the foreshore)
  - construction impacts.
- 5.4.4 **Port Stephens Council (PSC)** raised concerns regarding potential environmental impacts, particularly on marine water quality and both marine and land based ecosystems.
- 5.4.5 **EPA** advised it was unable to issue recommended conditions as concerns regarding potential impacts to receiving waters had not been sufficiently addressed. Key concerns raised related to the efficacy of the proposed WWTS and the potential impacts of effluent discharge on Posidonia seagrass populations, insufficient justification for input predictions for the hydrodynamic modelling and insufficient details on the monitoring program and contingency measures.
- 5.4.6 **Roads and Maritime Services (RMS)** (now Transport for NSW (TfNSW)) recommended conditions relating to marine signage.
- 5.4.7 **OEH** (now Environment, Energy and Science Group (EESG)) raised concerns regarding consistency of the biodiversity assessment and conservation of the proposed offsets with contemporary guidelines and the provision of offsets for impacts to the Coastal Saltmarsh EEC. OEH also recommended the Applicant prepare a Vegetation Management Plan (VMP) for retained areas of vegetation and the likely Aboriginal midden on the site be suitably surveyed and secured to ensure its protection prior to the commencement of construction.
- 5.4.8 **Department of Primary Industries (DPI)** provided comments from the former NSW Office of Water, MPA, Crown Lands and Fisheries NSW. These responses are detailed separately below.
- **NSW Office of Water** (now DPIE Water) recommended conditions relating to the pump house excavation and construction, including the requirement for a dewatering management plan and an acid sulfate soils management plan (ASSMP)
  - **MPA** raised concerns regarding damage to seagrass and aquatic fauna from pipeline construction, management of effluent discharge, the clearing of native vegetation, and the need for a permit for the taking of abalone broodstock from the PSGLMP
  - **Crown Lands** raised concerns in relation to the release of nutrients in discharge water, including seasonal and cumulative impacts, and subsequent impacts on the resilience and integrity of marine ecosystems. Additional information was requested regarding the installation and maintenance of the pipelines (which would be located on Crown Land).
  - **Fisheries NSW** recommended an ecological offset be provided for the permanent loss of seagrass caused by pipeline construction. Additional information was requested regarding biosecurity management

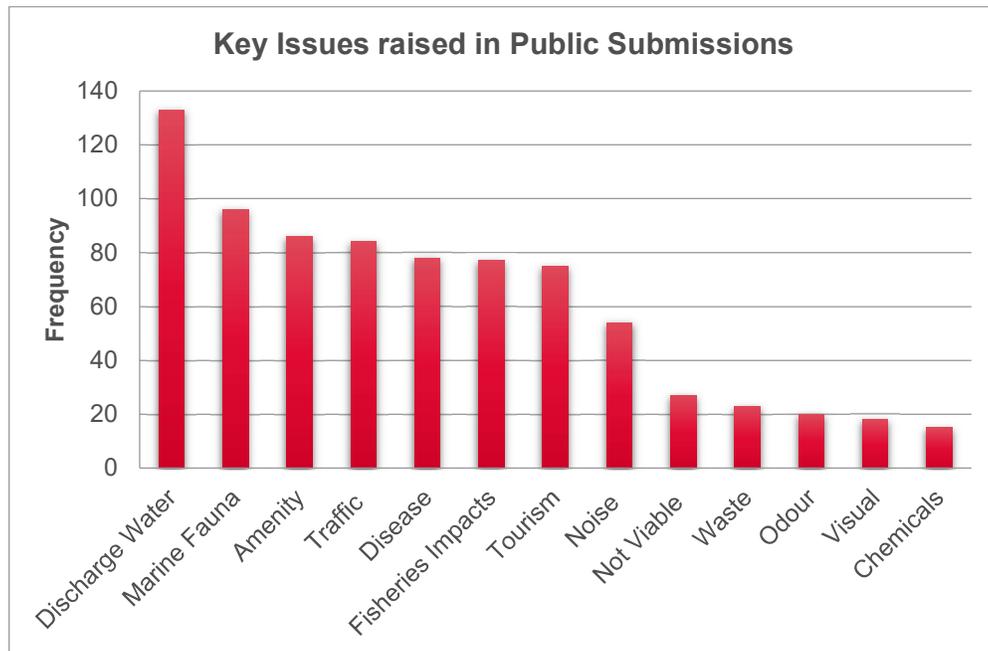
and the assessment of impacts of the onsite sewage management system to demonstrate the proposal would not adversely impact any Priority Oyster Aquaculture Areas. Conditions of consent were recommended requiring the Applicant to obtain a 'permit to harm marine vegetation' for the clearing of a small number of mangroves.

5.4.9 **NSW Rural Fire Service (RFS)** provided recommended conditions of consent in relation to bush fire risk and asset protection, firefighting water supply and emergency exit from the site in the event of a bush fire.

5.4.10 **NSW Trade and Investment** raised no concerns and noted that a Petroleum Exploration Licence (PEL) exists over the proposed development site.

**Public Submissions**

5.4.11 The Department received 219 submissions from the public and special interest groups. Of these submissions, 213 objected to the development, three supported and three provided comments. The key issues raised in public and special interest group submissions are detailed below in **Figure 12** and **Table 3** below.



**Figure 12 | Key Issues Raised in Public Submissions**

5.4.12 Submissions made in support of the proposal stated the development would provide the following benefits:

- the availability of fresh local produce
- job opportunities (including through tourism) in local communities where unemployment is an issue
- potential improvements to local infrastructure, i.e. the potential for road and electricity upgrades, which are needed due to local black outs and poor quality local roads.

**Table 3 | Key Issues Raised in Public Submissions**

Issue	Issue Summary
Discharge water quality	<ul style="list-style-type: none"> <li>• Nutrients such as nitrogen and ammonia may cause long-term impacts on aquatic ecosystems, especially seagrasses</li> <li>• Nutrient loads should be compliant with Council’s established water quality objectives (i.e. NorBE on water quality)</li> </ul>
Disease	<ul style="list-style-type: none"> <li>• Diseases from the farmed abalone may impact on wild populations though the transfer of pathogens in farm wastewater</li> </ul>

Issue	Issue Summary
	<ul style="list-style-type: none"> <li>High temperatures of Port Stephens will increase disease and mortality risk. Abalone is better suited to average water temperatures of 18-19°C (Port Stephens records temperatures of up to 24°C)</li> <li>Variable salinity, especially during periods of heavy rainfall, will increase disease</li> </ul>
Impacts on marine flora and fauna	<ul style="list-style-type: none"> <li>Wastewater leaving the farm may be contaminated with disease affecting wild abalone populations</li> <li>Potential food chain impacts i.e. sea grass degradation leading to fish/turtle/dugong impacts</li> <li>Intake pipelines may 'suck in' marine fauna such as small fish, seahorses, etc</li> </ul>
Amenity	<ul style="list-style-type: none"> <li>'Industry' is not suitable for a peaceful village such as Pindimar, which is quiet and tranquil</li> <li>Potential odour impacts</li> <li>Noise from traffic and farm generators may affect Pindimar, especially at night (and dusk and dawn)</li> <li>Pindimar should not be characterised as 'suburban' for the purposes of noise assessment (i.e. noise assessment incorrect)</li> </ul>
Traffic	<ul style="list-style-type: none"> <li>Traffic volumes in the village are low, many pedestrians and cyclists use the roads in summer (during peak visitation to holiday homes)</li> <li>Local roads would need upgrading</li> <li>Traffic assessment is not accurate</li> <li>Access to the site should be via Clarke Street</li> </ul>
Tourism	<ul style="list-style-type: none"> <li>Local tourist activities such as whale watching, recreational fishing, swimming may be affected by the proposal (due to water pollution and ecosystem impacts)</li> </ul>
Commercial viability and impacts of decommissioning	<ul style="list-style-type: none"> <li>The commercial viability of the proposal has been questioned and concerns raised regarding the removal of infrastructure should the farm be financially unsuccessful</li> </ul>
Waste	<ul style="list-style-type: none"> <li>Questions regarding classification, quantity and disposal of waste material including sediment/sludge from the wastewater treatment ponds</li> </ul>
Visual	<ul style="list-style-type: none"> <li>Impacts of the pipelines and farm infrastructure from the water</li> </ul>

### **Special Interest Groups**

- 5.4.13 **The NSW Greens** raised several concerns regarding potential water quality impacts from the discharge of effluent in proximity to a Sanctuary Zone, mortality risk for the abalone due to unsuitable water temperatures, disease risk to other aquatic fauna and suitability of the site within a sensitive estuarine environment.
- 5.4.14 **Foundation for National Parks and Wildlife** objected to the proposal based on impacts to the Tallowfield Wildlife Refuge which adjoins the proposed development site. Concerns related to the removal of native vegetation and habitat for native wildlife.
- 5.4.15 **Abalone Council of NSW** objected to the proposal due to biosecurity concerns.
- 5.4.16 **Pindimar Bundabah Community Association** objected to the proposal and raised concerns regarding the WWTS, the potential for water quality impacts in the PSGLMP due to eutrophication and biosecurity risks. The Association engaged two experts from the University of Technology, Sydney, and University of Melbourne, to prepare detailed technical reviews of the EA on its behalf to support its objection.
- 5.4.17 **Myall Koala and Environment Group Inc.** objected to the proposal on the basis the abalone farm poses unacceptable risks to the land based and water based environmental values of Port Stephens. The Group also raised concerns regarding the potential impact on seagrass beds and biosecurity risks.

## 5.5 Response to submissions

- 5.5.1 In November 2014, the Applicant submitted a Response to Submissions (RtS) following the public exhibition period. This was made publicly available on the Department's website on 19 November 2014.
- 5.5.2 The RtS included responses to the issues raised in community submissions and the concerns raised in government authority advice. In response to concerns raised regarding water quality impacts, the RtS included an additional stage of treatment in the WWTS comprised of a type of algae biofilter. The RtS was also supported by a supplementary ecology report providing more information on terrestrial and aquatic ecology impacts and an on-site effluent disposal assessment.

### Public Authority Advice

- 5.5.3 The Department consulted key agencies and Council on the RtS and received submissions from Council, EPA, OEH and Fisheries NSW.
- 5.5.4 **Council** recommended the Department request lodgement of an amended application to enable a complete assessment of the proposal. The following key amendments were recommended:
- a smaller scale trial of the proposed WWTS to demonstrate its effectiveness and ability to meet the NorBE test for development in the Myall Lakes and Port Stephens catchment
  - amended plans showing the location of the proposed new wastewater treatment ponds and extent of any additional clearing, including an assessment of any additional impacts.
  - relocation of the proposed on-site effluent disposal area to another location on the site not affected by flooding, sea level rise, watercourse buffers, the adjoining SEPP 14 Coastal Wetlands or the proposed conservation area
  - relocation of the proposed pipeline infrastructure to avoid the Aboriginal midden
  - revision and enhancement of the biodiversity conservation area, inclusion of a tree removal plan and an appropriate legal mechanism to protect biodiversity offsets in perpetuity.
- 5.5.5 **EPA** advised all the previous concerns raised regarding potential impacts to the receiving waters of the PSGLMP and impacts to Posidonia seagrass had not been sufficiently addressed. The EPA declined to provide recommended conditions.
- 5.5.6 **OEH** stated that all its concerns had been adequately addressed subject to the biodiversity offset being secured under a Biobanking Agreement under the *Threatened Species Conservation Act 1995* (TSC Act).
- 5.5.7 **Fisheries NSW** stated it was satisfied with the on-site aerated sewage management arrangements.

### Public Submissions

- 5.5.8 The Department also received four public submissions on the RtS raising concerns with the effectiveness of the revised WWTS and the potential impact of the proposal on the Port Stephens estuary and on Posidonia seagrass populations. Concerns were also raised regarding the location of farm infrastructure within an area affected by flooding and storm surge and a lack of commitment to mitigation measures.

