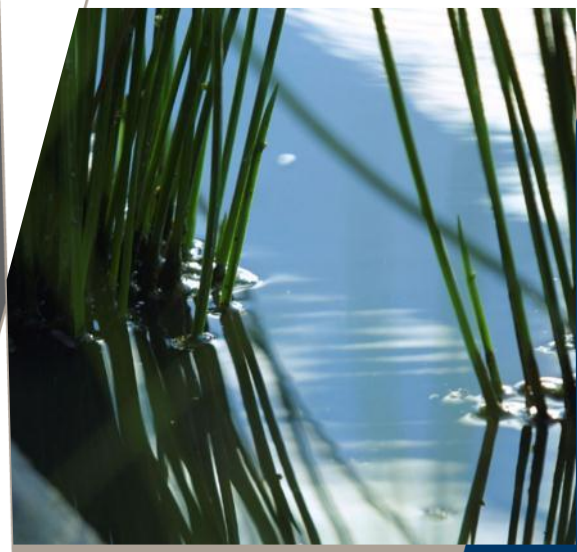
Aquatic Ecology Report

Boat House, Palm Beach

59916081 – Private and Confidential



Prepared for
London Lakes Partnership

26 April 2021

Cardno
Shaping the Future

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Document Information

Prepared for	London Lakes Partnership
Project Name	Boat House, Palm Beach
File Reference	59916081_R001_Aquatic_Ecology_Report_v6.docm
Job Reference	59916081 – Private and Confidential
Date	26 April 2021
Version Number	Rev6
Effective Date	26/04/2021
Date Approved:	26/04/2021

Document History

Version	Effective Date	Description of Revision	Prepared by:	Reviewed by:
A	24/11/15	Draft for Comment	Dan Pygas	Dr Craig Blount
0	23/3/16	Final Report	Dan Pygas	Craig Blount
1	28/02/20	Updated Final Report	Jake Ludlow	Craig Blount
2	02/03/20	Addressed Client's Comments	Dilys Zhang	
3	09/09/20	Amendment for project updates – for client review	Jake Ludlow	Dr Brendan Alderson Dilys Zhang
4	10/09/20	Final for submission to stakeholders	Jake Ludlow	Dilys Zhang
5	11/02/21	Updated following amended DA plans	Dan Pygas	
6	26/04/21	Updated following Council comments	Dilys Zhang/Jake Ludlow	Dilys Zhang

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1 Introduction

1.1 Background and Aims

London Lakes Partnership plan to develop the restaurant, facilities and deck areas at the Barrenjoey Boat House, Palm Beach (the Property). The Development Application (DA) is to include demolition of some existing facilities such as toilets, a stairway and food processing areas to improve the overall restaurant and boatshed operations and improve the satisfaction of patrons and employees. The works are also likely to include additional piles along the seaward extent of the Boat House deck areas to create a close-piled wave screen for reducing wave penetration beneath the decks and hence uplift forces and damage to the shoreline beneath the building (Cardno, 2020). Currently, the piles are spaced approximately 2.5 m apart, and the additions would result in slats being spaced approximately 0.06 m apart. Front wave wall piles will be hammered and installed by barge on high tide, while land-based piling will be advanced by truck mounted probe within the current property boundary on low tide. Piles required for the boathouse building, landward of the wave screen would only be inundated during a 1.8 m tide at the seaward side of the building. No additional piles would be installed along the northern and southern sides of the decking. It is also understood that all pontoons north of the jetty will be removed. A block seawall has also been installed below mean high water mark to the south of the boathouse by Northern Beaches Council.

Cardno (NSW/ACT) Pty Ltd was engaged by London Lakes Partnership to undertake a Marine Habitat Survey and at the Property and surrounds to document the current distribution of seagrass and other marine vegetation within the vicinity of the property and to predict the effects, if any, of the proposed works on the marine environment. The findings of the Marine Habitat Survey will assist in the preparation of the DA for the works to be submitted to Pittwater Council. The specific aims of the survey were to:

> Provide a broad description of habitats and species present, with emphasis on any marine vegetation such as seagrasses, mangroves and macroalgae beds within the vicinity of the Property;

> Identify marine vegetation species present and estimate the extent and position in relation to the Property.

> Predict the effects, if any, the proposed works may have on the marine vegetation and habitats.

An update to the DA in February 2021 included changes to land-based activities and enhanced dune stabilisation works. The changes did not affect the outcomes of the Costal Engineering Risk Assessment and predictions of changes to coastal processes including shoreline wave height and direction undertaken by Cardno (2021).

