



Marine Habitat Survey Address | 167 Riverview Road, Avalon Beach Client | Mr Simon Ehrlich Survey Date | 17 May 2021 Report Date | 21 July 2021 Job Number 21-072-02

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1. Report Background

1.1 Purpose of the Report

Crown Lands require that all proposed waterfront development works involving loadbearing structures located below the Mean High Water Mark be reviewed for compliance with environmental regulations. The aim of these regulations is to protect the marine environment, in particular the local fauna and flora such as seagrasses, mangroves and macroalgae. The body responsible for conducting the assessment during the planning stage of the proposed waterfront development is the NSW Department of Primary Industries (Fisheries).

The purpose of this report is to provide all the necessary data required for an assessment to be done by NSW Fisheries.

1.2 Environmental Considerations

In summary, the main environmental considerations that require assessment by NSW Fisheries for waterfront development applications are:

- a) Protection of seagrasses;
- b) Protection of mangroves;
- c) Conservation of the existing ecology; and
- d) Impacts from dredging.

The regulations upon which the environmental considerations are based are discussed below.

The Fisheries Management Act 1994 ("FM Act") applies to habitat and aquatic flora and fauna that have the potential to be affected by a proposed waterfront development. The objectives of the FM Act are to conserve, develop and share the fisheries resources of NSW for the benefits of present and future generations, and in particular to protect key fish habitats and to promote ecologically sustainable development. The FM Act states that

a person must not cut, remove, damage or destroy marine vegetation on public water land, or on the foreshore of any land or lease, except under the authority of a permit issued by the Minister under this Part (205) or of an aquaculture permit.

Two Fish Habitat Protection Plans have also been developed under the FM Act. The first plan deals broadly with dredging and reclamation activities, fish passage requirements, the protection of marine vegetation (in particular mangroves and seagrasses), and the importance of snags. The second plan is specific to the protection of seagrasses. Scientific research has shown that seagrasses are important to the ecology of shallow estuarine environments as they stabilise sediments and maintain water quality, provide shelter and food critical to the survival of a wide variety of juvenile fishes and mobile invertebrates (many of which are of commercial or recreational importance) and play an important role in the cycling of nutrients within estuaries. Seagrasses are a fragile ecological habitat, with many major estuaries in NSW having lost as much as 85% of their seagrass beds in the past

30 to 40 years. In 2012 the population of *Posidonia australis* seagrass (commonly known as strapweed) was listed as an Endangered Population in the estuaries of Sydney under the Fisheries Management Act (Part 7A).

1.3 The Property

The proposed waterfront development of the installation of a new jetty, ramp and pile stabilised pontoon is planned for 167 Riverview Road, Avalon Beach ("The Property").

For details of the existing structures at The Property and the proposed waterfront development refer to Sections 2.1 and 3.1 respectively

1.4 On-Site Survey Methodology of The Property

The on-site survey of The Property was conducted at 10:30 on 17 May 2021 by Rick Johnson of Waterfront Surveys Australia. Weather conditions at the time of the survey were sunny with a moderate SW breeze. The water surface was slightly choppy and underwater visibility was approximately 3 m. At the time of the survey the tide was rising, with a tidal height of 1.1 m.

The on-site survey area included the footprint of the proposed structures and extended a further 10 m in all directions from the footprint of the proposed structures. The survey was conducted from the shore and inspection of the seabed was done on snorkel. Photos of each habitat were taken using an underwater digital camera and a description of each differing habitat, and species list of aquatic flora and fauna observed within the survey area, was recorded. A tape measure was used to obtain the distance of seagrass from structures/shoreline.

Seagrass species were given the following codes:

Hal - Halophila ovalis (paddleweed)

Pos - Posidonia australis (strapweed)

Zos – Zostera capricorni (eelgrass)

The level of patchiness was also estimated using three categories:

A – Individual strands or small clumps (< 2 m diameter);

B - Medium sized patches (2 - 10 m diameter); or

C – Beds of relatively even distribution (> 10 m diameter).

Estimates of seagrass density were made by ranking each observation point using three categories:

1 – Low density (< 15% seabed cover);

2 - Medium density (15% - 50% seabed cover); or

3 – High density (> 50% cover).

Leaf length of seagrass was categorised as follows:

Halophila – S (short < 1 cm), M (medium 1 cm – 3 cm), L (long > 3 cm);

Posidonia – S (short < 15 cm), M (medium 15 cm – 30 cm), L (long > 30 cm); or

Zostera – S (short < 5 cm), M (medium 5 cm – 15 cm), L (long > 15 cm).

These codes provide a description of the seagrasses within an area and are useful in determining the nature and ecological value of any seagrasses likely to be affected by the proposed works. For example, seagrass with shorter leaves and a lower density (e.g. ZosC1S) may have less ecological value compared with seagrass with longer leaves and a higher density (ZosC3L).