### Independent Expert Advice

- 5.5.9 Dr McPhee carried out an independent review of the EA and RtS, having specific regard to matters regarding water quality and marine ecology. Dr McPhee advised the three-stage algal biofilter included in the revised WWTS is well established as reducing nutrient loads in aquaculture. However, there is a level of uncertainty regarding translating information from one production facility to another and whether the level of nutrient reduction modelled is achievable under all operation circumstances. Furthermore, Dr McPhee advised the RtS had not thoroughly taken into consideration the likelihood of any variability in effluent quality.
- 5.5.10 With respect to marine ecology, Dr McPhee noted that while the area of the disturbance from the proposed abalone farm is relatively small compared to the size of the mapped Posidonia beds in the PSGLMP, this needs to be tempered with the vulnerability of the habitat type and its slow recovery and the exposure to

cumulative impacts. Dr McPhee recommended the Applicant provide offsets for nutrient inputs into the marine environment and to account for the loss of Posidonia seagrass beds.

## **5.6 Response to Submissions Addendum**

- 5.6.1 Following the receipt of submissions and government advice on the RtS in late 2014 and early 2015, the Applicant worked with its consultants to prepare an amended proposal. In 2015, the EPA provided supplementary advice which required the Applicant to meet a more stringent water quality discharge limit for nutrients in the treated wastewater discharged from the abalone farm to the Port Stephens estuary. This more stringent limit was determined on the basis of its own data for the Port Stephens estuary and other estuaries containing Posidonia seagrass.

### ***Draft RtS Addendum***

- 5.6.2 In August 2017, the Applicant approached the Department with a revised proposal described in a Draft RtS Addendum Report. A key amendment to the proposal was a further revision to the WWTS which responded to the EPA's more stringent wastewater quality discharge requirement.
- 5.6.3 The Department advised the draft RtS Addendum did not sufficiently describe the key amendments to the proposal, provide a clear updated project description, clarify any additional environmental impacts or provide an updated set of development plans. In November 2017, the Applicant advised an Amended Environmental Impact Statement would be prepared, however, to date this document has not been submitted.
- 5.6.4 While waiting for the Applicant to submit satisfactory revised documentation, the Department sought to progress the assessment by providing the EPA, NSW Fisheries and Dr Daryl McPhee with an opportunity to review the draft revised proposal and supporting technical reports. The Department met with the EPA and Dr McPhee in February and May 2018 to discuss the proposal and the EPA's views. However, in June 2018, the EPA advised it was unable to support the development in its current form as the proposed WWTS technology is considered experimental, which presents an unacceptable risk to the sensitive receiving environment. Furthermore, the EPA advised several issues previously raised had not been addressed.
- 5.6.5 Throughout 2018, the Department liaised with the EPA technical officers and senior staff, the Applicant (one meeting), NSW Fisheries and Dr McPhee regarding the EPA's concerns in an effort to resolve the outstanding issues. However, despite the Department's efforts, in October 2018, the EPA formally advised the Department the proposed abalone farm presents an unacceptable risk to water quality, important ecological communities (Posidonia) and adjacent Sanctuary Zones. In particular, the EPA advised the proposed technology for the revised WWTS was experimental and not appropriate given the location in a Marine Park.
- 5.6.6 Dr McPhee and Fisheries disagreed with the EPA's view that the proposed wastewater treatment technology was experimental, however, noted any such system needs to be designed and optimised to suit the specific location and the specific marine aquaculture farming practice being proposed.

### ***Engagement of a Marine Ecology Expert***

- 5.6.7 To assist with its consideration of the WWTS design, in December 2018, the Department engaged Dr Pia Winberg an independent marine ecology expert with specialist technical knowledge in algal bioremediation systems. In May 2019, the Department visited the site with Dr Winberg, NSW Fisheries and the Applicant. Dr Winberg subsequently advised the proposal had not been designed to suit the location and does not adequately demonstrate the WWTS will be operated without considerable risks to both the viability of the project and the local marine ecosystem.
- 5.6.8 Dr Winberg recommended the Applicant develop pilot HRAP systems at a smaller scale to demonstrate the appropriateness of the design, technological competence and cross annual operational consistency. The Applicant would need to undertake ongoing intensive monitoring for both nutrient remediation and biosecurity concerns. Dr Winberg concluded that such a staged strategy would also be prudent for the investment and scaling of the operation and demonstrate ongoing goodwill from the aquaculture industry and responsible custodianship of the coastal ecosystems.

5.6.9 Despite Dr Winberg's advice and recommended amendments to the design of the WWTS, the Applicant made no further amendments to the project design and submitted the RtS Addendum as a final document in December 2020. A summary of government advice on the final RtS Addendum is provided below. This represents the final views of all the government authorities.

#### **Public Authority Advice**

- 5.6.10 **Council** advised it had outstanding concerns in relation to water quality, effluent disposal and biodiversity and was unable to undertake a complete assessment of the application. Council also noted a number of the Applicant's studies were outdated, particularly in light of the recent approval and commissioning of a new on-site wastewater treatment system in 2017 for a work shed on the site.
- 5.6.11 **PSC** recommended conditions requiring monitoring and management plans for water quality and seagrass.
- 5.6.12 **EPA** advised the substantive issues previously raised have not been satisfactorily addressed. The EPA maintained its position that the abalone farm, as proposed, in its present location, represents an unacceptable risk to a declared EEC (*Posidonia australis*) and adjacent Sanctuary Zones in the PSGLMP. The proposal does not provide the necessary level of confidence that the quality of the discharge effluent can be managed to ensure the protection of the estuarine waters of the PSGLMP.
- 5.6.13 **MPA** advised the likelihood of seagrass loss associated with the pipeline construction, maintenance and ongoing operation is of concern. MPA noted the advice of the EPA that suggests the proposed system relies on an effluent treatment system that is an experimental process and the effectiveness and robustness of this system has not been demonstrated in NSW. MPA stated the proposal in its current form would appear to be inconsistent with three of the four principles of ESD, namely the precautionary principle, inter-generational equity and the conservation of biological diversity and ecological integrity.
- 5.6.14 **Fisheries NSW** acknowledged algal treatment systems are being used in association with aquaculture facilities in Australia but noted the indicative design of the HRAP system presented in the plans submitted by the Applicant only shows a total of eight ponds on the site, rather than the nine ponds described in the Applicant's documentation.
- 5.6.15 **Crown Lands** advised it had no objection to the proposal and recommended a condition requiring the Applicant to obtain a licence under the CLM Act. Crown Lands also noted the bed of Port Stephens is subject to Aboriginal Land Claim 6686 by Worimi Local Aboriginal Land Council (LALC) and recommended the Applicant consult with the Worimi LALC to obtain concurrence to construct the pipelines.
- 5.6.16 **Biodiversity Conservation Division (BCD)** (former OEH) advised additional threatened species have been listed since the preparation of the Applicant's flora and fauna assessment in 2013 and there may have been changes in the abundance of some threatened species that occur on the site or for which there is suitable foraging habitat. BCD recommended the Applicant carry out an additional assessment of potential impacts on any species listed since 2013 and update the assessment of significance for those species where there have been changes in the abundance or distribution of those species.
- 5.6.17 **DPIE Water and the Natural Resources Access Regulator (NRAR)** (former NSW Office of Water) concurred with the recommendations made by the NSW Office of Water in 2014 on the EA.
- 5.6.18 **RFS** recommended a suite of conditions regarding bush fire management.
- 5.6.19 **TfNSW** advised the proposal would have minimal impacts to the safety of navigation and recommended a number of conditions to ensure construction impacts would be managed.

## 6 Assessment

- 6.1.1 The Department's assessment of the application has been undertaken in accordance with the EP&A Act. The relevant matters of consideration in determining the application are:
- the provisions of relevant EPIs
  - the EP&A Regulation
  - the likely impacts of the application, including environmental impacts on the natural and built environment, and social and economic impacts in the locality
  - the suitability of the site for the development
  - submissions made in accordance with the EP&A Act or the EP&A Regulation
  - whether the application is in the public interest.
- 6.1.2 The Department acknowledges the development has the potential to provide a range of local social and economic benefits and would contribute to the growth of the NSW aquaculture industry. However, the development must be assessed on its merits having regard to the matters for consideration under section 4.15 of the EP& Act.
- 6.1.3 In preparing this assessment, the Department visited the site on two occasions and considered the Applicant's EA, RtS and RtS Addendum and independent advice from marine sciences expert, Dr Daryl McPhee, and algae bioremediation expert, Dr Pia Winberg. The Department has considered the submissions made by the public and special interest groups and advice from government authorities.
- 6.1.4 Throughout the assessment, the EPA has consistently maintained significant concerns regarding the potential environmental impacts of the proposal on the marine water quality and seagrass beds in the PSGLMP. The Department has sought to resolve the EPA's concerns via a number of meetings, and written correspondence with the EPA and the Applicant and by seeking advice from independent experts. However, the EPA has consistently advised the issues remain unresolved and it does not have the confidence the proposal could operate without adverse environmental impacts. The EPA has declined to issue conditions of consent and would therefore not be in a position to issue an EPL. These issues are discussed in detail in **Sections 6.1 to Section 6.3** below.
- 6.1.5 The Department considers the key assessment issues are water quality impacts, impacts on seagrass and the public interest.

### 6.1 Water Quality Impacts

- 6.1.1 Abalone require a constant flow of high quality marine water for optimum health and growth. At full capacity, the proposed abalone farm will require approximately 50 ML per day of marine water to operate and would therefore discharge significant volumes of treated wastewater every day into the PSGLMP. The discharge outlet is approximately 400 m north of a designated Sanctuary Zone and approximately 100 m east of a large area of Posidonia seagrass beds. The ability of the Applicant's WWTS to effectively treat the discharge to remove nutrients is uncertain.
- 6.1.2 Effluent from the farm will contain suspended solids and dissolved organic nutrients (nitrogen and phosphorous) from uneaten food and abalone waste (faeces, feed and bacteria). An increase in the supply of nitrogen and phosphorous has the potential to stimulate the growth of plants, algae and phytoplankton in marine waters, leading to eutrophication (enrichment of nutrients into a waterbody). Eutrophication can lead to algal blooms which have the potential to cause substantial ecological degradation in the marine environment, including increased turbidity and reduced dissolved oxygen. Therefore, if not sufficiently treated prior to discharge, there is potential for the discharged wastewater to have a detrimental impact on the water quality of the PSGLMP marine waters.

## **Applicant's Assessment**

### Ambient Water Quality

- 6.1.3 In order to demonstrate a NorBE on water quality, as required by Council's water quality objectives for the Port Stephens estuary, and to set appropriate discharge limits, the ambient water quality in the receiving environment needed to be established. To do this, the Applicant relied on a number of existing studies and limited sampling carried out between 1998 to 2012 by Manly Hydraulics Laboratory, EPA, DPI and PSC. These reports found that water quality in the Port Stephens estuary was generally 'good' and generally satisfies the ANZECC guideline trigger values for the protection of aquatic ecosystems and secondary and primary contact recreation.
- 6.1.4 In response to concerns raised by the EPA, additional ambient water quality samples were taken by the Applicant between 2016 and 2017, adjacent to the proposed outlets and closest seagrass beds. The results were reported in the RtS Addendum. However, even with this additional data, the Applicant's own consultant, Marine Solutions, stated 'the available data are very limited and do not capture the seasonal and spatial variance in nitrogen levels in Port Stephens nor do they highlight nitrogen inputs from other anthropogenic sources' (e.g. urban and industrial stormwater run-off, nutrients from grazing and agriculture). Marine Solutions advised a targeted and well-designed, water quality monitoring program is critical to understand ambient conditions and to ensure discharge regulations are realistic.
- 6.1.5 Despite acknowledging that limited water quality data is available, the Applicant concluded the nutrient concentrations within Port Stephens are highly variable and are generally comparable to the ANZECC trigger values for marine ecosystems.