1.1.1 Proposal Works

The following works are proposed for the DA:

> The demolition of existing site sheds on licenced land and rebuilding into one ancillary building with a smaller footprint than the existing;

> New sewer and drainage works;

> New seawall;

> Re-building of the superstructure above the wharf (known as the Boat House) as per AS4997-2005;

> Replacement of piers under and around the superstructure due to Coastal Engineers Report and Access Report (work will be managed as a land-based activity due to the nature of the peering as per Demolition and Construction Report on pages 5-8;

> New wave baffle wall;

> Landscaping including dune stabilisation; and

> Amend parking to comply with AS2890.1.2004.

1.2 Existing Information

The Hawkesbury-Nepean River system, which is located in the west and north of Sydney, drains a large catchment of approximately 22,000 km². NSW Department of Primary Industries has done extensive mapping of aquatic vegetation within Hawkesbury River (West *et al*., 1985) and most recently in 2009 (Creese *et al*. 2009). The 2009 data were mapped at a scale of 1:1500 derived from aerial photographs with a positional accuracy of approximately 6 m. Vegetation boundaries were identified on orthorectified aerial photographs and boundary location and species identification were verified in the field.

Despite the waterway's large size, the total area of seagrass present in the Hawkesbury River system is quite small (2.089 km^2), with over two-thirds of this occurring in Pittwater (Creese *et al.* 2009). This is because much of the system, in common with other drowned river valleys, is deeper than the normal depth range for the growth of seagrasses, whereas, Pittwater is shallower and generally has clearer water than the main system, thus promoting the establishment of more extensive seagrass beds. In 2009, it was estimated that there were 1.885 km^2, 0.175 km^2 and 0.027 km^2 of seagrasses, mangroves and saltmarshes, respectively, within Pittwater.

Research has emphasised the importance of seagrasses to the ecology of shallow estuarine environments (Larkum *et al*. 1989). Briefly, seagrasses stabilise sediments, provide an important habitat for juvenile fishes and mobile invertebrates, many of which are of commercial or recreational importance (Bell & Pollard 1989) and are significant components in the cycling of nutrients within estuaries. Seagrasses are protected under Schedule 5 of the *Fisheries Management Act* 1994 (Part 7). In addition, populations of *Posidonia australis* in Port Hacking, Botany Bay, Sydney Harbour, Pittwater, Brisbane Waters and Lake Macquarie have suffered such a large reduction in abundance and geographic distribution that they have been listed as endangered populations under the threatened species schedules of the *NSW Fisheries Management Act 1994* and the *'Posidonia australis* seagrass meadows of the Manning-Hawkesbury ecoregion' (that includes Pittwater) as a threatened ecological community under the *Environment Protection and Biodiversity Conservation Act 1999.*

The amount of available light is one of the most important factors affecting the survival, growth, and depth distribution of seagrasses and increased shading of the seabed from artificial structures in the coastal zone can impact on their growth and distribution (Kenworthy and Fonseca, 1996). Although the areas of seagrass losses or impacts attributed to any individual foreshore structure is relatively small, the cumulative impacts and fragmentation of seagrass beds may be significant along highly developed shorelines.

The latest aquatic vegetation maps (Creese *et al.* 2009) indicate the presence of seagrasses at the subject property.

Recently, the invasive green alga *Caulerpa taxifolia* has been found in Pittwater, with the first recorded outbreak in Careel Bay in early 2001. Since then it has spread to Observation Point, Palm Beach in 2004, the eastern side of Scotland Island in April 2005 and in the latest Fisheries survey in April 2006, encircled Scotland Island (NSW DPI (Fisheries) 2015). In May 2006, NSW DPI (Fisheries) closed the eastern side of Pittwater from all commercial netting and prawn hauling to minimise the risk of spreading this invasive alga. This alga colonises new areas easily, is fast growing and is hard to eradicate. It out-competes native plants, especially seagrasses and is unpalatable to herbivores (Grey 2001).

2 Methods

Cardno visited the Property at 07:45 on 17 August 2020. Conditions were fair, the water surface was wind swept and underwater visibility was approximately 2 m. At the time of the survey the tide was dropping with an approximate tidal height of 0.80 m.

The Study Area included the structures associated with the Property (boathouse, decking, jetty and boat berths) and extended approximately 25 m in all directions to account for plant mobility and construction lay down areas. The survey was conducted using an underwater remote operated vehicle (ROV) from the jetty and pontoons and a further inspection of the seabed was done by snorkel. Photos of habitats were taken using the ROV inbuilt camera and a species list of aquatic flora and fauna observed was recorded.

