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## **Estuarine Risk Management Report on 252 Hudson Parade Clareville**

### **1. INTRODUCTION AND BACKGROUND**

It is proposed to undertake demolition works and construction of a dwelling house and secondary dwelling, swimming pool, carport, inclinor and boatshed at 252 Hudson Parade Clareville, hereafter denoted as the 'site'. A Development Application (DA2023/0690) has been submitted to Northern Beaches Council for these works.

As the site is potentially affected by estuarine hazards, it is subject to the *Pittwater 21 Development Control Plan (DCP)*<sup>1</sup>, in particular Chapter B3.7. It is also subject to the *Estuarine Risk Management Policy for Development in Pittwater* (Estuarine Policy, which is Appendix 7 of the DCP). As boatshed works are proposed, Chapter D15.15 of the DCP is also addressed herein, and as the boatshed and inclinor would be in the foreshore area, Clause 7.8 of *Pittwater Local Environmental Plan 2014* is addressed. *State Environmental Planning Policy (Resilience and Hazards) 2021* (SEPP Resilience) is also considered herein.

Horton Coastal Engineering Pty Ltd was engaged to complete the estuarine risk management report required by Council, as set out herein. The report author is Peter Horton [BE (Hons 1) MEngSc MIEAust CPEng NER]. Peter has postgraduate qualifications in coastal engineering and 31 years of coastal engineering experience, and has completed numerous studies along the Pittwater shoreline, including at Clareville. He is a Member of Engineers Australia and Chartered Professional Engineer (CPEng) registered on the National Engineering Register. Peter is also a member of the National Committee on Coastal and Ocean Engineering (NCCOE) and NSW Coastal, Ocean and Port Engineering Panel (COPEP) of Engineers Australia. He has inspected the area in the vicinity of the site on several occasions in the last few decades, including a specific recent inspection of the site on 25 August 2023.

All levels given herein are to Australian Height Datum (AHD). Zero metres AHD is approximately equal to mean sea level at present in the ocean immediately adjacent to the NSW mainland, and also within Pittwater.

### **2. INFORMATION PROVIDED**

Horton Coastal Engineering was provided with 20 drawings of the proposed works prepared by Anne Robson Architecture (a cover sheet and Drawing Nos DA02 to DA17, DA19, and two DA20 drawings), all dated 5 May 2023 (except DA05 and the second DA20 were dated

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<sup>1</sup> The version up to Amendment 27 (effective from 18 January 2021) was considered herein.

7 June 2023). A site survey by CMS Surveyors (Drawing 7919Bdetail, Issue 2 and dated 21 March 2022) was also provided.

### 3. EXISTING SITE DESCRIPTION

The site is located on the southern side of Taylors Point and adjacent to Refuge Cove on the eastern shoreline of Pittwater, with a broad aerial view in Figure 1, zoomed aerial view in Figure 2, and photograph of the site in Figure 3. The site is most exposed to a wind-wave fetch from the WSW to SW, with a fetch length of about 2.4km.



**Figure 1: Aerial view of site (red outline) on 30 August 2018**





**Figure 2: Zoomed aerial view of site (approximate red outline) on 25 January 2021**



**Figure 3: View of foreshore at site (between arrows) on 25 August 2023, facing north**



Based on the survey, the sandstone seawall offshore of the site has a crest level of about 1.2m to 1.5m AHD, with sand levels at the base of the seawall at about 0.0m AHD, making the visible part of the seawall about 1.2m to 1.5m high. A lawn area extends about 3m to 4m landward of the seawall, then levels rise up a steeply vegetated slope to 11m to 12m AHD at a deck, and 15.5m AHD at the dwelling (which has a floor level of about 16.6m AHD). Levels continue to increase moving further landward, to about 35m AHD at Hudson Parade.

Tidal flats extend offshore of the seawall, with the seabed level at about -0.4m AHD at 7m offshore.

#### **4. PROPOSED DEVELOPMENT**

It is proposed to undertake demolition works and construction of a dwelling house and secondary dwelling, swimming pool, carport, inclinator and boatshed at the site. No changes to the existing seawall are proposed.

The dwelling and secondary dwelling (with carport above) are to have floor levels of 15.9m and 29.9m AHD respectively, and the pool is to have a coping level of 13.6m AHD. These are well above the Estuarine Planning Level (see Section 6), so only the inclinator and boatshed need to be considered further herein.

The boatshed is to have a floor level of 2.32m AHD, and is to be constructed of concrete (floor, walls and roof).