### Assessment of Impacts

- 6.1.6 To assess the potential impacts of wastewater discharge on the marine environment, the Applicant carried out three-dimensional water quality modelling in the EA and RtS to predict the nutrient loads in the wastewater discharge and model the dispersion of the discharge at the outlet pipes. In the RtS Addendum, the Applicant relied on a literature review to predict water quality impacts, rather than carrying out further modelling. The key focus of the Applicant's assessment of water quality impacts was on nitrogen (N) as ammonia (interchangeably referred to by the Applicant as 'ammonia', 'ammonia-N' and 'total ammonia nitrogen'). Ammonia occurs in two forms, unionised ammonia (NH<sub>3</sub>) which is toxic to fish, and ammonium ion (NH<sub>4</sub>) which is relatively non-toxic until it is in higher concentrations.
- 6.1.7 The EA and RtS assessment considered a worst-case scenario at full farm capacity during both neap (smaller tides) and spring tides (larger tides). The Applicant's assessment predicted the average maximum ammonia-N concentration in the discharged wastewater would be 11.7 µg/L and reports this would exceed the ANZECC trigger value of 10 µg/L for recreational purposes by 1.7 µg/L. While all other nutrient parameters would be below ANZECC trigger values. However, the Applicant noted elevated concentrations would be confined to a small (25 m x 25 m) area close to the discharge point and discharge depth, where recreational uses are unlikely to occur (as pipes and discharge points will be marked with navigational buoys).
- 6.1.8 The Applicant's predicted discharge nutrient concentrations for the WWTS described in the EA and RtS for all nutrients, as reported in the Applicant's assessment, is outlined in **Table 4** below.
- 6.1.9 The Department notes not all the ANZECC trigger values outlined in the Applicant's assessment (as shown in **Table 4**) reflect the recommended trigger values in the ANZECC guidelines for estuaries in south-east Australia (Table 3.3.2 of Volume 1 of the Guidelines). The Applicant's assessment adopted a trigger value of Filterable Reactive Phosphorous (FRP) of 15 µg/L, however the Department notes this should have been a concentration of 5 µg/L. The predicted discharge concentration of 10 µg/L therefore exceeds the trigger value of 5 µg/L for FRP. Similarly, the value for TP should be 30 µg/L not 50 µg/L.

6.1.10 It is also noted, that while the Applicant’s predictions are understood to be for ammonia-N (both NH<sub>3</sub> and NH<sub>4</sub>) the Applicant used the ANZECC trigger value for ammonium (NH<sub>4</sub>) of 15 µg/L for marine ecosystems.

**Table 4 | Predicted WWTS Discharge Nutrient Concentrations**

Nutrient	EA Discharge Concentration (µg/L)	RtS Discharge Concentration (µg/L)	ANZECC Trigger Value (µg/L) reported in Applicant’s Assessment	
			Marine Ecosystems <sup>(e)</sup>	Recreational Purposes <sup>(f)</sup>
Ammonia	78	11.7	15	10
TN <sup>(a)</sup>	113	17	300	-
FRP <sup>(b)</sup>	25	10	15	-
TP <sup>(c)</sup>	30	12	50	-
TSS <sup>(d)</sup>	180	180	10,000	1,000,000

<sup>(a)</sup> TN = Total Nitrogen includes all forms of dissolved nitrogen and total ammonia nitrogen (inclusive of ammonia and ammonium); <sup>(b)</sup> FRP = Filterable Reactive Phosphorous; <sup>(c)</sup> TP = Total Phosphorous; <sup>(d)</sup> TSS = Total Suspended Solids; <sup>(e)</sup> Trigger values from Volume 1, ANZECC Guidelines; <sup>(f)</sup> Trigger values from Table 5.2.3, Volume 1, ANZECC Guidelines

Wastewater Treatment System

6.1.11 The design of the Applicant’s WWTS has evolved over the course of the assessment primarily in response to concerns raised by the EPA. To meet the EPA requirements for the ammonia-N (both NH<sub>3</sub> and NH<sub>4</sub>) discharge concentration of 2 – 3 µg/L, the final design described in the RtS Addendum involves several stages of treatment using algal bioremediation, including a three-stage algal biofilter and a series of HRAPs. The final proposed WWTS is illustrated in **Figure 10** (see **Section 2.4** of this report).

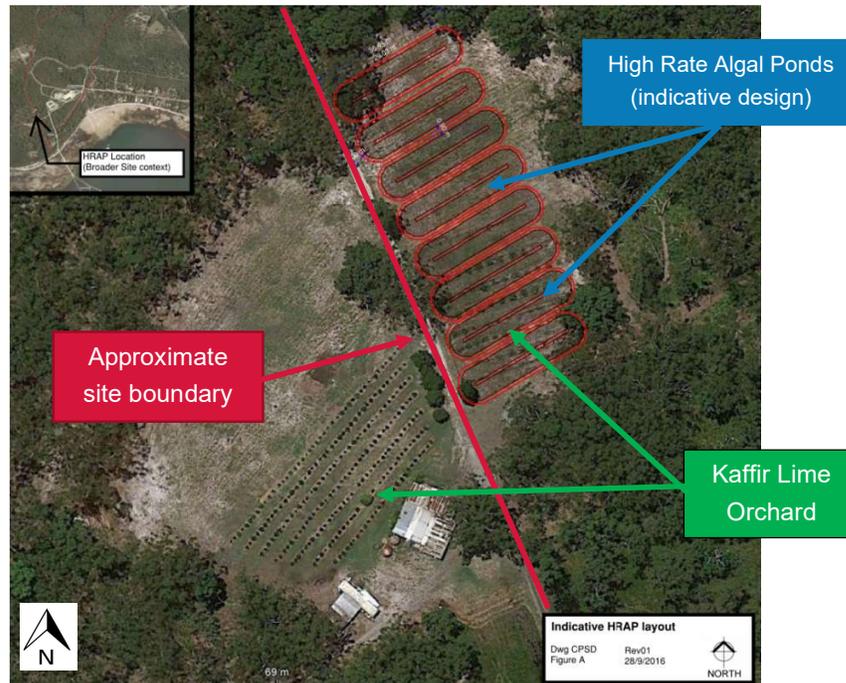
6.1.12 The Applicant proposes to build the HRAPs on a cleared area in the south-western corner of the site, currently half occupied by an old lime tree plantation, with the remainder of the site being cleared and DA approved (DA 271/2009, Great Lakes Council) for an expansion of agriculture (lime trees). The area of the old lime orchard and adjacent cleared land is approximately 0.47 ha (4,700 m<sup>2</sup>) (refer **Figure 13**).

6.1.13 The Applicant’s consultant, Marine Solutions, noted the HRAP design described in its report was not prescriptive and was to be used as a guide only. The indicative design for the HRAPs included in the Marine Solutions report, as illustrated in **Figure 13**, only shows eight ponds in the cleared area, instead of the nine ponds described in the Applicant’s RtS Addendum.

6.1.14 In lieu of modelling the HRAP system, the Applicant relied on a literature review to estimate the nitrogen removal efficiency of the system. The Applicant advised the HRAP system would reduce the concentration of dissolved nutrients in the form of dissolved inorganic nitrogen (DIN) (includes nitrogen in the form of ammonia, ammonium, nitrate and nitrite) to between 20 – 200 µg/L and the concentration of ammonium to 0.003 - 0.005 µg/L. No estimate was provided for the predicted discharge concentration for ammonia-N. The Applicant only noted that ammonia levels are intrinsically linked to DIN. It is therefore unclear what concentration of ammonia-N would be achieved by the addition of the HRAP system.

Monitoring and Contingencies

6.1.15 The Applicant proposes to monitor water quality within the farm and within marine waters adjacent to the outflow pipes. A draft monitoring regime was included in the EA, however, specific monitoring locations were not identified. Monitoring is proposed to be undertaken in accordance with EPA requirements with regard to timing, criteria and location. In the event water quality exceeds discharge limits, the Applicant proposed several contingencies including reducing abalone feed levels, ceasing water discharge and recirculation of treated farm water, increasing aeration of water, reducing stock levels and reviewing the WWTS.



**Figure 13 | Indicative HRAP Design and Location**

#### **Submissions and Government Advice**

- 6.1.16 The potential for the proposal to have adverse water quality impacts was the most significant concern raised in public submissions (62% of submissions). Concerns raised related to the potential discharge of nutrients to the PSGLMP, the need to achieve a NorBE on water quality and long-term impacts on aquatic ecosystems.
- 6.1.17 Key concerns raised in government advice related to the efficacy of the proposed WWTS, insufficient baseline ambient water quality data, lack of a detailed monitoring program, constraints of the water quality modelling and lack of contingencies. Government authorities noted the water quality modelling lacked consideration of variability in performance of the WWTS as a result of seasonal variations and weather conditions.
- 6.1.18 Throughout the assessment, the EPA and Council have maintained their concerns regarding the ability of the proposed WWTS to effectively and consistently remove nutrients from the discharge waters. Given the limited ambient water quality monitoring data available and the environmental values of the PSGLMP, the EPA recommended a conservative discharge concentration of 2 - 3 µg/L for ammonia-N be adopted to ensure the protection of the PSGLMP aquatic ecosystem. The recommended discharge limit was based on EPA water quality data from Port Stephens and three other NSW estuaries with Posidonia seagrass growing in them, primarily Lake Macquarie, with limited data from Wallis Lake and Brisbane Waters.
- 6.1.19 Despite the Applicant adding additional stages of treatment to the WWTS (as described in the RtS and RtS Addendum), carrying out further water quality modelling and providing additional technical reports and information, the Applicant has been unable to satisfy the concerns of the EPA, Council, MPA and the Department's experts.. Advice from the EPA stated the proposed WWTS system relies on the effectiveness of the HRAP system, an effluent treatment system that is an experimental process, and the effectiveness, consistency in performance and robustness of this system has not been demonstrated in NSW.
- 6.1.20 The EPA maintains its position the proposal would result in a substantial discharge of effluent and the Applicant's assessment does not provide the necessary level of confidence that the quality of this effluent can be managed to ensure the protection of waters in the Marine Park. On that basis, the EPA has recommended a precautionary approach and has declined to issue recommended conditions that could be incorporated into a development consent or an EPL.

- 6.1.21 Following its review of the RtS and RtS Addendum, Council advised its concerns regarding the risk of water quality impacts remain as the Applicant's NorBE assessment is based on limited and dated studies and presents a significant risk. Council recommended the WWTS be proven on a smaller scale to provide certainty the NorBE objectives can be achieved. Furthermore, as the information previously requested by Council has not been provided, Council is unable to complete its assessment of the application.
- 6.1.22 Advice from the MPA concurs with the concerns raised by the EPA. MPA advised the threat of serious or irreversible damage environmental damage and a lack of full scientific certainty associated with the proposed WWTS enlivens the precautionary principle. MPA concludes the proposal in its current form would appear to be inconsistent with three of the four principles of ESD, namely, the precautionary principle, inter-generational equity and the conservation of biological diversity and ecological integrity.

### **Expert Advice**

#### **Dr McPhee**

- 6.1.23 Dr McPhee recommended discharge limits for ammonia-N be 10 µg/L based on the ANZECC trigger value for recreational purposes. However, Dr McPhee noted the EPA has recommended discharge limits well below ANZECC trigger values due to the limited available ambient water quality data and the environmental values of the PSGMLP. While Dr McPhee does not support the basis for the EPA's recommended limits, Dr McPhee considers more stringent limits below ANZECC trigger values are justified on a precautionary basis given the uncertainty with respect to the ambient conditions.
- 6.1.24 Dr McPhee's advice also noted the lack of clarity around the descriptors with respect to the Applicant's reporting on predicted ammonia concentrations and data provided by the EPA, also noting this is complicated by the fact that the toxicity of ammonia-N varies depending on the temperature and pH of discharge waters.
- 6.1.25 Over the course of the assessment, Dr McPhee has consistently advised the algal bioremediation wastewater treatment techniques proposed by the Applicant are well-established, efficient and cost-effective wastewater treatment methods and disagrees with the EPA's view that the HRAP system is experimental in nature.
- 6.1.26 However, Dr McPhee considers there is a level of uncertainty regarding the performance of the Applicant's WWTS. Dr McPhee notes the Applicant has carried out an extensive literature review of HRAPs to demonstrate the effectiveness of this system in other aquaculture facilities. However, while the information presented is relevant and demonstrates in theory the technology can work, there are a range of project-specific performance considerations for the HRAP system that have not been sufficiently described or considered by the Applicant. This includes design constraints, weather conditions, seasonal factors and the strain of algae used. As such, there is a level of uncertainty as to whether the level of nutrient reduction modelled is achievable under all operational circumstances and a lack of contingencies should the HRAP be ineffective for a significant period. Given the uncertainties, consistently meeting the relevant water quality discharge limits cannot be guaranteed.