During the time of the survey the following seagrass species were recorded and assigned codes below;

> Posidonia (*Posidonia australis*);

> Zostera (*Zostera muelleri* subsp. *capricorni*); and

> Halophila (*Halophila* sp.).

Estimates of seagrass density were made by ranking each observation point using three categories as per King and Barclay (1986):

> 1 – Low density (< 15% cover),

> 2 – Medium density (15% - 50% cover), or

> 3 – High density (> 50% cover).

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.

3 Results

At the time of the survey, the intertidal habitat at the Property consisted primarily of bare sand, which was present below and adjacent to the boathouse and decking areas (**Plate 1a**). A concrete boat ramp was present to the north of the boathouse and decking. The wooden piles and boulders below the decking were colonised by oysters (*Saccostrea* spp.), anemones (Order: Actiniaria) and limpets / chitons (Class: Polyplacophora) (**Plate 1b/c**). Piles within the subtidal areas were colonised by brown algae including Neptune's necklace (*Hormosira banksia*) and *Sargassum* sp. and ascidians (Class: Ascidiacea) (**Plate 1d**).

At the time of the survey, *Posidona, Zostera* and *Halophila* seagrass was present within the Study Area (see mapping of type and extent in **Figure 3-1**).

Posidonia occurred dominantly in one high density patch to the south west (**Plate 1e**), medium density patches also occurred among/near medium density *Zostera* in the south and south west in proximity to the jetty and pontoons. A medium density patch also occurred in the north west among medium density *Zostera* and low density *Halophila* (**Plate 1g**). Small shoots of medium density *Zostera* were common west of the jetty, and also in areas of *Halophila* north and south of the jetty and pontoons. A small patch of medium density *Zostera* was recorded north of the jetty in the centre of the Study Area. Medium density *Halophila* was present south and north of the northward pontoon (**Plate 1f**), with a patch present to the north west extent of the northern pontoon/berthing area. *Halophila* was also common amongst medium density *Zostera* at the southern/northern extent and west of the berthing area.

No seagrass was present under, and immediately adjacent to (within 5 m) of the boathouse decking areas and where the alterations to piling would take place. The closest seagrass in proximity to the work zone are medium density patch of *Zostera* adjacent to jetty and medium density *Halophila*, approximately 15 m from the deck. No *Posidonia* was present within approximately 25 m of the area of proposed pile placement.

The invasive algae *Caulerpa taxifolia* was not observed in the Study Area, however this may have been attributed to the poor underwater visibility during the inspection as it was recorded in previous surveys completed by Cardno in 2016.