The inclinator is to have all components above 2.32m AHD. The rail car would extend down to a few hundred millimetres above the base of the rail, with a low voltage charging port and limit switch located below the lowest level of the car (these are all weather products, but would be damaged if submerged in water). The car would stop about 200mm above the limit switch and charging port so there would need to be a landing and steps for people to access on and off the car. At the lower level of the inclinator there would also be a low voltage call station, expected to be mounted on a pole about 1.2m above the base level of the car.

#### **5. DESIGN LIFE**

In the Estuarine Policy, it is noted that a design project life of 100 years should be adopted, unless otherwise justified. A 60-year design life (that is, at 2083) has been adopted for the proposed development. This is the same design life as adopted in the *Coastal Zone Management Plan [CZMP] for Bilgola Beach (Bilgola) and Basin Beach (Mona Vale)* that was prepared by the author for Council and gazetted on 14 July 2017. Although this CZMP does not geographically apply at the site, it is the only gazetted CZMP in the former Pittwater Council area, and hence is relevant to consider in the selection of design life.

As justified in the CZMP, a 60 year life is considered to be appropriate for infill residential development as it is consistent with the design life used in various Australian Standards (eg *AS 3600 – Concrete structures*), tax legislation, and community expectations. It is a conservative design life to adopt for a boatshed<sup>2</sup>.

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<sup>2</sup> A 25 year design life would typically be adopted for a boatshed. This is consistent with *Australian Standard AS 4997 - Guidelines for the Design of Maritime Structures*, in which the recommended design life for a small craft facility is 25 years.

## **6. ESTUARINE PROCESSES**

### **6.1 Design Still Water Level at End of Design Life**

In Cardno (2015), the 100-year Average Recurrence Interval (ARI) present day water level in the region covering the site is reported as 1.52m AHD. This includes the effects of astronomical tide and storm surge (combined level of 1.44m AHD), plus local wind setup (0.08m). Wave action can temporarily and periodically increase water levels above this level, particularly in severe storms if they generate wind-waves that propagate towards the site.

Cardno (2015) estimated a 2050 Estuarine Planning Level (EPL) of 2.63m AHD, and 3.13m AHD at 2100, at the foreshore<sup>3</sup>. These EPL's include wave runup and overtopping effects and a freeboard of 0.3m<sup>4</sup>, and do not include any reduction with distance landward of the foreshore.

At present at the site, Mean High Water is approximately 0.5m AHD and Mean High Water Springs is about 0.6m AHD. The combined astronomical tide and storm surge level for a monthly and bi-annual event is about 1.0m and 1.2m AHD respectively. Corresponding water levels only increase slightly for rarer events, eg 1 year ARI level of 1.24m AHD, 10 year ARI level of 1.34m AHD and 50 year ARI water level of 1.41m AHD (Department of Environment, Climate Change and Water [DECCW] (2010).

In Cardno (2015), sea level rise values of 0.4m at 2050 and 0.9m at 2100 were applied relative to 2010 (based on DECCW, 2010), which is not correct as those benchmarks were derived relative to 1990, and historical sea level rise has not been discounted. Appropriate sea level rise values (relative to 2010) with discounting of historical sea level rise would be 0.34m at 2050 and 0.84m at 2100.

For the proposed design life of 60 years (at 2083), it would be possible to interpolate between the 2050 and 2100 sea level rise values noted above. However, given the non-linear rate of sea level rise and to allow for a probabilistic assessment, it is considered to be most appropriate to directly derive sea level rise values from Intergovernmental Panel on Climate Change [IPCC] (2021), which is widely accepted by competent scientific opinion.

Using the same methodology applied in the acceptable risk assessment in the *Coastal Zone Management Plan for Bilgola Beach (Bilgola) and Basin Beach (Mona Vale)*, and using a base year of 2010 as Cardno (2015) water levels were derived at 2010, the sea level rise values presented in Table 1 (at 2083) were determined for the five illustrative scenarios (shared socioeconomic pathways, SSP's<sup>5</sup>) considered in IPCC (2021)<sup>6</sup>.

This includes regional sea level rise variations at Sydney as reported by the Physical Oceanography Distributed Active Archive Center (PO.DAAC), a NASA Earth Observing System Data and Information System data centre operated by the Jet Propulsion Laboratory in Pasadena, California. The sea level rise values were determined at 2083, relative to the average sea level from a 1995-2014 baseline (taken to be at 2005).

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<sup>3</sup> Assuming that the seawall has a crest level of 1.5m AHD.

<sup>4</sup> Use of a freeboard is not necessarily considered to be appropriate in a wave runup scenario.

<sup>5</sup> Known as representative concentration pathways in the previous IPCC (2013) assessment.

<sup>6</sup> The five illustrative scenarios represent varying projected greenhouse gas emissions, land use changes and air pollutant controls in the future.

