Waterfront Surveys
AUSTRALIA

Marine Habitat Survey

Address | 139 – 141 Riverview Road, Avalon Beach

Client | MMIG Developments Pty Ltd

Survey Date | 14 February 2024

Report Date | 5 December 2024

Job Number 24-048-05 B

Table of Contents

1. Report Background

1.1 Purpose of the Report

Crown Lands require that all proposed waterfront development works involving load-bearing 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 for any development works located below the MHWM 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 for 139 – 141 Riverview Road, Avalon Beach ("The Property") is restricted to minor foreshore works which are all located above the MHWM.

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 12:30 on 14 February 2024 by Rick Johnson of Waterfront Surveys Australia. Weather conditions at the time of the survey were sunny with minimal breeze. The water surface was calm and underwater visibility was approximately 4 m. At the time of the survey the tide was high and then dropping, with a tidal height of approximately 1.65 m.

The on-site survey area included the area below the MHWM across the width of The Property to the lateral limit and offshore beyond the navigation limit line. 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. 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 on the western shoreline of the Avalon headland at Pittwater - approximately 275 m north of Paradise Beach Wharf. The Property faces in a westerly direction.

The existing structures present at The Property at the time of the on-site survey (Photos 1 - 4) included:

- a boatshed on the southern side of The Property, surrounded on the northern and western sides by a timber deck (the deck finished approximately 5 m beyond the MHWM);
- a timber skid ramp (6.75 x 2.8 m) located out the front of the boatshed south to the boatshed's southern building line and placed on top of an area of stacked rocks;
- a concrete ramp (5.5 x 2.9 m) that is an extension of the timber skid ramp and was crumbling away at the seaward end.

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 stacked stone seawall stretched across the width of The Property (Photo 3). The seawall was fronted by bedrock covered in a layer of intertidal sand. The sandy seabed was covered in numerous large boulders and rocks on the southern side of the boatshed and skid ramp (Photos 3 - 5) and an area of stacked boulders and large rocks under the timber skid. This rocky intertidal habitat extended out to the end of the existing timber skid ramp. The intertidal habitat to the north of the skid ramp and boatshed consisted predominantly of sand on bedrock.

The seawall was devoid of intertidal biota. The boulders and rocks under the skid ramp and on the southern side of The Property were colonised by a medium to high density cover of Sydney rock oysters (*Saccostrea glomerata*). The outermost 2 - 3 m of rocky substrata was colonised by clumps of brown Neptune's necklace (*Hormosira banksii*). The intertidal sand was unvegetated.

b) Subtidal Ecology

The subtidal zone within the on-site survey area of The Property started off the end of the existing timber skid ramp and consisted of a gradually sloping seabed composed of sand covered with a high proportion of rocks and rubble (Photo 6). The rocks and rubble continued offshore for 11 m (Photo 7), before transitioning to a gradually sloping seabed of sand (Photos 8 - 10) which continued uniformly offshore beyond the survey area.

The rocky substrata that stretched offshore for 11 m beyond the end of the timber skid ramp (Photos 6 - 7) was colonised by a high density cover of brown macroalgae (bubbleweed *Sargassum* sp., kelp *Ecklonia radiata,* scrollweed *Padina* sp. and turfing filamentous), along with a low density cover of the green invasive weed *Caulerpa taxifolia.* The entire sandy subtidal seabed across The Property was colonised by seagrass (Photos 7 - 10). There was a narrow bed of medium density *Zostera* that started at the end of the rocky reef followed by a wider bed of mixed seagrass - medium density *Zostera* and *Halophila* along with low density scattered clumps of *Posidonia* (see section c. below for more seagrass density and distribution details). The mixed seagrass bed extended offshore to 31 m beyond the end of the timber skid ramp, at which point the sandy seabed became unvegetated.

Fish observed during the on-site survey included yellowfin bream (*Acanthopagrus australis*), luderick (*Girella tricuspidata*) and crested morwong (*Cheilodactylus vestitus*).

c) Seagrass and Mangroves

The entire sandy subtidal seabed across The Property was colonised by seagrass (see seagrass mapping in Appendix B). The seagrass habitats extended further inshore on the northern side of The Property, but the measurements of seagrass bed widths and species composition presented here are for the seabed located offshore of the concrete ramp.

There was a narrow bed of medium density, long leaved *Zostera* (ZosC2L; Photos 7 - 8) that started at the end of the rocky reef and extended offshore for 5.4 m. The above *Zostera* bed transitioned to a 14 m wide bed of mixed seagrass (Photos 9 - 10). The mixed bed consisted of low to medium density, long leaved *Zostera* (ZosC1/2L); medium density *Halophila* (HalC2L); low density clumps of long leaved *Posidonia* (PosA1L) that were scattered across the seabed, with gaps of up to 2 - 3 m between each clump (Photos 9 - 10); and a low density cover of the green invasive weed *Caulerpa taxifolia*.