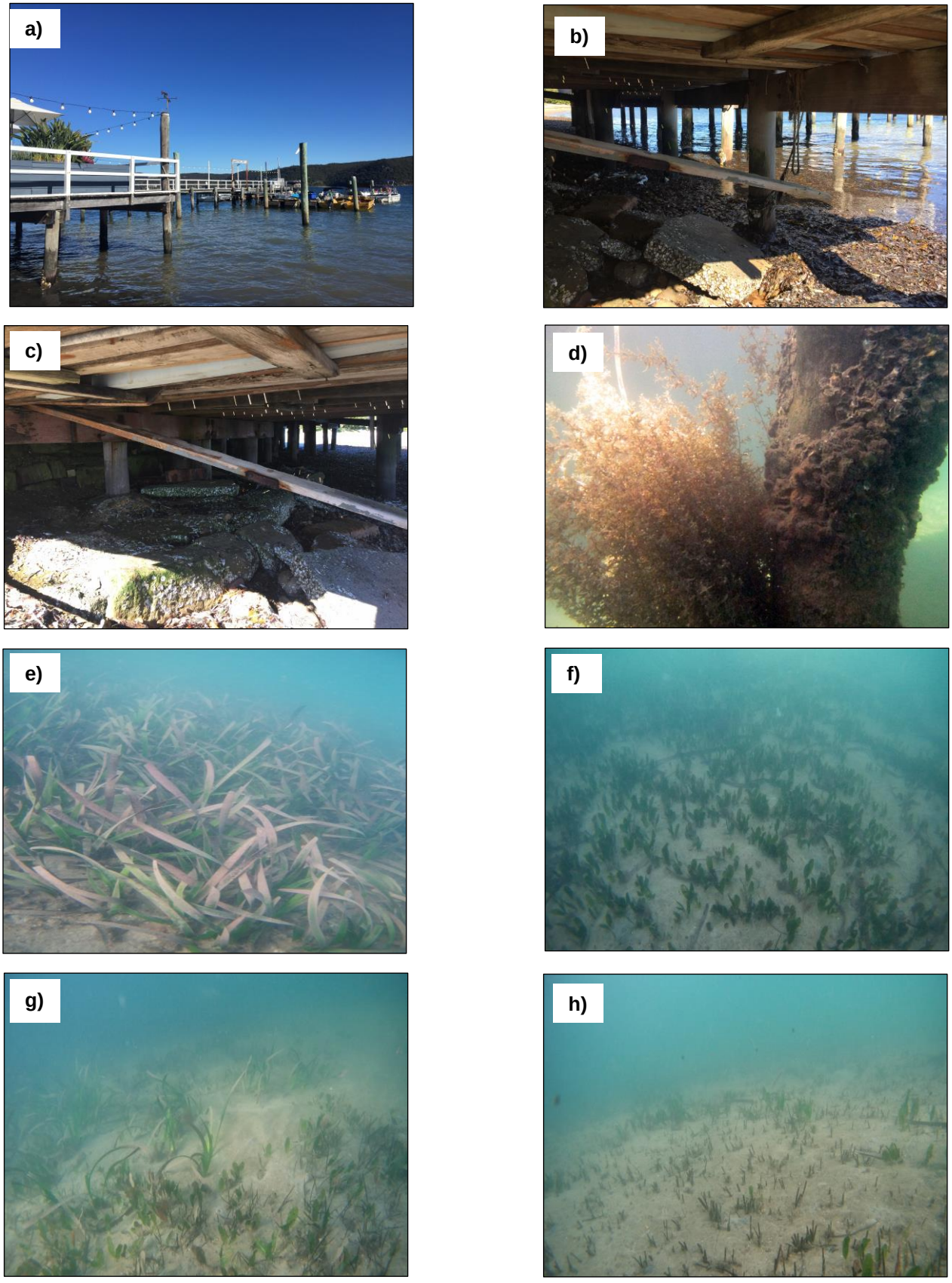

Plate 1a) Adjacent to the boathouse and decking, submerged bare sediment habitat b) Sydney rock oyster attached to the decking piles and c) attached to boulders below the decking, d) brown algae on the subtidal piles below the jetty, e) high density *Posidonia*, f) medium density *Halophila*, g) medium density *Posidonia,* Zostera, *Halophila* and h) medium density *Zostera* and low density *Halophila*.

Figure 3-1 **Aerial figure of the Property with the indicative location of seagrasses present within the Study Area at the time of the survey. Wave screen impact 8/*8* and 8/7 zones highlighted in yellow. The red arrows indicate the recommended path for the barge movements to avoid areas of *Posidonia*.**

4 Assessment of Impacts and Recommendations

Potential impacts of the proposed works described in **Section 1.1** on aquatic ecology and the proposed recommendations to avoid, minimise and mitigate project impacts would likely include:

> The direct loss of a small amount of soft sediment and bare sand habitat in the footprint of the additional decking piles. The impact from the loss of a small area of soft sediment/bare sand is considered to be very minor as there is a considerable amount of equivalent habitat in the surrounding area.

> Land based piling via truck mounted probe must be completed on the lowest possible tide (i.e. piling areas not inundated) and under appropriate meteorological conditions to avoid potential run-off of excavated material.

> Piling via barge is only to be completed on high tide and in suitable weather conditions. The barge (un-propelled, draft approx. 0.5 m) will be only moved into position upon a high tide of 1.6-1.7 m allowing sufficient water above the shallower areas adjacent to the northern pontoon. The barge will be moved via a large tinny (draft approx. 0.3 m) with an out-board motor that can be tilted to suit water depth to avoid prop scouring (recommended barge path represented by red arrow in **Figure 3-1**). The boundaries of mapped areas of *Posidonia* (**Figure 3-1**) would be marked clearly at the water's surface (i.e. Exclusion Zones) so that all vessels would avoided these areas during the barge escort. A minimum of 0.5 m above the seabed in any area is required as a precaution to avoid damage to the seabed or any marine flora or fauna occurring at the time of mobilisation. Once into proximity (near the four existing berthing piles) the barge can then be manoeuvred into position during the high tide by ropes. Once in position the barge can be securely tied off and remain over the bare sediment while the works progress (approx. three days). On completion of the works, the barge must only be moved out on a similar tide as mentioned above.

> An increase in the surface area of artificial intertidal habitats (e.g. piles). The installation of these proposed structures would provide new intertidal habitats that would likely be colonised by fauna and flora similar to that observed within the Study Area.