**Table 1: Sea level rise (m) at Sydney from a 1995-2014 average level (taken at 2005) to 2083 derived from IPCC (2021) and PO.DAAC**

Emissions Scenario (Shared Socioeconomic Pathway)	Exceedance Probability		
	95% exceedance	Median	5% exceedance
SSP1-1.9	0.12	0.27	0.52
SSP1-2.6	0.16	0.32	0.60
SSP2-4.5	0.24	0.41	0.71
SSP3-7.0	0.30	0.49	0.81
SSP5-8.5	0.35	0.56	0.92
Average	0.23	0.41	0.71

Taking the median exceedance probability and average of the 5 SSP's, a sea level rise value of 0.41m at 2083 (relative to 2005) was derived. Given that Cardno (2015) water levels were derived at 2010, the sea level rise should be determined relative to 2010. Watson (2020) found that the rate of sea level rise from satellite altimetry in the SE Australia region was 3.5mm/year from 1992-2019. Applying this rate from 2005 to 2010, the projected sea level rise from 2010 to 2083 at Sydney is 0.39m.

Therefore, the design 100 year ARI estuarine still water level at 2083 is 1.91m AHD. This still water level is about 0.41m below the proposed boatshed floor and inclinator base.

## 6.2 Wave Action

Cardno (2015) estimated that the 100 year ARI wave climate in the region covering the site was a significant wave height of 0.82m (average of the highest one-third of waves) and mean wave period of 2.4s (or peak spectral wave period of 3.4s assuming a 1.4 multiplier).

In the design event, waves would break at and overtop the crest of the seawall, propagating landward. Using the methodology outlined in Cardno (2015), the design wave runup level is 2.32m AHD at the foreshore. Therefore, it is considered reasonable to adopt an Estuarine Planning Level (EPL) of 2.32m AHD at the foreshore.

## 7. RISKS OF DAMAGE TO PROPOSED STRUCTURES AND MITIGATION OF THOSE RISKS

The floor level of the boatshed and inclinator base are at the EPL, so there are no specific requirements for these structures from a coastal engineering perspective, except that any components of the boatshed below 2.32m AHD should comprise materials that are tolerant of inundation. If this is adopted, the risks of damage to the proposed boatshed from estuarine inundation would be suitably mitigated, and it would have an adequately low risk of failure. With the inclinator above the EPL, the risks of damage to it from estuarine inundation would be suitably mitigated, and it would have an adequately low risk of failure.

Any other items along the foreshore not specifically mentioned above should be designed to withstand inundation below the EPL of 2.32m AHD. This means that any electrical items below this level should be waterproofed, any potentially polluting items should be stored above the EPL, and no items should be stored below the EPL that could float away or be damaged by inundation.

## **8. MERIT ASSESSMENT**

### **8.1 Chapter B3.7 of the Pittwater 21 DCP**

Based on the DCP (numbering added herein for convenience):

1. All development or activities must be designed and constructed such that they will not increase the level of risk from estuarine processes for any people, assets or infrastructure in surrounding properties; they will not adversely affect estuarine processes; they will not be adversely affected by estuarine processes; and
2. All structural elements below the Estuarine Planning Level shall be constructed from flood compatible materials; and
3. All structures must be designed and constructed so that they will have a low risk of damage and instability due to wave action and tidal inundation; and
4. All electrical equipment, wiring, fuel lines or any other service pipes and connections must be waterproofed to the Estuarine Planning Level; and
5. The storage of toxic or potentially polluting goods, materials or other products, which may be hazardous or pollute the waterway, is not permitted to be stored below the Estuarine Planning Level; and
6. For existing structures, a tolerance of up to minus 100mm may be applied to the Estuarine Planning Level in respect of compliance with these controls.
7. To ensure Council's recommended flood evacuation strategy of 'shelter in place' it will need to be demonstrated that there is safe pedestrian access to a 'safe haven' above the Estuarine Planning Level.

With regard to Item 1, the proposed development would not significantly change estuarine processes nor increase the level of risk in surrounding areas for the design event, as the movement of water and waves over the area seaward of the site would not be significantly altered. If the requirements in Section 7 are followed, the risk of the proposed development being adversely affected by estuarine processes would be suitably mitigated. That is, the development is at an acceptably low risk of being adversely affected by estuarine processes with the measures outlined in Section 7 adopted. Therefore, Item 1 is satisfied.

Item 2 is satisfied with the measures outlined in Section 7 adopted.

With regard to Item 3, with all structures at or above the EPL, there are no coastal loading requirements (such as hydrostatic and wave forces) that need to be considered for structural design of the boatshed or inclinator.