There was a small patch of high density, medium leaf length *Zostera* (ZosB3M) in a patch of sand in amongst the rocky seabed, located 2.5m to the south of the existing concrete ramp.

No mangroves were observed at The Property.

2.2.2 Existing Ecology Based on Government Published Records

NSW Fisheries has done extensive mapping of the estuarine habitats and vegetation in all of NSW's estuaries (NSW DPI, 2023). The online map of January 2023 indicates the presence of a bed of mixed *Posidonia* and *Zostera* seagrass at The Property, as part of an extensive mixed *Posidonia/Zostera* seagrass habitat along most of the shoreline of Avalon Beach.

3. Proposed Foreshore Development

3.1 Proposed Foreshore Works

The proposed minor foreshore works at The Property are all located above the MHWM (see attached Foreshore Plan provided by CM Studio in Appendix B). The minor works consist of:

- flat lawn area on the northern side of site, behind the seawall;
- additional space behind the existing boatshed; and
- associated retaining walls.

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

In summary, as the minor foreshore works are all located above the MHWM and behind the seawall, there is no marine habitat assessment required for this site as no marine ecology at The Property will be impacted.

Prepared by

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Appendix A - On-site Survey Photos

The following photographs taken by Rick Johnson during the on-site survey conducted at The Property on 14 February 2024 are provided overleaf.

- Photos 1 - 5. Existing waterfront structures and intertidal habitats at The Property.
- Photo 6. Subtidal rocky reef at the site.
- Photos 7 - 10. Seagrass habitats at the site.

Photo 1. The foreshore and existing structures at The Property, as viewed from the navigation limit line.

Photo 2. The northern side of the boatshed, timber deck and timber skid ramp.

Photo 3. The intertidal habitats of seawall, sand and boulders on the southern side of the skid and boatshed.

Photo 4. The timber skid ramp and submerged concrete ramp, with intertidal boulders on the left hand side of the skid ramp.

Photo 5. Submerged intertidal boulders on the southern side of the skid ramp, colonised by oysters and Neptune's necklace.

Photo 6. Shallow, subtidal rocky reef on the southern side of the concrete ramp, colonised by brown macroalgae.

Photo 7. The inner margin of the narrow bed of medium density *Zostera* (ZosC2L) that started at the end of the rocky reef.