2. Existing Property Details

2.1 Existing Structures at The Property

The Property is located halfway along the eastern shoreline of the Avalon headland at Pittwater - approximately 500 m north of Paradise Beach Wharf. The Property faces in a westerly direction, but the waterfront facilities face in a west-north-westerly direction.

The existing structures (Photos 1 - 3) present at The Property at the time of the on-site survey included:

- a timber boatshed and deck (extending 4 7 m beyond the MHWM), supported on 12 sleeved concrete piers, on the northern edge of The Property; and
- a set of metal slip rails (23 m in length), supported on concrete piers, extending out from the centre of the boatshed deck.

2.2 Existing Ecology at The Property

2.2.1 Existing Ecology Based on Observations from the On-Site Survey

a) Intertidal Ecology

The intertidal zone at The Property consisted of artificial and natural habitats. A sandstone block seawall stretched across the width of The Property (Photos 2 and 4) and was fronted by an extensive intertidal rock platform (Photos 1 and 4). The rock platform extended 14.5 m out from the seawall (to the end of the proposed jetty). The sleeved shed and deck piers, and the metal slip rails provided additional artificial intertidal habitats (Photos 1 and 3).

The base of the seawall was colonised by low numbers of small periwinkles (*Nodilittorina unifasciata*). The rock platform had two intertidal zones of biota. The upper zone (extending the upper 5 m out from the seawall), was colonised by low numbers of periwinkles (*Austrocochlea porcata, Bembicium nanum* and *Nodilittorina unifasciata*) and mulberry whelks (*Morula marginalba*). The lower zone (that extended the outer 10 m) was colonised by brown algae (Neptune's necklace *Hormosira banksii*, encrusting *Ralfsia verrucosa* and unidentified filamentous; Photo 5) and a low density cover of Sydney rock oysters (*Saccostrea glomerata*). The sleeved shed and deck piers were colonised by barnacles (*Tesseropora rosea*) on their inshore sides. The metal slip rails and concrete piers were colonised by oysters and green filamentous alga.

b) Subtidal Ecology

The subtidal zone within the on-site survey area of The Property consisted of a gradually sloping rocky reef with several patches of sand, that extended offshore from 14.5 - 24.5 m off the seawall (Photo 6). The proposed outermost jetty piers, ramp, pontoon and pontoon stabilising piles would be located in/over this rocky substratum. Beyond 24.5 m off the seawall, the seabed consisted of gradually sloping sandy silt (Photos 7 - 8) that was bioturbated from the burrowing activities of benthic fauna and continued offshore beyond the onsite survey area.

The rocky reef from 14.5 - 19 m was colonised by a high density cover turfing brown filamentous alga along with sparse short clumps of brown bubbleweed (*Sargassum* sp.). The outer section of rocky reef from 19 - 24.5 m (Photo 6) was colonised by a high density cover of brown macroalgae (bubbleweed, kelp *Ecklonia radiata*, forkweed *Dictyota dichotoma* and scrollweed *Padina* sp.) and red coralline alga (*Corallina officinalis*). The sandy silt seabed beyond 24.5 m off the seawall (and 2 m seaward if the end of the proposed pontoon) was colonised by *Zostera* and then *Posidonia* seagrass (Photos 7 – 8; see section c. below for more distribution details).

The subtidal section of the existing metal slip rails were colonised by a high density cover of brown turfing filamentous alga and bubbleweed.

Fish observed during the on-site survey included many yellowfin bream (*Acanthopagrus australis*) and luderick (*Girella tricuspidata*).

c) Seagrass and Mangroves

There was a bed of medium density, medium leaf length *Zostera* (ZosC2M; Photo 7) located 24.5 m off the seawall, in the sandy silt off the end of the subtidal rock reef. This *Zostera* bed ran parallel to the shoreline and was 7 m in width (see seagrass map in Appendix B). The *Zostera* bed transitioned to a low density, medium leaf length bed of *Posidonia* (PosC1M; Photo 8) 31.5 m off the seawall, and continued a further 9 m offshore. At 40.5 m the soft seabed was unvegetated.

There was no seagrass present within the footprint of the proposed structures (see Appendix B). The outer edge of the proposed pontoon would be located 2 m inshore of the *Zostera* bed and the proposed pontoon stabilising piles located 3.5 m inshore of the *Zostera* bed. The inner margin of the *Posidonia* bed would be located 9.5 m offshore of the proposed pontoon.

No mangroves were observed within the on-site survey area of The Property.

2.2.2 Existing Ecology Based on Government Published Records

NSW Fisheries has done extensive mapping of the aquatic vegetation in Pittwater. The latest aquatic vegetation maps (Creese et al. 2009) indicate the presence of seagrass (*Posidonia*) offshore of The Property.