#### **Dr Pia Winberg**

- 6.1.27 Given the specific issues raised by the EPA in relation to the performance of the proposed incorporation of the HRAP system into the WWTS, in 2018, the Department also engaged Dr Pia Winberg, a marine ecology and algal bioremediation expert. The focus of Dr Winberg's review was to consider the effectiveness of HRAP technology as an addition to the proposal to remediate the nutrient load concerns. Dr Winberg visited the site with the Department, the Applicant and DPI as part of her consideration of the proposal.
- 6.1.28 Dr Winberg advised that HRAP technology is indeed a suitable and effective technology that can remediate nutrient streams from diverse sources, including abalone wastewater. Dr Winberg acknowledged the Applicant's extensive literature review on the HRAP concept to demonstrate its effectiveness. However, Dr Winberg advised the proposal does not adequately demonstrate the HRAP system will be operated without considerable risks to both the viability of the development and the local marine ecosystem. Specific concerns raised related to the design of the HRAP system (algae production, stocking and harvesting), a lack of regard

to diurnal (night and day) and seasonal variability in performance, insufficient biosecurity management and demonstrated practical operating knowledge.

- 6.1.29 As algal production (and therefore the effectiveness of the HRAPs) is light dependent, Dr Winberg also advised the estimated area set aside for the HRAP system is insufficient as the proposed HRAP location is surrounded by tall trees and shaded for a large extent of the day. To achieve a NorBE on water quality for the proposed scale of the development (60 tpa of abalone), Dr Winberg recommended the HRAP area be a minimum of one ha, which is double the area proposed by the Applicant.
- 6.1.30 Dr Winberg recommended the fully scaled proposal should not be approved and suggested the Applicant develop pilot HRAP systems at a smaller scale that can demonstrate the design, technological competence and cross-annual operational consistency. This should also include monthly water quality monitoring at and around the proposed discharge point to confirm water quality targets and ongoing intensive monitoring for nutrient remediation. Dr Winberg concurs with the government agencies that application of the precautionary principle with respect to the application is prudent, given the location and receiving marine habitat.

### ***Department's Assessment***

#### ***Ambient Water Quality and Discharge Limits***

- 6.1.31 The EPA's guidance on 'Using the ANZECC Guidelines and Water Quality Objectives in NSW' (2006) states the ANZECC guidelines are conservative assessment levels, not 'pass/fail' criteria. As such, it is important to consider the local context to set appropriate discharge limits, as local conditions vary naturally dependent on the seasons, weather, tides and other anthropogenic inputs (e.g. stormwater runoff).
- 6.1.32 The EPA, Council and Dr McPhee have advised the Applicant has not provided sufficient ambient data to have confidence the Applicant's proposed discharge concentrations are appropriate. The Applicant's assessment collates ambient water quality data from various sources and locations over a significant period (since 1998). However, this data has not been analysed or presented in a useable form and as such, it is difficult to interpret. As there is considerable spatial and temporal variability in the data presented, the drivers of these variations cannot be discerned with any certainty and what this data means in the context of the proposal is uncertain.
- 6.1.33 While the EPA's recommended discharge limit for ammonia-N is conservative, in the absence of suitable reliable data the EPA's recommended limit may not be appropriate for the locational specific nutrient, temperature and pH regime at the abalone farm discharge location. The Department also notes and concurs with Dr McPhee's advice that there is uncertainty with respect to the descriptors used by the Applicant for ammonia, with different descriptors used for discharge water quality characteristics throughout the documentation submitted over the course of the assessment.
- 6.1.34 The Department concurs with other government authorities and Dr McPhee that the water quality data presented by the Applicant is insufficient to determine appropriate discharge limits for the proposal with any certainty. This position is supported by the Applicant's own consultant report by Marine Solutions, which stated the available ambient water quality data is limited. On this basis and given the lack of scientific certainty regarding the existing ambient water quality in the PSGLMP, the Department recommends a precautionary approach be adopted in this case.
- 6.1.35 That is, given the uncertainty around the actual background water quality and the appropriateness of the EPA's recommended limit, the Department is unable to recommend an appropriate discharge limit to ensure a NorBE is achieved and the estuarine environment is protected.

#### ***Assessment of Impacts***

- 6.1.36 The potential water quality impacts of the proposal were identified early in the assessment process as a key issue by the Department, key government authorities and the community. The EPA has maintained significant concerns regarding the conservatism and robustness of the Applicant's water quality modelling

and the worst case and cumulative water quality impacts of the proposal. Council raised similar concerns and Dr Winberg and Dr McPhee have subsequently advised the application is insufficient in this regard.

- 6.1.37 The Department has provided considerable opportunity for the Applicant to address the concerns raised, reviewing multiple revisions of the Applicant's water quality assessment and WWTS in consultation with the key government authorities and the experts. The Department acknowledges the Applicant's efforts to demonstrate a NorBE on the water quality of the PSGLMP, however, uncertainties remain regarding the robustness of the water quality model and its predictions and the efficacy of the proposed WWTS. The Applicant has been unable to confirm the proposal will have a NorBE effect on water quality and has not demonstrated with scientific certainty that the water quality of the PSGLMP will be protected.
- 6.1.38 Having regard to the advice of the government authorities and independent experts, the Department considers the application documentation does not contain a complete and robust assessment of water quality impacts and does not adequately demonstrate the potential impacts of the development can be effectively mitigated. The Department's assessment finds the Applicant has not undertaken an adequate assessment of the likely environmental impacts on the natural environment and concludes the application has not satisfied the requirements of section 4.15(1)(b) of the EP&A Act.

#### Wastewater Treatment System and Contingencies

- 6.1.39 The Department acknowledges the Applicant has made several changes to the WWTS in response to the concerns raised by the EPA, Council and the public. The Department, Fisheries NSW and the independent experts have worked cooperatively with the Applicant to try to resolve the concerns raised and clearly articulate the key issues, recommended design changes and information required. This included recommendations regarding the design of the WWTS, staging the proposal and carrying out PoP trials of the WWTS before scaling to commercial operations.
- 6.1.40 Despite this, the Applicant has persisted with seeking consent for a large-scale commercial operation without first demonstrating the key components of the farm WWTS can be operated and managed at a smaller scale to give confidence in the proposal in the proposed location.
- 6.1.41 The Department notes the design for the HRAP system proposed by the Applicant's consultant, Marine Solutions, is indicative. However, the design indicates the cleared area is not large enough to provide the nine individual HRAPs proposed. Additionally, Dr Winberg's advice indicates the area of HRAPs should be at least double what is proposed given the limitation on light access, indicating the scale of the development is unsuitable for the location.
- 6.1.42 Furthermore, on the basis of the Applicant's assessment, it is not clear how effective the HRAPs will be at removing ammonia-N from discharge waters as the Marine Solutions report discusses the predicted effectiveness of the HRAPs for removing DIN and ammonium, but does not provide the predicted discharge concentration for ammonia-N.
- 6.1.43 Having regard to the advice of the independent experts, the Department considers the WWTS technology proposed is suitable to treat wastewater from an abalone farm. However, the independent experts have advised the final design of the WWTS lacks sufficient details around the project-specific requirements necessary to have confidence in the performance of the Applicant's proposed system and would present a significant risk to the local marine ecosystem. Furthermore, the Department notes the experts have advised the WWTS lacks appropriate contingencies in the event of low performance conditions and/or the inability to meet the relevant discharge limits.

#### Conclusion

Based on the advice of the EPA, Council and the independent experts, the Department has considerable concerns about the potential water quality impacts to the PSGLMP ecosystem. The Department's assessment concludes the proposal has the potential to cause serious and irreversible adverse impacts on

the PSGLMP receiving marine environment, including sensitive ecological communities such as the Posidonia seagrass. The Department considers the potential for serious and irreversible impacts to occur represents an unacceptable risk.

- 6.1.44 There is a lack of scientific certainty regarding the ambient water quality, appropriate discharge limits, water quality impacts and the performance of the WWTS. The Department advises a precautionary approach and concludes the potential benefits of the proposal do not outweigh the potential adverse environmental impacts.

## 6.2 Seagrass Impacts

- 6.2.1 The inlet and outlet pipes from the proposed abalone farm will pass through mangroves, intertidal sandflats and seagrass meadows (refer **Figure 8**). The potential impact of the proposed construction and operation of the development on Posidonia seagrass meadows in the PSGLMP is a key concern for this proposal. Direct impacts would be caused by construction of the proposed pipelines, which will result in the removal and disturbance of approximately 40 m<sup>2</sup> of Posidonia seagrass meadows along the pipeline alignments. Indirect impacts may be caused by:
- shading of the seagrass from the constructed pipelines as light is a limiting factor in seagrass growth (area of impact not quantified in the application)
  - elevated nutrient levels in the treated effluent which would be continuously discharged in high volumes from the farm outlet pipes. The localised addition of nutrients to the marine environment may promote the growth of epiphytic algae<sup>3</sup> on Posidonia leaves, which in turn can impact the health and ultimately the survival of Posidonia meadows.

### *Applicant's Assessment*

- 6.2.2 To assess the potential impacts of the proposal on aquatic ecology, in 2013 the Applicant carried out an Aquatic Ecology Assessment (AEA) and a subsequent biodiversity assessment in 2014 as part of the EA and RtS, respectively. The 2013 AEA considered the potential impacts across a range of aquatic flora and fauna species, however, the focus of the assessment was primarily on mangrove and seagrass habitats as these were the most likely to be directly disturbed by the proposed farm. The 2013 AEA concluded the risk of impacts to the mangrove habitat would be low or negligible given the small number of trees impacted by the construction of the pipelines.
- 6.2.3 The 2013 AEA noted the shallow margins of the Port Stephens estuary are habitat for extensive seagrass meadows, namely Posidonia (refer **Figure 14**), eelgrasses (*Zostera capricorni*) and paddleweed (*Halophila ovalis*). The Applicant's investigations found Posidonia dominates the seagrass meadow underneath the proposed pipeline alignment. The 2013 AEA stated Posidonia is the most susceptible to anthropogenic disturbance and has been shown to be difficult to rehabilitate following disturbance. In acknowledgement of this, shading impacts are proposed to be reduced by separating the inlet and outlet pipes and raising the pipelines over seagrass habitat.
- 6.2.4 The 2014 biodiversity assessment provided further details regarding the Applicant's approach to the assessment and management of aquatic ecology impacts in response to matters raised by the former OEH, Council, EPA and the community (as outlined in **Section 5.4** above). The assessment confirmed the Applicant proposes to design and implement monitoring programs to verify the impact on the seagrass and mangrove habitats adjacent to trenching works and pipeline placements. A seagrass management plan is also proposed to guide and minimise any disturbance as a result of laying pipelines through the seagrass habitat. The Applicant did not propose to provide any offsets for the loss of Posidonia seagrass.

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<sup>3</sup> Epiphytic algae are species of algae that grow on other plants. Epiphytes are generally fast growing and can dominate seagrass ecosystems. Epiphytic algae can damage the seagrass by smothering it or competing for light.