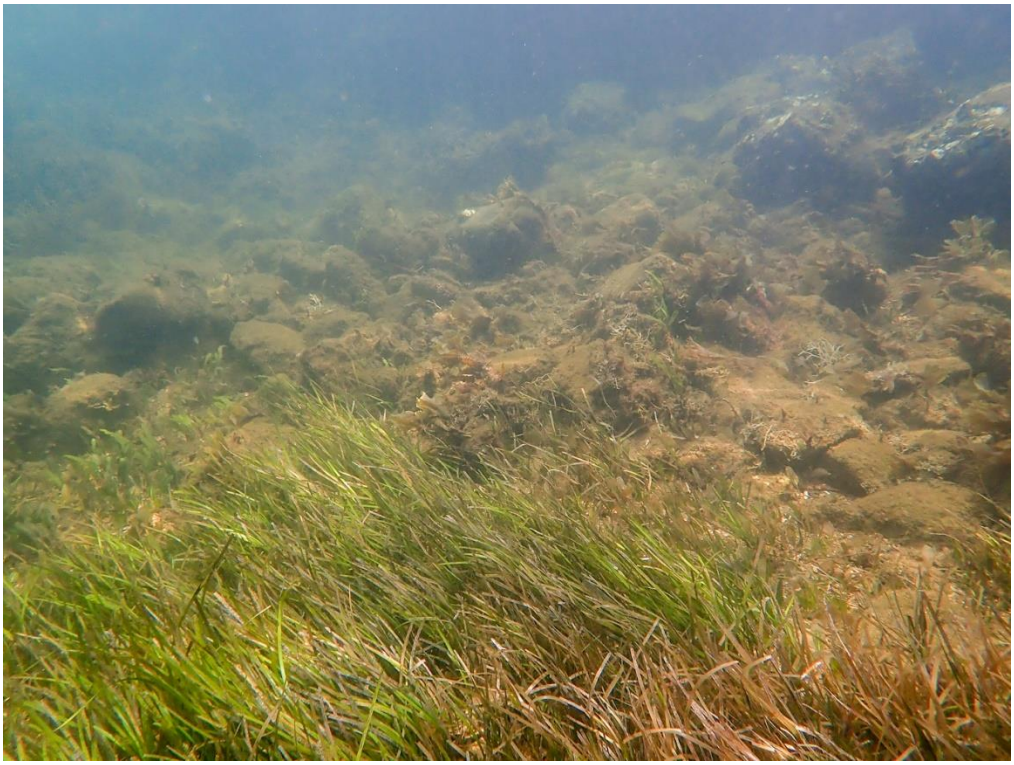


Photo 8. The middle of the narrow bed of medium density *Zostera.*

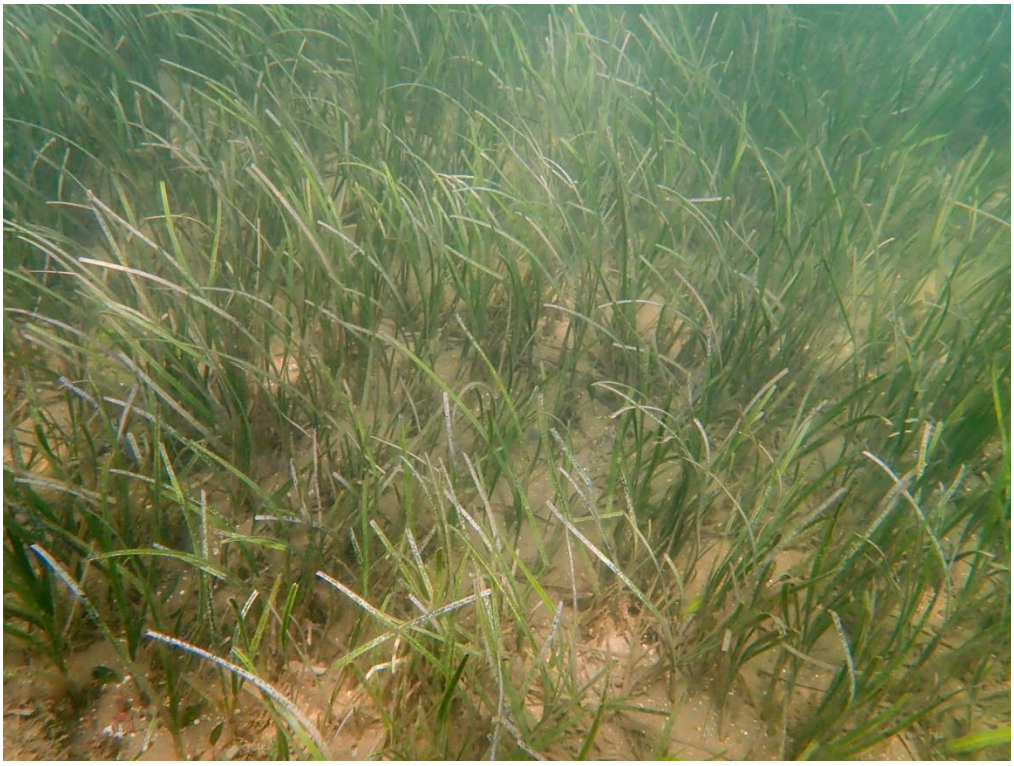


Photo 9. Mixed bed of medium density *Halophila* and low density *Zostera* (HalC2L/ZosC1L). There were scattered clumps of *Posidonia,* with 2 - 3 m gaps between each clump, within this bed - but the absence of *Posidonia* in this photo is evidence of its patchiness.