> A short-term increase in turbidity during the installation of the decking and wave screen piles. Any harm to marine life is predicted to be minimal and temporary, especially if care is taken to ensure that effects are localised during construction. Given that the sediment is largely comprised of sand, disturbed sediment is likely to settle out of the water column locally and rapidly following mobilisation. During the installation of the piles by barge (approx. seven piles), continuous visual monitoring of turbidity should be conducted and pilling activities adjusted accordingly (e.g. temporary cessation) if water with elevated turbidity reaches nearby seagrass patches (*Zostera* and *Halophila*). The remaining vertical slats will be constructed on land at low tide over bare sediment, this involves hand excavation to 0.3 m with slats lowered down from the deck.

> The new pile arrangement is unlikely to affect long-shore drift of sediment (Cardno, 2021) and as such it is very unlikely that it could cause a build-up of sediment around the piles that could encroach upon the nearest seagrass beds. Although the objective of pile installation is to reduce the energy and height of waves below the decking and boathouse, there would be little change to wave height and energy seaward of the piles from backscatter (Cardno, 2021). Thus, potential impacts of the new piling arrangement (particularly during large storms) to seagrasses closest to the proposed new piles from scouring from waves dynamics would be unlikely. Importantly, the nearest of the threatened *Posidonia* meadows are further than 35 m away from the area of proposed pile placement.

> The construction of the wave screen will have some effect on wave heights and directions at the shoreline. There is likely to be tendency for minor sand accumulation at the shoreline beneath the Boat House because of a localised change in near shore wave direction. It is estimated that the area highlighted in **Figure 3-1** has potential to be affected by reflected waves from the front screen. Based on previous investigations in Botany Bay, Kurnell seagrass patches experience a near bottom wave particle speed of approx. 1 m/s (equal to roughly a shear stress of 1 N/m^2) which will tear up seagrass from a sandy seabed. At this site, a near bottom wave particle speed of 1 m/s or an Hs=0.8 (swell height) is needed to damage seagrass. Based on Lawson and Treloar's Pittwater Estuary Processes Study, a Hs=0.8 occurs roughly every 8 years (8/8 zone, **Figure 3-1**) in this area. The effects of wave reflection

and radial reduction from the proposed outer wave screen, however, would see a Hs of 0.8 occur roughly every 7 years, increasing the frequency of damage to seagrass in this area (8/7 zone, **Figure 3-1**). Therefore, as indicated on 8/7 zone in **Figure 3-1**, the patches of medium density *Halophila (*and a small portion of *Zostera)* to the south may be affected from the wave screen installation.

> Pontoons north of the jetty have been removed, thus decreasing the area of shaded seabed and providing opportunity for these areas to be colonised by pioneering species *Zostera* and *Halophila*.

> The preliminary assessment of Acid Sulphate Soils (ASS) undertaken by Crozier (2018) indicated the potential for ASS at depth, within the expected zone of piling is considered extremely low within driven pile locations. Considering the western portion is within Class 1 ASS, care should be undertaken. If signs of Potential Acid Sulphate Soils (PASS) are encountered during excavation, work must be stopped and a full Acid Sulphate Soil Management Plan (ASSMP) should be prepared and implemented before resuming work.

> As part of the DA, an upgrade of the sewer system allowing trade waste water is to be treated to a higher quality than the existing system. The system includes a modern grease arrestor (approved by Sydney Water) and on-site pumping facility designed to hold a maximum 24-hour's worth of storage to prevent surcharge in the event of a breakdown. The incorporation of these design measures are likely to be sufficient to prevent any overflow impacts to the marine environment.

> The fuel/chemical storage facility has been designed in accordance to AS1940. A spill kit and a spill prevention and clean-up procedure would be implemented once the development is operational. Vessel fuel would be carried from the storage facility and care taken when refuelling.

> Dune stabilisation works would be undertaken just north of the car park area. This would include nourishment with Virgin Excavated Natural Material (VENM) removed from the building site and planting with native plants. This would reduce the potential for erosion and mobilisation of sediment into the marine environment that can otherwise be detrimental for seagrass due to smothering and reduced light penetration.

> The proposed building is expected to be 1.7 m higher than the existing building. The architectural shading drawings DA15-17, dated 1 March 2021 (see **Appendix B**) illustrate the existing shadow vs. the proposed shadow. The increase in the shading footprint falls on bare sediment in the shallow areas below the HAT, south of the Property. Based on this, there would be no anticipated increases in shading over seagrass.