**Figure 14 | Posidonia Seagrass Meadow**

- 6.2.5 To demonstrate Posidonia can tolerate a range of nutrient concentrations, the RtS Addendum included a limited set of raw water quality data for Port Stephens and other NSW estuaries from a 35 year-old research study and a public online database. No analysis of these results was provided.
- 6.2.6 The Applicant's assessment concluded the proposed discharge from the proposed abalone farm will not impact on the seagrasses near the site and as such, the proposed abalone farm will result in minimal impacts to aquatic species and habitats in the PSGLMP estuary. Furthermore, the proposal would not have any significant impact on the viability of the local population of Posidonia or result in a net loss of Posidonia seagrasses within the coastal and estuarine waters of NSW.
- Submissions and Government Advice**
- 6.2.7 Throughout the assessment of the application, the EPA, MidCoast Council and MPA have maintained their concern regarding the potential impacts of the construction and ongoing operation of the proposal on the existing Posidonia seagrass beds. Key concerns related to the potential for water quality impacts from the farm WWTS discharge and shading (discussed in **Section 6.1** above) and the direct permanent impacts resulting from the pipeline construction.
- 6.2.8 Despite the timing of the listing of Posidonia under the EPBC Act, the EPA is of the view the application should be referred to the Commonwealth for consideration. The MPA agrees that consideration of the potential impacts of the development on a nationally listed EEC within a marine park established to conserve biological diversity and maintain ecosystem integrity and function are central to the consideration of ecological sustainability.
- 6.2.9 Throughout the assessment, the EPA has stated the current proposal is a significant threat to Posidonia as this species exists in marine environments with low nutrient concentrations. If approved, there is a risk of a continual discharge of nutrient-rich wastewater which would be detrimental to this species. Furthermore, the proposal would set a precedent for further expansion of the industry in the Port that collectively would constitute a risk to the viability and health of this species. The EPA advised the proposal presents an unacceptable risk to Posidonia seagrass and recommends a precautionary approach.
- 6.2.10 As the development would damage and interfere with habitat in a GUZ in the GLPSMP, the development would require a marine park permit under the MEM Act from MPA. MPA advised that Posidonia has low resilience to impacts and has extremely slow rates of recovery. Loss or damage can be permanent or take decades to recover raising intergenerational equity considerations. MPA shares the concerns raised by the EPA relating to direct disturbance of seagrass meadows and the risk of water quality impacts and concluded

the proposal would be inconsistent with the principles of ESD, namely intergenerational equity and conservation of biological diversity and ecological integrity.

- 6.2.11 Having regard to the Objects of the MEM Act, which requires consistency with the principles of ESD, MPA advised a permit cannot be granted for the development.
- 6.2.12 Crown Lands raised concerns about seasonal, compounded or cumulative effects of nutrients and eutrophication on seagrass. Key concerns raised related to the potential for an accelerated increase of nutrient inputs to threaten marine ecosystem resilience and integrity, an increase in the risk of marine algal blooms and other water quality problems (e.g. odour, scum) and localised decreases in oxygen in marine waters at the discharge point.
- 6.2.13 Impacts on marine flora and fauna, including seagrass, was raised by approximately 45% of public submissions and therefore represents a key concern in the community.

#### **Expert Advice**

- 6.2.14 Dr Daryl McPhee noted the potential impact on Posidonia seagrass is the most significant marine ecology impact that may originate from the proposal. This species is less resilient, difficult to restore or transplant and recovers poorly from disturbance relative to other seagrass species in NSW. Dr McPhee confirmed the health of Posidonia can be adversely impacted by the addition of nutrients to the marine environment and this species recovers very slowly from disturbance. Dr McPhee concluded that, while the Applicant has tried to avoid disturbance of Posidonia, a residual impact will remain.
- 6.2.15 Dr McPhee advised that, while the area of direct disturbance from the construction of the proposed pipelines is relatively small (40 m<sup>2</sup>) compared to the size of the mapped Posidonia beds in Port Stephens (4 km<sup>2</sup>), this needs to be tempered with the vulnerability of the habitat type and its slow recovery and the exposure of it to cumulative impacts in Port Stephens.
- 6.2.16 Given the listing of Posidonia seagrass as an EEC under the Commonwealth EPBC Act in 2015, Dr McPhee concurred with the advice of the EPA that the Applicant should consider whether the impacts of the proposal are likely to be significant in the context of the advice provided in conjunction with the Commonwealth listing.
- 6.2.17 On balance, Dr McPhee advised the design option proposed by the Applicant is likely to provide the least amount of environmental disturbance as compared to tunneling and burying the pipes beneath the seafloor. However, while the design of the proposed pipelines and the location of the discharge point seeks to avoid disturbance of Posidonia, a residual impact will remain which requires mitigation or offsetting. Dr McPhee concluded there is a threat of serious or irreversible environmental impact on Posidonia. Given the vulnerability to disturbance of Posidonia and the importance of the Port Stephens Posidonia beds, it is important that a precautionary approach be considered in terms of development assessment.

#### **Department's Assessment**

- 6.2.18 The risk of adverse impacts to Posidonia seagrass and the vulnerability of this community were identified by government authorities, the community and Dr McPhee early in the assessment process. Given the uncertainties around the level of nutrients in the farm discharge water (as discussed in **Section 6.1** above) and the potential for cumulative water quality impacts in the PSGLMP, the Department recommends a precautionary approach be taken in this instance.
- 6.2.19 The Applicant has been given a number of opportunities to provide additional information to satisfy the concerns raised regarding Posidonia seagrass impacts since the application was lodged in 2014. Despite this, the authorities have advised the proposal does not include suitable mitigation measures or offsets for residual impacts on this species. The Applicant has been unable to demonstrate the construction and operation of the abalone farm would not adversely impact the Posidonia seagrass community in the PSGLMP.
- 6.2.20 The Department notes the PSGLMP Operational Plan states that seagrasses such as Posidonia play an important role in the estuary, including providing habitat for economically important crustaceans and fish

(commercial and recreational species), foraging habitat for other species, such as Green Turtles, and filtering suspended solids. They are also important in maintaining water quality by using nutrients and stabilising sediments in shallow water. According to the Commonwealth, Posidonia is considered to provide the most structural complexity to seagrass habitat and play the most vital role in ecosystem processes.

- 6.2.21 While the Department is satisfied the transitional arrangements in the EPBC Act do not require the Applicant to make a further referral to the Commonwealth as a result of impacts to Posidonia, the listing of this community as nationally significant since lodgment of the application heightens the importance of protecting the Posidonia beds within the PSGLMP.
- 6.2.22 The proposal will directly impact at least 40 m<sup>2</sup> of Posidonia beds with the extent of further impacts from shading and nutrient-laden discharge water unknown. Despite the permanent loss of Posidonia seagrass from pipeline construction and the potential for further impacts from ongoing operational impacts, the Applicant has not proposed suitable mitigation or offsets for the loss of Posidonia. Recovery of seagrass from indirect impacts may take a significant amount of time or may be permanent.
- 6.2.23 The limited water quality data submitted with the RtS Addendum is also insufficient to demonstrate whether this community can tolerate a range of nutrient concentrations, which may occur while the farm is operating. Furthermore, insufficient water quality data has been provided to determine a suitable ambient target for the discharge waters to ensure protection of Posidonia and the PSGLMP aquatic ecosystem.
- 6.2.24 Based on the advice of the EPA, MPA and the Department's independent expert, the Department considers the proposal presents an unacceptable risk to the health of Posidonia seagrass communities and the conservation of biological diversity and ecological integrity of the PSGLMP. Loss of Posidonia as a result of the pipeline construction may be permanent or take decades to recover, raising intergenerational equity considerations.
- 6.2.25 The objects of the EP&A Act include the need to facilitate ESD in decision-making. In this instance, the proposal is considered to be inconsistent with the principles of ESD, namely the conservation of biological diversity and ecological integrity and intergenerational equity. The Department advises a precautionary approach and concludes the potential benefits of the proposal do not outweigh the potential adverse ecological impacts.

### **6.3 Public Interest**

- 6.3.1 The Department has considered the issue of the public interest in relation to the proposal. In doing so, the Department has considered the issues raised by the community and special interest groups (as discussed in **Section 5.4** of this report) and inspected the site.

#### ***Applicant's Assessment***

- 6.3.2 The Applicant considers the proposal represents a positive development outcome for the site and would provide a range of scientific, environmental and social benefits, including:
- meeting the increasing demand for healthy, natural food products both locally and internationally
  - helping to reduce excessive fishing pressure on wild Abalone populations
  - development of a site suitably separated from nearby sensitive land uses and not visible from public areas
  - the potential for research and development, training and educational opportunities
  - the creation of local employment for 35 people during construction and 15 full-time operational jobs
  - likely flow-on benefits to the local economy through the purchase of construction and operational supplies and services throughout the farm's lifetime.
- 6.3.3 The Applicant's assessment concludes the potential impacts of the proposed abalone farm have been assessed and the proposal is not likely to have significant detrimental impacts on the physical or social environment or result in any significant changes to the existing quality of life for the local community. Any potential impacts are proposed to be adequately managed through the implementation of recommended

management and mitigation measures. The farm is anticipated to result in a number of benefits to the local community and will help to meet the growing demand for sustainably produced seafood in NSW.

#### *Department's Assessment*

- 6.3.4 The Department acknowledges the proposed development has the potential to provide several public benefits to the local and broader community as described by the Applicant. The Department agrees the proposed abalone farm could provide local social and economic benefits through the provision of employment, flow-on benefits and training and research opportunities.
- 6.3.5 The NSW Government supports the development of the NSW aquaculture industry through the NSW LBSAS and recognises the project would contribute to the growth of this industry in NSW. However, the EP&A Act provides a merit-based approach to assess the social, economic and environmental impacts of developments against applicable statutory and policy requirements. As discussed in **Section 6.1** and **Section 6.2** of this report, the Department, key government authorities and the independent experts are not satisfied the environmental impacts of the development can be managed or mitigated satisfactorily.
- 6.3.6 The public submissions demonstrate the community has significant concerns regarding the potential environmental impacts on the PSGLMP and amenity impacts on residents in the local village of Pindimar. Furthermore, the local Council has raised a number of environmental concerns and has advised there is insufficient information submitted by the Applicant to complete its assessment. The proposal is opposed by key State and local special interest groups, including The NSW Greens, Abalone Council of NSW and the Pindimar Bundabah Community Association.
- 6.3.7 The Applicant has been unable to provide sufficient evidence to demonstrate the development would not result in serious or irreversible environmental impacts, or that such impacts would be effectively avoided or mitigated. As discussed in **Section 4.8**, the proposed development raises concerns regarding intergenerational equity as the proposal does not ensure the health, diversity and productivity of the environment are maintained or enhanced for the benefit of future generations.
- 6.3.8 The Department has considered the issue of the public interest very closely. The Department does not consider the public benefit of the proposed abalone farm would sufficiently outweigh the potentially serious and irreversible environmental impacts the development may have on the significant natural assets of the PSGLMP and surrounds. Consequently, the Department does not consider the proposed development is in the public interest.

## 7 Evaluation

- 7.1.1 The Department has assessed the application on its merits and has fully considered all relevant matters under section 4.15 of the EP&A Act, the objects of the EP&A Act and the principles of ESD. The assessment has been informed by the advice and concerns raised by water quality experts at the EPA, the MPA, Council and the Department's independent experts. To try and resolve the concerns raised, the Department has consulted extensively with the government authorities, the experts and the Applicant over many years.
- 7.1.2 The Department acknowledges the Applicant has attempted to provide the requisite information and has revised the technical reports and WWTS design over the course of the assessment. However, despite these efforts, the quality of information remains insufficient for the Department, key government authorities and the independent experts to have confidence the proposed abalone farm can be operated without considerable risk to the biological diversity and ecological integrity of the PSGLMP. This includes the potential for irreversible impacts on sensitive Posidonia seagrass communities.
- 7.1.3 The Department notes there are numerous land based abalone farms operating on the coastlines of Victoria, South Australia and Tasmania, and the proposal would support the growth of the industry in NSW. However, these existing facilities are typically located on remote coastlines, such as the Eyre Peninsula in South Australia, with direct access to oceanic marine waters, while the proposal is within the protected waters of the PSGLMP adjacent to a Sanctuary Zone, which requires a high level of protection.
- 7.1.4 The NSW Government's regulatory authorities are very conscious of the need to ensure that the development of the aquaculture industry in NSW proceeds in a manner that does not jeopardise ecological sustainability. It is therefore critical that any new land based aquaculture facility operates to best practice environmental standards and ensures protection of the sensitive marine environment. The Department considers the Applicant has not demonstrated the proposal will operate to best practice standards or that it will protect the sensitive marine environment of the PSGLMP.
- 7.1.5 The Department's assessment has concluded the proposal is not consistent with the principles of ESD, is not in the public interest and should be refused for the following reasons:
- there is scientific uncertainty the water quality impacts can be sufficiently mitigated by the proposed WWTS and the Applicant has been unable to demonstrate there would not be serious or irreversible impacts on Posidonia seagrass communities
  - the potential water quality impacts of the proposal on the PSGLMP present an unacceptable risk to marine ecology and are inconsistent with strategic objectives to achieve a NorBE on water quality
  - the proposed development is inconsistent with the principles of ESD, namely the precautionary principle, intergenerational equity and conservation of biological diversity and ecological integrity
  - the Applicant has not undertaken an adequate assessment of the likely environmental impacts on the Port Stephens natural marine environment and as such, the application has not satisfied the requirements of section 4.15(1)(b) of the EP&A Act.
- 7.1.6 Following on from its assessment of the development, the Department considers the development may not be approvable. This assessment report is hereby presented to the Commission for determination.