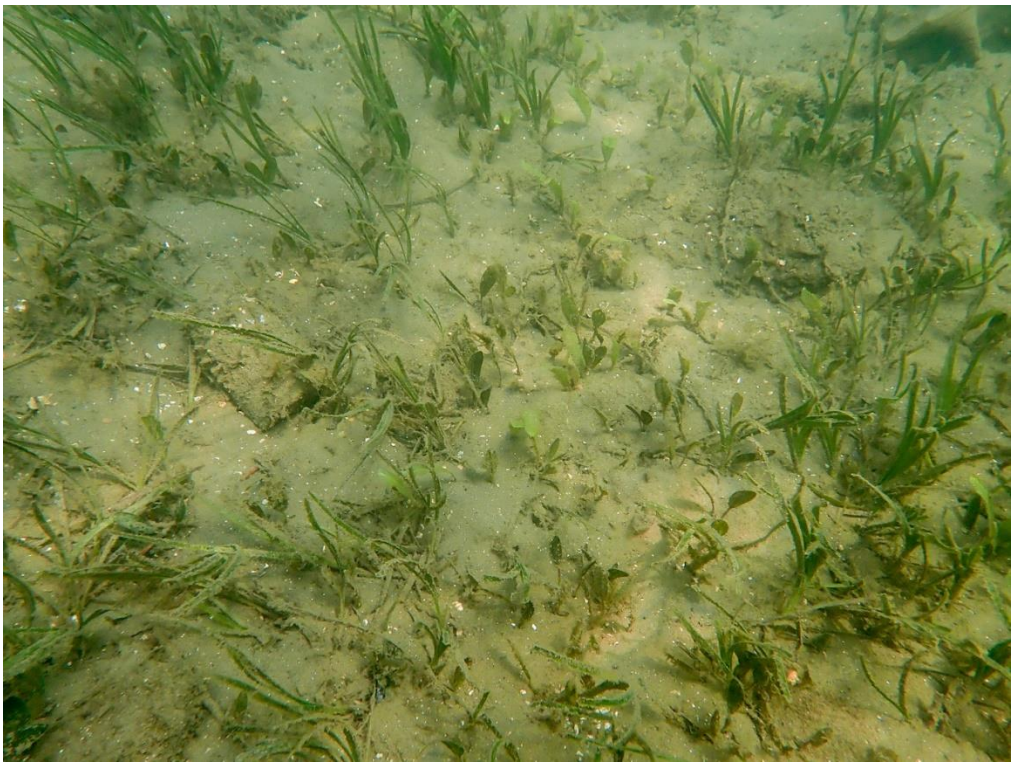
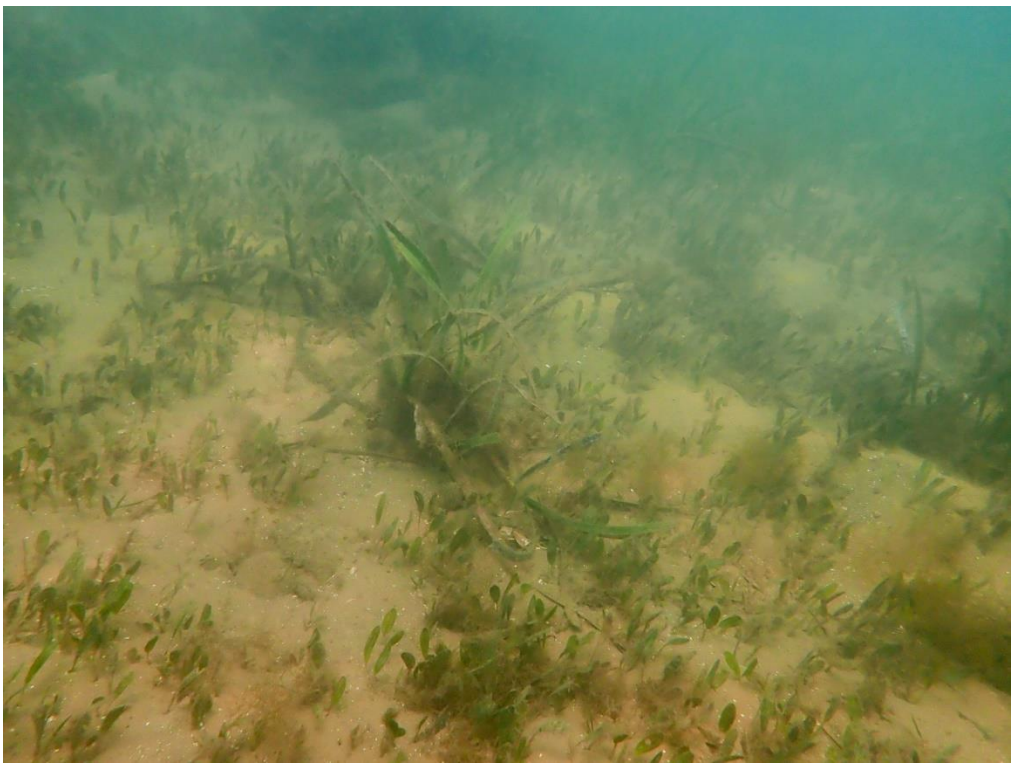


Photo 10. Mixed bed of medium density *Halophila,* low density *Zostera* and scattered clumps of low density *Posidonia* (HalC2L/ZosC1L/PosA1L).



Appendix B - Foreshore Plan and Seagrass Map

The proposed foreshore plan (provided by CM Studio) and mapped seagrass at 139 – 141 Riverview Road, Avalon Beach is provided overleaf.

CM STUDIO

Project:
Riverview House II

139-141 Riverview Road, Avalon Beach

Project number 2023_152

Revisions

No.	Description	Date
1	Development Application	11/09/2024

Client:
MMIG Developments Pty Ltd

Drawing Number: DA090 Issue 1

Date 11/09/2024

Drawing:
Foreshore Plan

Scale 1:200 @ A3

Drawn by: BW Checked by: EW

Appendix C - References

NSW Department of Primary Industries (Jan 2023). *NSW Estuarine Habitat Dashboard.* https://nsw-dpi.shinyapps.io/NSW_Estuarine_Habitat/