3. Proposed Waterfront Development

3.1 Proposed Structures of the Waterfront Development

The proposed waterfront development at The Property consists of the:

- installation of a new mesh deck jetty (13.05 x 1.2 m) adjacent to the southern side of the existing boatshed, supported on five piers;
- installation of a new mesh ramp (6.0 x 1.2 m); and
- installation of a fibreglass pontoon (3.0 x 6.0 m) with two stabilising piles located halfway along each side.

3.2 Assessment of Potential Impacts of the Proposed Development to the Existing Ecology of The Property

3.2.1 Summary of Findings

In summary, the potential impacts on the aquatic ecology at The Property from the installation of a new jetty, ramp and pile stabilised pontoon are expected to be minimal, temporary and unlikely to cause any damage or harm to marine life.

All the proposed structures (jetty, jetty piers, ramp, pontoon and pontoon stabilising piles) would be located in/over the intertidal rock platform and subtidal rocky reef. There was no seagrass present within the footprint of the proposed structures (see seagrass map in Appendix B). The outer edge of the proposed pontoon would be located 2 m inshore of the *Zostera* bed and the proposed pontoon stabilising piles located 3.5 m inshore of the *Zostera* bed. The inner margin of the *Posidonia* bed would be located 9.5 m offshore of the proposed pontoon.

3.2.2 Detailed Listing of Findings

The potential impacts to the existing ecology of The Property are assessed in detail below in relation to the four main environmental considerations:

- a) Protection of seagrasses;
- b) Protection of mangroves;
- c) Conservation of the existing ecology; and
- d) Impacts from dredging.

a) Protection of seagrasses

Development Works	Potential Impact to Seagrasses		
	Summary	Discussion	
Installation of new jetty piers and pontoon piles	Potential increase in turbidity very minor	The jetty piers and pontoon stabilising piles would be inserted into the rocky substrata at the site, therefore, any resulting increase in	
		turbidity would be very minor.	

		Nonetheless, the use of a silt curtain during the time of the piling works would mitigate the any potential effects on the nearby seagrass habitat, by containing the suspended sediments within the enclosed area of the silt curtain.
Installation of new	No indirect harm to	As the outer edge of the proposed
structures	seagrass from shading	pontoon is located 2 m inshore of
		the nearest seagrass habitat
		(<i>Zostera</i>), there would be <u>no</u> harm
		to any seagrass habitat from
		shading

b) Protection of Mangroves

No ecological impact from the waterfront development as there were no mangroves present in the survey area.

c) Conservation of the Existing Ecology

Development Works	Potential Impact to Existing Ecology		
	Summary	Discussion	
Installation jetty	Provide new subtidal and	The installation of five jetty piers,	
piers, pontoon piles	intertidal artificial	two pontoon stabilising piles and a	
and pontoon	habitats	fibreglass pontoon would provide	
		new subtidal and intertidal artificial	
		habitats at The Property for flora	
		and fauna to colonise	

d) Impacts from Dredging

No ecological impact from the waterfront development as there is no dredging required.

Appendix A - On-site Survey Photos

The following photographs taken by Rick Johnson during the on-site survey conducted at The Property on 17 May 2021 are provided overleaf.

- > Photos 1 4. Existing waterfront structures and intertidal habitats at The Property.
- > Photos 5 6. Algae colonising the intertidal and subtidal rocky habitats at the site.
- > Photos 7 8. Seagrass habitats at the site.

Photo 1. Existing structures (boatshed, deck, slip rails and cradle) at The Property viewed looking north, with extensive intertidal rock platform visible in foreground.



Photo 2. Existing structures viewed from the water – the red arrow indicates the location of the proposed jetty.



Photo 3. The location of the proposed jetty, adjacent to the southern side of the timber deck.



Photo 4. The seawall and upper zone of the intertidal rock platform at the location of the proposed jetty.



Photo 5. Brown algae (Neptune's necklace and turfing filamentous) colonising the submerged, lower zone of the intertidal rock platform in the footprint of the proposed jetty.



Photo 6. The subtidal rocky reef in the footprint of the proposed jetty end, ramp, pontoon and pontoon stabilising piles, colonised by brown macroalgae and turfing red coralline algae



Photo 7. Inner edge of the medium density *Zostera* bed (ZosC2M) located off the end of the subtidal rocky reef (visible in the background) and 2 m offshore of the proposed pontoon.



Photo 8. Low density bed of *Posidonia* (PosC1M) on the sandy silt, located 9.5 m offshore of the end of the proposed pontoon.



Appendix B - Existing Structures and Seagrass Map

The waterfront development design layout plan for 167 Riverview Road, Avalon Beach provided by Australian Ports and Marinas and mapped seagrass habitats is provided overleaf.



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nber	Project Number	PTL.5		
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Appendix C - References

Creese, R. G., Glasby, T. M., West, G. and Gallen, C. (2009). *Mapping the habitats of NSW estuaries*. Industry & Investment NSW Fisheries Final Report Series 113. Port Stephens, NSW, Australia. 95pp.