Prepared by:  
Sally Munk, Principal Planner  
Industry Assessments

Endorsed by:



11 May 2021

**Joanna Bakopanos**  
**Acting Director**  
**Industry Assessments**

Endorsed by:



12 May 2021

**Chris Ritchie**  
**Acting Executive Director**  
**Energy, Industry and Compliance**

## Appendices

### Appendix A – List of Documents

The Department has relied upon the following key documents during its assessment of the proposed development:

#### Environmental Assessment

- Environmental Assessment titled 'Pindimar Abalone Farm Environmental Assessment Report MP (10\_0006)' Revision 3, prepared by City Plan Services dated 28 February 2014

#### Response to Submissions

- 'Response to Submissions titled 'Pindimar Abalone Farm Response to Submissions Report' prepared by City Plan Services dated 19 November 2014

#### Response to Submissions Addendum

- A report entitled 'Final Response to Submissions, An Addendum Report – August 2017, Abalone Farm, Pindimar' prepared by City Plan Services, Revision 3 – Final, dated 27 November 2020

#### Statutory Documents

- Relevant considerations under section 4.15 of the EP&A Act (see **Appendix B**)
- Relevant environmental planning instruments, policies and guidelines (see **Appendix C**)

#### Independent Expert Reviews

- Dr Daryl McPhee, Bond University, provided formal advice on seven occasions and supplementary advice on two occasions. All advice are provided to the Commission via the following Sharepoint link:

[https://environmentnsw.gov-my.sharepoint.com/:f:/g/personal/sally\\_munk\\_planning\\_nsw\\_gov\\_au/ErLOzOmHRJ5Jv4Y8z5jLhbEB-uKbXf20DOgH67A0Ug3rmA?e=6Mhrna](https://environmentnsw.gov-my.sharepoint.com/:f:/g/personal/sally_munk_planning_nsw_gov_au/ErLOzOmHRJ5Jv4Y8z5jLhbEB-uKbXf20DOgH67A0Ug3rmA?e=6Mhrna)

- Dr Pia Winberg, Venus Shell Systems, provided formal advice on two occasions and supplementary advice on two occasions. All advice notes are provided to the Commission via the following Sharepoint link:

[https://environmentnsw.gov-my.sharepoint.com/:f:/g/personal/sally\\_munk\\_planning\\_nsw\\_gov\\_au/EogcJnQ\\_6OxLIIA9ukK-mckBxqah-90ph-3mlG7LuOT0hw?e=rWPZgn](https://environmentnsw.gov-my.sharepoint.com/:f:/g/personal/sally_munk_planning_nsw_gov_au/EogcJnQ_6OxLIIA9ukK-mckBxqah-90ph-3mlG7LuOT0hw?e=rWPZgn)

All documents relied upon by the Department during its assessment of the application may be viewed at: <https://www.planningportal.nsw.gov.au/major-projects/project/10621>

## Appendix B – Considerations under Section 4.15 of the EP&A Act

### Matters for Consideration under Section 4.15 of the EP&A Act

Matter	Consideration
a) the provisions of: <ul style="list-style-type: none"> <li data-bbox="305 359 797 428">i.) any environmental planning instrument, and</li> </ul>	The Department has considered the relevant environmental planning instruments in its assessment of the development.
<ul style="list-style-type: none"> <li data-bbox="305 449 797 747">ii.) any proposed instrument that is or has been the subject of public consultation under this Act and that has been notified to the consent authority (unless the Planning Secretary has notified the consent authority that the making of the proposed instrument has been deferred indefinitely or has not been approved), and</li> </ul>	There are no relevant draft EPIs.
<ul style="list-style-type: none"> <li data-bbox="305 768 797 831">iii.) any development control plan, and</li> </ul>	Development control plans do not apply to State significant development.
<ul style="list-style-type: none"> <li data-bbox="305 852 797 1010">iiia) any planning agreement that has been entered into under section 7.4, or any draft planning agreement that a developer has offered to enter into under section 7.4, and</li> </ul>	There are no planning agreements.
<ul style="list-style-type: none"> <li data-bbox="305 1031 797 1188">iv.) the regulations (to the extent that they prescribe matters for the purposes of this paragraph), that apply to the land to which the development application relates,</li> </ul>	The Department has assessed the development in accordance with all relevant matters prescribed by the regulations, the findings of which are contained in this report.
b) the likely impacts of that development, including environmental impacts on both the natural and built environments, and social and economic impacts in the locality,	The Department has considered the likely impacts of the development in detail in Section 6 of this report. The Department concludes the proposal is not consistent with the principles of ESD, is not in the public interest and may not be approvable.
c) the suitability of the site for the development,	The site itself is located within land that is suitably zoned for land based aquaculture and is identified as land having the potential for development of aquaculture in the LBSAS. Aquaculture is also permissible in the General Use Zone of the PSGLMP where the discharge pipes will be laid. However, the Applicant has not been able to demonstrate with certainty the scale or design of the proposed development is suitable for the site.
d) any submissions made in accordance with this Act or the regulations,	All matters raised in submissions have been summarised in Section 5 of this report and given due consideration as part of the assessment of the development in Section 6 of this report.
e) the public interest.	The Department does not consider the public benefit of the proposed abalone farm would sufficiently outweigh the potentially serious and irreversible environmental impacts the development may have on the significant natural assets of the

**Matter****Consideration**

PSGLMP and surrounds. Consequently, the Department does not consider the proposed development is in the public interest.

## Appendix C – Consideration of Environmental Planning Instruments

To satisfy the requirements of section 4.15(1) of the EP&A Act, the following EPI's were considered as part of the Department's assessment:

- State Environmental Planning Policy (Major Development) 2005 (MD SEPP)
- State Environmental Planning Policy (Coastal Management) 2018
- State Environmental Planning Policy No 14 – Coastal Wetlands (as in force at the time)
- State Environmental Planning Policy No 71 – Coastal Protection (as in force at the time)
- State Environmental Planning Policy (Koala Habitat Protection) 2020
- State Environmental Planning Policy No 55 – Remediation of Land (SEPP 55)
- draft State Environmental Planning Policy (Remediation of Land) (draft Remediation SEPP)
- State Environmental Planning Policy (Primary Production and Rural Development) 2019
- State Environmental Planning Policy No 62 Sustainable Aquaculture (SEPP 62) (as in force at the time)
- Great Lakes Local Environmental Plan 2014
- Port Stephens Local Environmental Plan 2013

### **State Environmental Planning Policy (Major Development 2005)**

In October 2007, the development was declared a 'major project' (Schedule 1, Clause 2) being development for the purpose of aquaculture located in an environmentally sensitive area of State significance (the PSGLMP).

### **State Environmental Planning Policy (Coastal Management) 2018**

SEPP 14 and SEPP 71 were repealed on 3 April 2018 by State Environmental Planning Policy (Coastal Management) 2018 (Coastal Management SEPP). Clause 21 of the new Coastal Management SEPP provides for savings and transitional provisions for development applications lodged, but not finally determined, immediately before the commencement of this policy.

### **State Environmental Planning Policy No 14 – Coastal Wetlands (as in force at the time)**

The aim of State Environmental Planning Policy No 14 - Coastal Wetlands (SEPP 14) is to ensure that coastal wetlands are preserved and protected for environmental and economic reasons. The policy applies to coastal local government areas outside the Sydney metropolitan area.

There are two SEPP 14 wetlands located to the south-east and south-west of the proposed abalone farm. The proposed bushfire evacuation boardwalk and bridge over Pig Station Creek will cross over the wetland to the south-east of the site. As the proposal would not drain, fill, or construct a levee on this wetland, it is considered that water quality impacts are unlikely to negatively affect the ecological function and habitat within the wetland.

The Department is satisfied that the development would have minimal impact on the nearby coastal wetlands.

### **State Environmental Planning Policy No 71 – Coastal Protection (as in force at the time)**

SEPP 71 applies to the site as it is within the NSW coastal zone. In broad terms SEPP 71 aims to ensure that the natural, cultural, recreational and economic assets of the NSW coast are protected and appropriately managed. The relevant matters for consideration in clause 8 of SEPP 71 include:

- the suitability of development given its type, location and design and its relationship with the surrounding area
- the scenic qualities of the New South Wales coast, and means to protect and improve these qualities
- measures to conserve animals and plants and their habitats
- measures to protect the cultural places, values, customs, beliefs and traditional knowledge of Aboriginals
- likely impacts of development on the water quality of coastal waterbodies
- the conservation and preservation of items of heritage, archaeological or historic significance.

The Department has considered all matters for consideration in SEPP 71. The Department considers the development is unsuitable for the location given the proposed design and its potential impacts on the protected waters of the PSGLMP and the sensitive marine ecosystem. Based on the advice of the EPA, MPA, Council and the independent experts, the Department's assessment concludes the proposal has not

demonstrated the proposal includes sufficient measures to protect *Posidonia* seagrass and has the potential to have significant adverse impacts on the water quality of the Port Stephens estuary. On this basis, the proposal is considered inconsistent with SEPP 71.

#### **State Environmental Planning Policy (Koala Habitat Protection) 2020**

In 2019, State Environmental Planning Policy No.44 – Koala Habitat Protection (SEPP 44) was repealed and replaced by State Environmental Planning Policy (Koala Habitat Protection) 2019 (2019 Koala SEPP). In November 2020, State Environmental Planning Policy (Koala Habitat Protection) 2020 (Koala SEPP 2020) replaced and repealed the 2019 Koala SEPP and largely reinstated the provisions of SEPP 44. There are no savings provisions in Koala SEPP 2020 relating to development applications. On this basis, the Department has considered the application against the requirements of Koala SEPP 2020.

Koala SEPP 2020 aims to encourage the proper conservation and management of areas of natural vegetation that provide habitat for koalas to ensure a permanent free-living population over their present range and reverse the current trend of koala population decline. Koala SEPP 2020 applies to RU2 Rural Landscape zoned land in the MidCoast LGA, however, the SEPP does not strictly apply to the assessment of SSDs. Notwithstanding, the Department has considered the requirements of this SEPP as the proposed abalone farm site is considered to contain 'potential koala habitat' under Koala SEPP 2020, due to the presence of *Eucalyptus robusta* and *E. microcorys* trees on the farm site. These trees constitute at least 15% of the total number of trees in the upper and lower strata of the tree component.

A Koala Plan of Management is required to be prepared for sites defined as 'core koala habitat' only. The Applicant's biodiversity reports confirm the site contains 'potential koala habitat' but is not defined as 'core koala habitat'. Nevertheless, the Applicant proposes to provide a Koala Plan of Management post approval.

The Department concludes that the development would have minimal impact on koala populations or koala habitat with the implementation of an appropriate Koala Plan of Management. The Department is satisfied the proposal is consistent with Koala SEPP 2020.

#### **State Environmental Planning Policy No 55 – Remediation of Land**

SEPP 55 aims to provide a State-wide approach to the remediation of contaminated land. In particular, SEPP 55 aims to promote the remediation of contaminated land to reduce the risk of harm to human health and the environment by specifying:

- under what circumstances consent is required
- the relevant considerations for consent to carry out remediation work
- the remediation works undertaken meet certain standards and notification requirements.

Contamination is not likely to be a significant concern in relation to this proposal as the site comprises predominantly undeveloped land. The Applicant has advised that no potentially contaminating activities are known to have occurred within the proposed development footprint, and only minimal excavation works are proposed.