In summary, the direct footprints of new piles on soft sediment/bare sand is considered to be very minor as there is a considerable amount of equivalent habitat in the surrounding area. Piling via barge is to be only completed on high tide and appropriate weather conditions as described above, and with a minimum buffer of 0.5 m above the seabed to avoid damage to the seabed or any marine flora or fauna potentially occurring at the time of construction and during demobilisation to a more suitable anchorage via a large tinny with an adjustable outboard fitted away from seagrass (i.e. bare sand). The effects of the wave screen are likely to cause a localised change in wave direction, near bottom wave particle speed and frequency of damage which may impact on some small patches of seagrass (mainly *Halophila*) in the area close to the wave screen. However, removal of the additional northward pontoons has provided suitable habitat for seagrass colonisation. Pittwater Local Environmental Plan 2014 Control B4.16 (see **Appendix A**) for Seagrass Conservation stipulates that Development shall not be permitted within a 50 m buffer area of seagrass unless it can be demonstrated that the outcomes of this control can be met, which are 'The conservation of seagrass beds in Pittwater' and 'The replacement of lost/damaged seagrass beds'. Given potential for impacts to seagrass from the works are not expected and elevated turbidity and any smothering during to installation of the additional decking piles and any block seawall is able to be managed through the sediment controls described above, the outcomes of Control B4.16 should be met.

5 References

Bell, J. D. and Pollard, D. A. (1989). Ecology of fish assemblages and fisheries associated with seagrasses. In: *Seagrass Ecosystems – An Australian Perspective*, Larkum, A. W. D., McComb, A. J., and Shepherd, S. A., (eds). Elsevier, Amsterdam.

Cardno. (2021). Coastal Engineering Risk Assessment. Document Ref .: 59916081/R003. St Leonards, NSW: Cardno

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. 95 pp.

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. 95 pp.

Crozier. (2018). Geotechnical Site Investigation for Proposed Alterations and Additions at “The Boathouse”, 1191 Barrenjoey Road, Palm Beach. Prepared for London Lakes Partnership.

Grey, D. (2001). Caulerpa taxifolia: Invasive weed prompts response actions. Fisheries NSW Spring, pp. 4-5.

Industry and Investment NSW (Fisheries) (2010). Requirements for Reviewing Foreshore Developments.

Kenworthy, W.J., Fonseca, M.S (1996). Light requirements of seagrasses Halodule wrightii and Syringodium filiforme derived from the relationship between diffuse light attenuation and maximum depth distribution. Estuaries 19: 740-750.

King, R.J. & Barclay, J.B. (1986). Aquatic angiosperms in coastal saline lagoons of New South Wales. III. Quantitative assessment of Zostera capricorni. Proceedings of the Linnaean Society of NSW 109: 41-50.

Larkum, A. W. D., McComb, A. J. and Sheperd, S. A. (1989). Biology of Seagrasses – A Treatise on the Biology of Seagrasses with Special Reference to the Australian Region. Elsevier Science, Amsterdam, Netherlands, 841 pp.

Lawson and Treloar (2003), Pittwater Estuary Processes Study. Prepared for Pittwater Council

NSW Department of Primary Industries (Fisheries) (2015). Home. Fishing and Aquaculture. Pests and Diseases. Marine Pests. Caulerpa (Caulerpa taxifolia). http://www.dpi.nsw.gov.au/fisheries/pests-diseases/marine-pests/nsw/caulerpa-taxifolia

West, R.J., Thorogood, C.A., Walford, T.R. and Williams, R.J. (1985). Estuarine inventory for New South Wales, Australia. NSW Department of Agriculture and Fisheries Bulletin No. 2. Sydney, Australia.

Appendix A

B4.16 Seagrass Conservation

Land to which this control applies

> All areas of the Pittwater waterway containing seagrass - P21DCP-BCMDCP033

> The Waterways Locality and properties which abut the Pittwater Waterway – P21DCP-D15MDCP751

P21DCP-D15MDCP751

Uses to which this control applies

> Dwelling House - New

> Dwelling House - Alterations and Additions

> Attached Dual Occupancy

> Multi-Unit Housing

> Shop-Top Housing

> Business Development - New Construction or Alterations and Additions

> Subdivision (Additional Lots - Excludes Dual Occupancy)

> Jetty, ramp, pontoon (ancillary to a dwelling)

> Attached dwellings in non-urban areas

> Group Building

> Residential Flat Building (2 storey)

> Residential Flat Building (3 storey)

> Seniors Housing - SEPP (Seniors Living) 2004

> Bed and Breakfast Establishment

> Child Care Centre

> Demolition

> Earthworks/Landfill

> Waste Water Disposal System

> Hospital/Nursing Home

> Rural Industry

> Other Development/Land Use

> Secondary Dwelling

Outcomes

The conservation of seagrass beds in Pittwater. (En)

The replacement of lost seagrass beds. (En)

Controls

Development shall not significantly affect seagrass beds.