#### **draft State Environmental Planning Policy (Remediation of Land) (draft Remediation SEPP)**

The draft Remediation SEPP seeks to retain the key operational framework of the current SEPP 55, while also adding new provisions relating to changes in categorisation and introducing modern approaches to the management of contaminated land. The development has been assessed against SEPP 55 (see above), and the Department is satisfied the development would be consistent with the draft Remediation SEPP.

#### **State Environmental Planning Policy (Primary Production and Rural Development) 2019**

State Environmental Planning Policy - 62 – (Sustainable Aquaculture) (SEPP 62) was repealed on 27 February 2019 and replaced with the Primary Production and Rural Development SEPP. Savings and transitional provisions are embedded into the new Primary Production and Rural Development SEPP that allows the continued reliance on SEPP 62 for the assessment of this application as this SEPP was in place at the time the application was lodged.

### **State Environmental Planning Policy No 62 – (Sustainable Aquaculture) (as in force at the time)**

SEPP 62 defines 'aquaculture' as cultivating fish or marine vegetation for the purposes of harvesting and selling them and keeping fish in a confined area for a commercial purpose (such as a fish grow-out pond). SEPP 62 was a key policy tool in NSW regulating aquaculture activities, providing consistent planning requirements for aquaculture. It defines where and how sustainable aquaculture should occur. The implementation of SEPP 62 requires compliance with the provisions of the 'NSW Oyster Industry' and the 'Land Based' Sustainable Aquaculture Strategies.

Clause 15B of SEPP 62 requires the consent authority to consider any potential impacts of aquaculture on the oyster industry before granting development consent. Clause 15D requires that the provisions of the NSW Oyster Industry Sustainable Aquaculture Strategy (OISAS) be taken into account.

In accordance with SEPP 62 and the OISAS, the Department has consulted with DPI during the course of the assessment. DPI raised concerns with the Applicant's on-site sewage management system and the potential for impacts on Priority Oyster Aquaculture Areas. The Applicant subsequently provided an on-site effluent disposal assessment which confirmed the proposal would not adversely impact the oyster areas. Based on the advice of the DPI, the Department is satisfied the proposal is unlikely to have an impact on any priority oyster aquaculture area.

### ***The NSW Land Based Sustainable Aquaculture Strategy (LBSAS)***

The NSW LBSAS is gazetted under SEPP 62. It identifies appropriate aquaculture sites and provides an explanation of the approvals process. The LBSAS contains an Aquaculture Industry Development Plan (AIDP) which is also gazetted under the *Fisheries Management Act 1994*. The AIDP specifies best practice guidelines based on ecologically sustainable development (ESD) principles.

The best practice principles in the AIDP are relevant to the Pindimar Abalone Farm development to ensure it complies with ecological sustainable development (ESD) principles.

Both Council and Fisheries NSW have indicated that they are generally satisfied that the proposal meets the aims and objectives of SEPP 62 and is located on a site where sustainable land based aquaculture is permissible. The consent authority is not to consent to the development without firstly categorising the development having regard to the project profile analysis under the LBAS (refer to Part 2, Clause 13 of SEPP 62). The Department has considered the proposed development in relation to the SEPP 62 and the PPA below.

### **Project profile analysis**

For the purposes of determining the level of assessment of applications for development consent under SEPP 62, the proposed aquaculture development is to be categorised (in accordance with the opinion of the consent authority formed having regard to the relevant project profile analysis), as follows:

- Class 1-Non-designated development (low-level risk),
- Class 2-Non-designated development (medium-level risk),
- Class 3-Designated development.

The relevant class is to be determined as follows:

- Class 1- if all the risk levels in relation to each attribute are Level 1,
- Class 2- if all the risk levels in relation to each attribute are Level 2 or Levels 1 and 2,
- Class 3- if any risk level in relation to an attribute is Level 3.

The consent authority is not to consent to aquaculture development under this Policy unless it has first categorised the development in accordance with this clause after receiving adequate information from the Applicant for that purpose.

The Department's has considered the categorisation of the development (i.e. Level 1, 2 or 3) in the table below, having regard to the project profile analysis provided by the Applicant in the EA, and all other information available for the assessment of the proposal (i.e. RtS, RtS Addendum).

Following this assessment, the Department concludes that the proposed development would be categorised a Class 2 development (non-designated).

Issue	Level 1	Level 2	Level 3	Department's opinion on the Level of risk
<b>1. Water supply information</b>				
a) Saline ground water availability	Saline water available from Saline Interception and Evaporation Scheme.	Bore required to source saline waters.		N/A
b) Fresh - Water availability	Existing licence approved for bore or river extraction, or Licence available.	New licence required for bore or river extraction, or Reliant upon on-farm dam and 10% of local run-off. Use of a mains water supply for growout, nursery or hatchery.		N/A
c) Freshwater projects that plan to pump water from a river – Environmental flows	No access restrictions based on flows in normal conditions	Access permitted only during high flows in normal conditions		N/A
<b>2. Acid sulfate soils</b>				
If site is less than 2 metres AHD based on survey data, ASS soil profile based on ASS Risk Maps <sup>2</sup>	ASS Landform Process Class A with Landform Element Class b, l, t, p, y or w	ASS Landform Process Classes A,W, B, E, L, S with other Landform Element than b, l, t, p, y or w		<b>Level 2</b>
<b>3. Heritage</b>				
a) Heritage sites based on LEP or REP maps and State Heritage Inventory	No listings on the proposed site	Listings onsite		<b>Level 1</b>
b) Aboriginal heritage based on DECCW Aboriginal Heritage Information Management System and Local Aboriginal Land Council	No recorded sites or places and DECCW advised that no cultural or archaeological assessment is required	Sites or places recorded on the land and/or DECCW advised that a cultural and/or archaeological assessment is required.	Sites/places of regional or national significance present and likely to impact on sites/places.	<b>Level 2</b>
<b>4. Native title</b>				
Status of native title interests	Crown Land, previous determination Native Title extinguished	Crown Land Native Title interest needs to be determined		<b>Level 1</b>
<b>5. Flooding</b>				
a) Consistency with Council and/or DECCW Floodplain Management Plans	Development is consistent with the outcomes of management plans and needs no controls	Development of the site is consistent with the management plan but will be restricted or controlled	Development of the site is inconsistent with the outcomes of management plans	<b>Level 2</b> Stormwater management and controls are considered in the Applicant's EA and the Secretary's EA report.
b) Floodway Area	Development is not proposed in a floodway	Development is proposed in a floodway		<b>Level 1</b>
<b>6. Water supply quality</b>				
Water quality risks from nearby land uses	Growout water quality is consistently suitable for aquaculture and has low risk of contamination.	Growout water quality is mostly suitable for aquaculture and has low risk of contamination.	Growout water quality is not generally suitable for aquaculture and requires treatment OR has a high risk of	<b>Level 2</b> Water quality in the source location within Port Stephens (i.e. below 5m depth) consistently meets ANZECC guidelines. However, there have been incidences of storms in the catchment affecting local water quality in the short term.

Issue	Level 1	Level 2	Level 3	Department's opinion on the Level of risk
			contamination	
Potable water for processing etc.	Mains water; or Reliable supply of potable water onsite.	Insecure supply of potable water requiring supplementation during dry periods; or No existing potable water supply on site.		Level 2
<b>7. Water supply access</b>				
Saline groundwater supply access	Via piping from a saline groundwater interception and evaporation scheme	Via saline groundwater bore on property	Via compacted earthen channel from a saline groundwater interception and evaporation scheme.	N/A - saline groundwater will not be accessed.
Location of inlet/outlet pipe for estuarine or marine farms.	Existing infrastructure suitable to carry inlet/outlet pipe, or Sump/pit or any deepening of bed of estuary or waterway is not required.	Rock anchoring of inlet/outlet pipeline for marine water, or Requires a sump/pit in estuary or waterway, or Establishment across ocean beach.		<b>Level 2</b> Pipelines will need to be anchored to the bed of the estuary and will also require trenching and burial of the pipelines for part of their length.
Fresh water pump station site	Does not require sump/pit or any deepening of bed of river.	Requires a sump/pit in river		N/A
<b>8. Stock security</b>				
Proposed species consistent with Table 3 (species culture methods and constraints) in Species Selection chapter.	Pond or tank site above the PMF level in the eastern drainage or above 1:100 ARI flood level in the western drainage.	Pond or tank site below PMF level in the eastern drainage or below 1:100 ARI flood level in the western drainage but constructed so unlikely to be inundated and lose stock in a flood event.		<b>Level 1</b> The main farm precinct containing abalone is above the calculated Flood Planning Level for the development.
<b>9. Hydrology Issues</b>				
Catchment Drainage including Stormwater	No catchment drainage across site, or Provision to manage across site flows not likely to affect surrounding area.	Catchment drainage across site; or Alteration of the drainage of stormwater likely to affect surrounding properties	Flood management likely to alter the course of the river or drainage patterns.	<b>Level 1</b> No catchment drainage across site and stormwater controls will ensure development meets neutral or beneficial water quality objectives.
Excess water (effluent) storage pond/dam.	No stormwater catchment drainage into excess water (effluent) storage pond/dam.			<b>Level 1</b> Stormwater flows would not enter settlement ponds.
<b>10. Mean site elevation</b>				
Mean elevation of the area occupied by ponds or tanks	>1 metre AHD	< 1 metre AHD		<b>Level 2</b> The farm infrastructure is at 2-14m AHD with the exception of the pump house.

Issue	Level 1	Level 2	Level 3	Department's opinion on the Level of risk
<b>11. Ecology</b>				
Vegetation type on the actual development site (flora survey required)	Cultivated land, improved pasture, or predominantly cleared and no need for consent to clear or disturb native vegetation under <i>Native Vegetation Conservation Act 1979</i> or Water Management Act.	Predominantly native vegetation – trees, shrubs, and grasslands OR Clearing vegetation requires consent under Native Vegetation Conservation Act 1979 or Water Management Act.	Proposal likely to impact on vegetation of ecological significance.	<b>Level 2</b> Separate consent for the clearing of vegetation under the <i>Native Vegetation Conservation Act 1979</i> is not required for SSD. The Department, OEH and the Applicant consider that the proposal is unlikely to impact on vegetation of ecological significance provided that the proposed mitigation measures are implemented successfully.
Occurrence of threatened species, populations or ecological communities or their habitats (flora & fauna survey required)	No threatened species, populations or ecological communities or their habitats known or likely to occur – Test of significance not required	Threatened species, populations or ecological communities or their habitats known or likely to occur – Test of significance required	Likely to significantly affect threatened species, populations or ecological communities or their habitats.	<b>Level 2</b> Tests of significance have been undertaken for the Threatened species and Endangered Ecological Communities that have been identified on site. As above, the Department and OEH agree that with the implementation of the recommended mitigation measures, no significant impacts will occur.
Likely impact on aquatic habitats and mangroves.	No likely disturbance or impact.	Disturbance or impact on aquatic habitat or mangroves – approval or permit needed to disturb mangroves or seagrasses, reclamation or dredging works or impeding fish passages.		<b>Level 2</b> Direct impacts to 40m <sup>2</sup> of seagrasses and some trimming of mangroves required.
<b>12. Aboriginal heritage</b>				
Consultation with Aboriginal community	No values of cultural significance to the Aboriginal community identified.	Values of cultural significance to the Aboriginal community identified. Agreement reached between Aboriginal community, DECCW and proponent on the management of these values.	Values of cultural significance and no agreement reached with Aboriginal community or DECCW on the management of these values.	<b>Level 2</b> Consultation with Karuah and Worimi LALCs was undertaken by the Applicant. Agreement has been reached between the Department, Aboriginal community and OEH on the management of the midden.
Location of Aboriginal Sites	No recorded Aboriginal site/place and DECCW advised that no cultural or archaeological assessment is required	Recorded Aboriginal site/place and/or DECCW advised that a cultural and/or archaeological assessment is required		<b>Level 2</b> A cultural and/or archaeological assessment was undertaken as part of the EA.
Likely impact on Aboriginal heritage	No impact on Aboriginal sites/places or values of cultural significance to Aboriginal community	Impact on Aboriginal sites/places or values of cultural significance to Aboriginal community	Sites/places of regional or national significance present and likely to impact on sites /places.	<b>Level 1</b> With the fencing of the midden and implementation of an aboriginal heritage management plan, impacts are unlikely to occur as a result of the development.
<b>13. Provision of riparian buffer</b>				
Riparian buffer distance from the edge of the culture or effluent pond.	> 50 metres	< 50 metres		<b>Level 1</b> Pig station creek is greater than 50m from the farm precinct including the settlement ponds.