Development shall replace seagrass in areas where it has been lost.

No filling, dredging or other disturbance shall be undertaken within a 50m buffer area of

seagrass beds.

Jetties, ramps, wharves and pontoons shall be designed and constructed to maximise light filtration to seafloor.

Nutrients release into waterway shall not be increased. Development shall not result in turbidity in the vicinity of seagrass.

On-site waste water system systems shall include removal of Phosphorus and Nitrogen to below P 0.05 and N 0.05mg/L.

Variations

Development shall not be permitted within a buffer area unless it can be demonstrated that the outcomes of this control can be met.

Provided the outcomes of this control are achieved, Council may consider variation to this control for:

> environmental restoration projects whose objective is the improvement of estuarine water quality; or

> activities within an approved Pittwater Council Plan of Management.

Appendix B


LEGEND
EXISTING SHADOW
PROPOSED SHADOW
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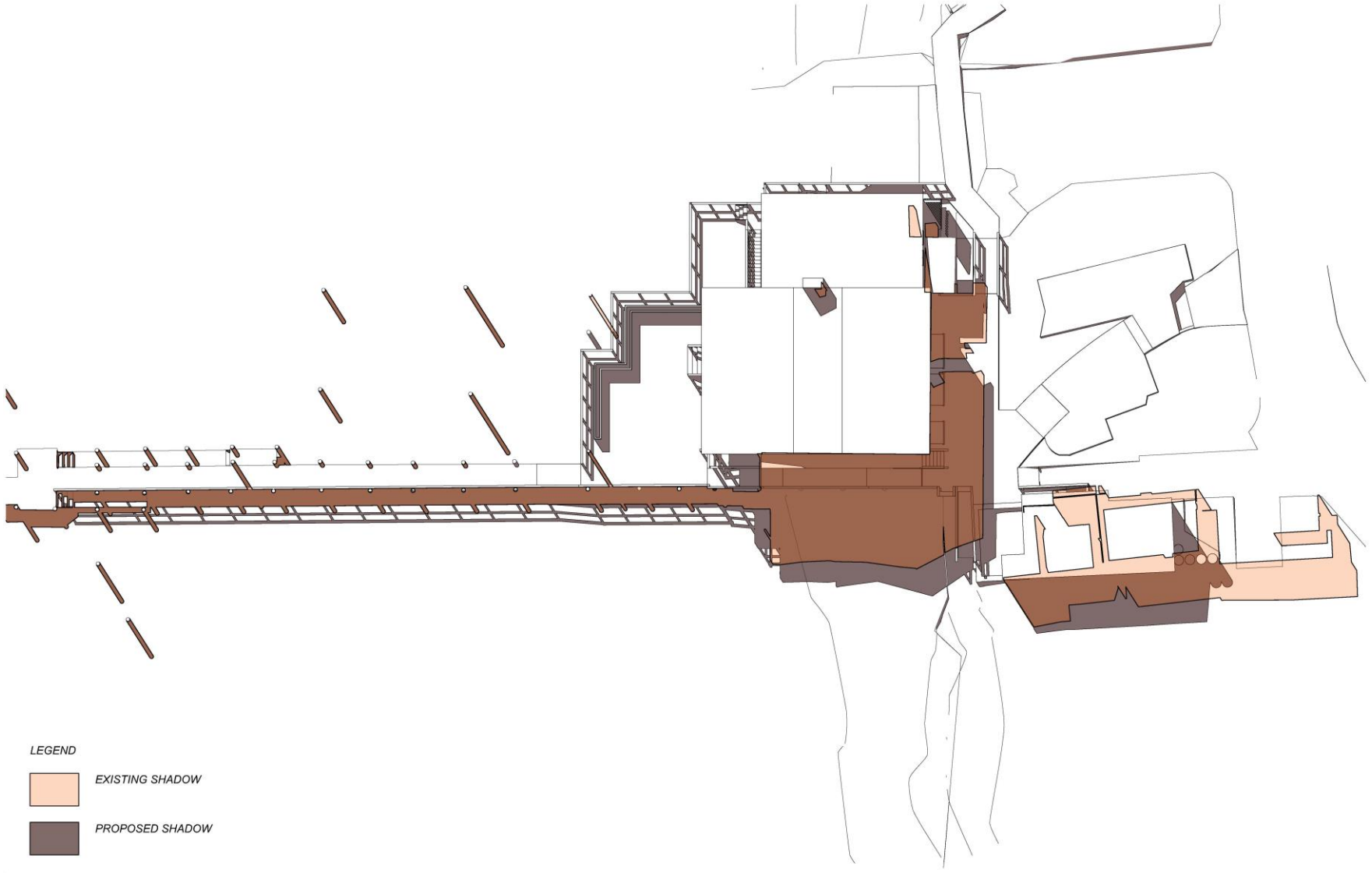
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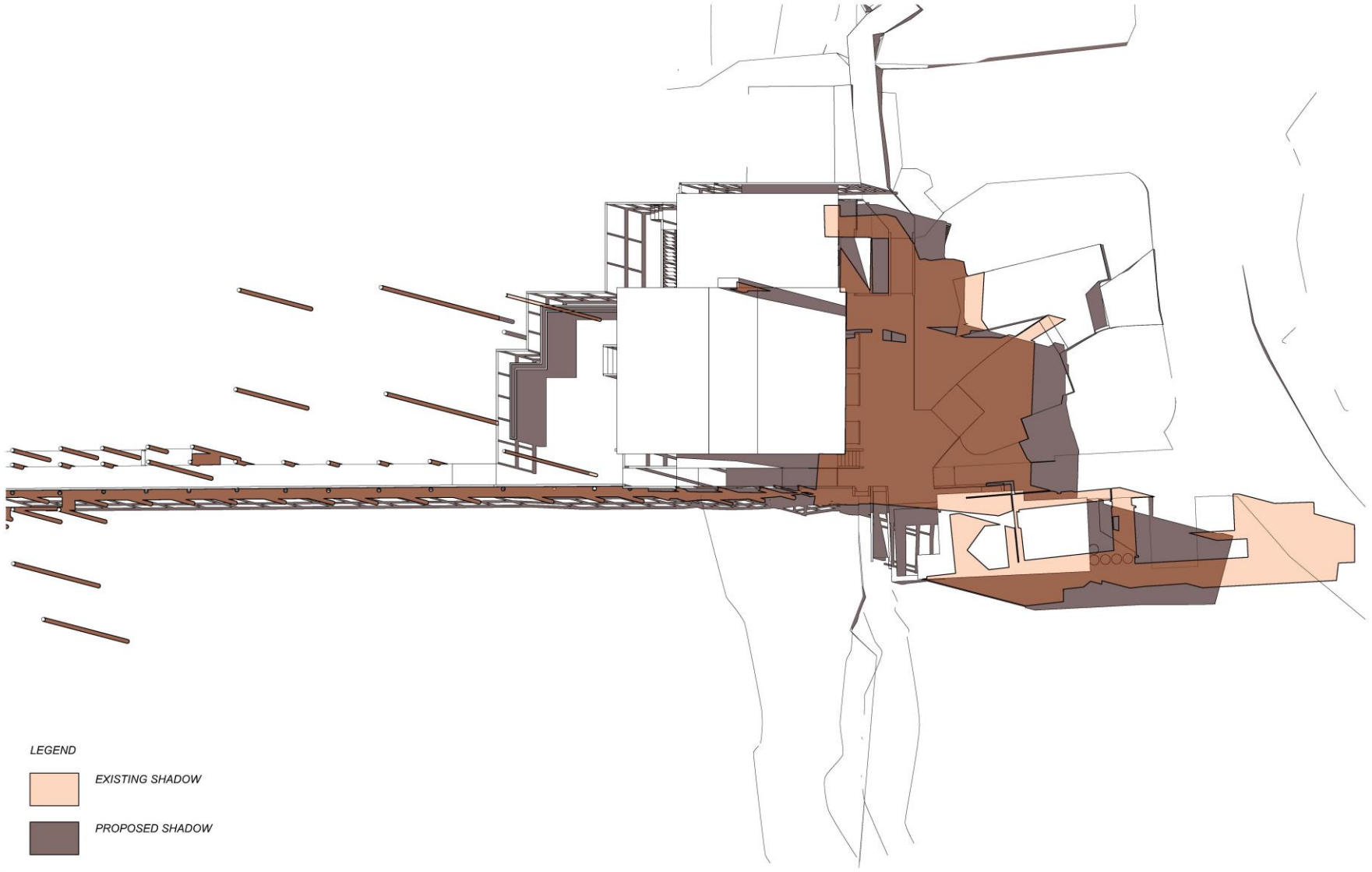

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