Issue	Level 1	Level 2	Level 3	Department's opinion on the Level of risk
<b>14. Excess water disposal</b>				
Management of excess freshwater from closed systems	Non-irrigation reuse scheme (e.g. Hydroponics, reuse, discharge to sewer with a trade waste agreement); OR Irrigation re-use scheme and irrigation site has adequate area and soils have slight limitations.	Irrigation re-use scheme and irrigation site has inadequate area and/or soils have moderate		<b>N/A</b> Freshwater will not be used for farm operations
Management of excess saline groundwater	Disposed to a saline groundwater interception and evaporation scheme, estuary or ocean via piping or channels lined with impervious liner.	Disposal from a closed system to an on-site evaporation system or direct injection to a saline aquifer.	Disposed to a saline groundwater interception and evaporation scheme, estuary or ocean via earthen channel.	<b>N/A</b> Saline groundwater will not be used for farm operations
<b>15. Neighbourhood land use</b>				
Potential for conflict with neighbours	Neighbouring land zoning compatible e.g. agriculture/industrial development.	Neighbouring land zoned for residential or rural residential purposes or has been identified as suitable for this purpose in an LEP or REP.	Potential for conflict with neighbours	<b>Level 2</b> Neighbouring land is zoned 1(a) rural, with the closest residents 300m from the farm site. Noise and amenity impacts have been considered in the Department's assessment, and with the recommended conditions are considered acceptable.
<b>16. Flooding</b>				
Impacts of development on flooding	Development not likely to adversely impact flood behaviour	Development likely to adversely impact on flood behaviour		<b>Level 1</b> No offsite impacts of the development on flooding are likely.
<b>17. Health Management</b>				
Identification and treatment of disease	On site trained staff with appropriate facilities, or Demonstrated arrangement with accredited laboratory or veterinary practice	No onsite provision for diagnosis of disease and no backup arrangements with an accredited laboratory or veterinary practice		<b>Level 1</b> Staff will be trained in disease identification and management. The farm would have detailed procedures in place to manage disease developed in consultation with DPI's Biosecurity Unit.
<b>18. Feed Management</b>				
Feed storage	Vermin proof facilities to store feed (e.g. enclosed shed, cool, low humidity)	Feed stored outdoors or so as not to minimise odour or other problems		<b>Level 1</b> Feed to be stored in a shed.
<b>19. Water monitoring for intensive culture</b>				
Capacity to monitor water quality.	Provisions of high quality water quality meters or test kits to monitor DO, Temperature, ammonia, salinity and pH	No provisions for regular monitoring		<b>Level 1</b> Water quality monitoring of intake water, effluent and estuary water would be monitored regularly as proposed in the EA and as required by the EPA
<b>20. Organic Waste Management (e.g. mortalities, processing waste and other waste)</b>				
Temporary storage of organic waste	Daily disposal; or Held prior to disposal so no	Held in sealed or covered containers	No specific arrangements	<b>Level 1</b> The EA states that Abalone mortalities will generally be kept

Issue	Level 1	Level 2	Level 3	Department's opinion on the Level of risk
	odour generated (e.g. frozen or chilled)	prior to intermittent disposal		chilled until disposal, with the exception of those samples fixed in formalin and temporarily stored until dispatch to laboratories.
Disposal of organic waste on-site or off-site	Disposed at an approved off-site recycling or landfill facility; or Buried (with lime) or composted in an area which is > 100m from a waterways and where the groundwater is > 3m and the soil has low permeability	Buried (with lime) or composted in an area which is < 100m from a waterways or where the groundwater is < 3m or the soil is not low permeability.	No specific arrangements	<b>Level 1</b> Organic waste is proposed to be disposed at an approved off-site recycling or landfill facility (e.g. Bedminster Advanced Resource Recovery Facility).
Disposal of stock in the event of a mass mortality, on-site or off-site	Arrangements in place for disposal at an approved off-site recycling or landfill facility.	Buried (with lime) or composted in an approved onsite disposal area.	No specific arrangements	<b>Level 1</b> Mass mortalities could be disposed of as above
<b>21. Recirculating Water Management for Intensive Culture</b>				
Storage capacity for recycling water in semi closed and closed intensive culture systems.	> 2 times the volume of largest growout pond or tank	1 - 2 times the volume of largest growout pond or tank	< the volume of largest growout pond or tank	<b>N/A</b> The proposal is a flow through system (see below)
<b>22. Discharge Water Management for Open (flow through) freshwater (for approved species) or estuarine, marine or saline ground water systems</b>				
POEO Act Licence	Not required	POEO Act Licence required		<b>Level 2</b>
In stream water quality objectives.	In stream water quality objectives met.	In stream water quality objectives not met. Mitigation measures to meet WQOs required.		<b>N/A</b> Freshwater would not be used for farming operations
Discharge water treatment	Discharge water screened to avoid escapement of stock and a water treatment system.	Discharge water screened to avoid escapement of stock and no treatment.		<b>Level 1</b> The application the screening of discharge water to avoid escapement of stock. It also includes an effluent water treatment system.
Daily Discharge limits for species approved for freshwater open systems e.g. salmonids.	< 60mg/l TSS < 0.30mg/l Total N < 0.05mg/l Total P	> 60mg/l TSS > 0.30mg/l Total N > 0.05mg/l Total P		<b>N/A</b> (not freshwater)
Total Discharge load limits for species approved for freshwater open systems e.g. salmonids.	< 55kg N/tonne of fish produced < 12kg P/tonne of fish produced	> 55kg N/tonne of fish produced > 12kg P/tonne of fish produced		<b>N/A</b> (not freshwater)
<b>ADDITIONAL CRITERIA FOR POND AQUACULTURE</b>				
<b>Water supply</b>				
Estuarine - Tidal amplitude	Greater than 600mm	Less than 600mm		<b>Level 1</b> According to the Applicant the maximum tidal amplitude is 1.96m.
Topography				
Estuarine ponds – slope of land	< 2% slope	>2% slope		<b>Level 2</b> The Settlement Pond area has an average slope of approximately 2.9% (from 2.06 to 4.21 AHD, over a 'run' of approximately 75m).
Freshwater ponds – slope of land	< 5% slope.	>5% slope		<b>N/A</b> No freshwater ponds
<b>Soils</b>				
Soil Characteristics – Suitability for pond/dam construction	Clay with mixture of soil/sand and low erosion potential	Sandy/gravelly with erosion potential and/or limited water holding capacity –		<b>Level 2</b> Sandy/ gravelly with erosion potential and/ or limited water

Issue	Level 1	Level 2	Level 3	Department's opinion on the Level of risk
	and suitable for dam construction	may need to import most pond clay for lining material or an artificial liner		holding capacity. The Applicant intends to use an artificial liner.
Soil Contamination based on SEPP 55 criteria for the area occupied by any pond	Suitable for residential use or for animal occupation	Exceed levels safe for animal or residential uses		<b>Level 1</b> The Applicant considers that the site is uncontaminated. The Department has considered past land use and is satisfied that contamination is highly unlikely.
<b>Hydrology Issues</b>				
Potential to affect groundwater below any pond	No underlying potable or high quality fresh groundwater within 3m of the surface	Underlying groundwater within 3m of the surface.		<b>Level 2</b> The Applicant is not certain where fresh groundwater is on the site. The settlement ponds are proposed to be lined therefore impacts on groundwater are unlikely.
<b>Saline Groundwater Pond Design</b>				
Saline groundwater ponds including excess water storage ponds.	Artificial liner with compacted clay underneath and ground water monitoring bores.	Compacted clay and groundwater monitoring bores.		<b>N/A</b> Saline water will be sourced from Port Stephens estuary (not from groundwater)
<b>Health Management</b>				
Period of total farm dryout after every production cycle for prawns.	>6 weeks between crops	<6 weeks between crops		<b>N/A</b>
Predators management of fingerling or growout ponds	All fingerling ponds screened/netted, or other management systems not intending harm to predators in place for growout ponds.	Only 'scare' systems (Note: may trigger need for Test of significance if threatened bird species are affected)		<b>N/A</b> Abalone would be kept in tanks and raceways.
<b>Pond Water Management for intensive culture - NA</b>				
<b>ADDITIONAL CRITERIA FOR TANK AQUACULTURE</b>				
<b>1. Water supply information</b>				
Estuarine – Tidal amplitude	>300mm	< 300mm		<b>Level 2</b> According to the Applicant the maximum tidal amplitude is 1.96m.
<b>2. Health Management</b>				
Disinfection of tank aquaculture system	Systems capable of disinfection and dry-out to break pathogen cycle	Difficulty in total disinfection and dry-out of facility or no provisions		<b>Level 1</b> Abalone would be kept in plastic tanks which the Department understands can be dried out and disinfected.
<b>3. Culture water Management</b>				
Semi closed and closed tank aquaculture systems	Recirculating aquaculture system with biofiltration, solids filtration (fine, suspended, settleable) oxygen, UV, or ozone, pH control	Recirculating aquaculture system having reduced or non-standard componentry.		<b>Level 1</b> The farm would have the ability to recirculate water and includes solids filtration, UV treatment, ozone treatment and Algae Bioremediation.

### Great Lakes Local Environmental Plan 1996 (as in force at the time)

The subject site is located within the Great Lakes LGA, which extends to the Mean High Water Mark of Port Stephens. The principal instrument for controlling development within the Great Lakes LGA at the time the project application was made under Part 3A is the Great Lakes Local Environmental Plan 1996 (Great Lakes LEP 1996).

The relevant aims and objects of the LEP are:

- to protect and enhance the environmental qualities of the area
- to protect environmentally sensitive areas and the heritage of the area
- to improve opportunities for ecologically sustainable development.

As discussed in **Section 6** of this report, the Department's assessment has concluded the proposal has not demonstrated with certainty that the development would protect or enhance the environmental qualities of the area or environmentally sensitive areas, including the PSGLMP and seagrass communities within it.

As discussed in **Section 4** and **Section 6** of this report, the proposed development is inconsistent with the principles of ESD, namely the precautionary principle, intergenerational equity and conservation of biological diversity and ecological integrity

#### **Great Lakes Local Environment Plan 2014 (Great Lakes LEP 2014)**

The land based components of the farm would be located on land zoned RU2 Rural Landscape. The marine pipeline structures are in part, within waters and intertidal areas zoned W2 Recreational Waterway. Aquaculture is permitted with consent in these zones.

The relevant aims and objectives of the Great Lakes LEP include:

- to facilitate the orderly and sustainable economic development of the land
- to protect and enhance the environmental, scenic and landscape assets
- to ensure the development has regard to the capability of the land so that the risk of degradation is minimise
- to minimise land use conflict
- to ensure that the development meets water quality objectives adopted by Council
- to protect the ecological values of recreational waterways
- to protect, enhance and provide for the long-term management of native biodiversity and to identify and protect biodiversity links and corridors throughout the landscape.

The Department's assessment of the proposal in relation to Council's water quality objectives and water quality impacts is discussed in **Section 6** of this report. The Department's assessment has concluded the proposal has not demonstrated with certainty that the development would achieve a NorBE on water quality or that it would protect the ecological values of the PSGLMP.

#### **Port Stephens Local Environmental Plan 2013 (Port Stephens LEP)**

The pipelines are within an intertidal area zoned W2 Recreational Waterways under the Port Stephens Local Environmental Plan 2013 (Port Stephens LEP) and within the GUZ within the waterway under the PSGLMP Zoning Plan. Water supply systems and aquaculture are permissible within the W2 zone.

## Appendix D – Recommended Instrument of Refusal