Items 4 and 5 were noted as being required in Section 7.

Item 6 has not been applied.

With regard to Item 7, occupants are not at significant risk of injury at the site for the design coastal storm event, and can shelter-in-place in the dwelling or secondary dwelling without any need for evacuation. It is further noted that the largest component of elevated water level is astronomical tide, which is entirely predictable and independent of the storm event, so early warning is available. The inundation peak would also only have a duration of around 2 hours (at high tide).

With regard to another item in Chapter B3.7 of the DCP, no mitigation works are proposed that would significantly modify the wave action or tidal inundation behaviour within the

development site (including the filling of land, the construction of retaining structures and the construction of wave protection walls).

## **8.2 Estuarine Risk Management Policy for Development in Pittwater**

The requirements of the *Estuarine Risk Management Policy for Development in Pittwater* (Estuarine Policy) have been met herein by consideration of:

- estuarine processes and the Estuarine Planning Level in Section 6; and
- the controls in Chapter B3.7 of the Pittwater 21 DCP in Section 8.1.

Furthermore, although the current Estuarine Policy does not have a form that is required to be filled in, Council has in the past requested that a form provided in a former Estuarine Policy be completed, as provided at the end of the document herein.

## **8.3 Chapter D15.15 of the Pittwater 21 DCP**

Based on Chapter D15.15 of the DCP, “boatsheds shall meet the following criteria:

- Boatsheds shall be located above mean high water mark on freehold land, where practicable. Where this cannot realistically be achieved, as much of the proposed boatshed as is practical must be located above mean high water mark to minimise encroachment onto the littoral zone below mean high water mark.
- Boatsheds shall be one storey and no greater than 4.5 metres in building height above the platform on which it is built, 4.0 metres in width and 6.0 metres in length, as illustrated in Diagram 4. The use of lofts or similar design concepts shall not be permitted.
- Boatsheds shall not prevent or hinder public foreshore access. Alternative access must be provided where a proposed boatshed is likely to make existing foreshore access below mean high water mark difficult.
- Boatsheds cannot be used for any other purpose than the storage of small boats and/or boating equipment. The incorporation [sic] any internal kitchen facilities, habitable rooms, shower or toilet facilities shall not be permitted. Roof areas of boatsheds shall not be used for recreational or observational purposes.
- Boatsheds shall be constructed of low maintenance materials that are of a tone and colour which is sympathetic to the surrounding setting. Structures proposed along the western foreshores, McCarrs Creek, Horseshoe Cove, Salt Pan Cove, Refuge Cove, Clareville and Careel Bay are to have specific regard for the natural landscaped character of the area. Reflective materials and finishes for private boatsheds shall not be permitted.
- The minimum floor level for proposed boatsheds shall be in accordance controls for foreshore development around the Pittwater Waterway.
- Boatsheds shall be able to be entirely enclosed. Boatsheds which either partially or wholly do not incorporate appropriate wall cladding shall not be permitted, as such structures tend to become visually obtrusive when viewed from the waterway.
- All electrical equipment and wiring shall be water tight below the designed flood/tidal inundation level”.

With regard to (i), the proposed boatshed is above mean high water mark and on freehold land.

With regard to (ii), the boatshed is single storey and has dimensions of 4m × 6m as required, and a height of 3.4m which is below the required limit of 4.5m.



With regard to (iii), the boatshed is entirely on private property and would not prevent or hinder public foreshore access.

With regard to (iv), this requirement is noted.

With regard to (v), this is not a coastal engineering matter so is not considered herein.

With regard to (vi), the floor level is at the EPL.

With regard to (vii), it is understood that the boatshed is to be completely enclosed.

With regard to (viii), this requirement was noted in Section 7.

#### **8.4 Clause 7.8 of Pittwater Local Environmental Plan 2014**

##### *8.4.1 Preamble*

The proposed boatshed and inclinor are located in the Foreshore Area, so Clause 7.8 of *Pittwater Local Environmental Plan 2014* (LEP 2014) should be considered.

##### *8.4.2 Clause 7.8(1)*

In Clause 7.8(1) of LEP 2014, it is stated that the “objectives of this clause are as follows:

- (a) to ensure that development in the foreshore area will not impact on natural foreshore processes or affect the significance and amenity of the area,
- (b) to ensure continuous public access along the foreshore area and to the waterway”.

The proposed boatshed and inclinor are entirely on private property and above the EPL, and would not affect public access nor impact on natural foreshore processes.

##### *8.4.3 Clause 7.8(2)*

Based on Clause 7.8(2) of LEP 2014, “development consent must not be granted for development on land in the foreshore area except for the following purposes:

- (a) the extension, alteration or rebuilding of an existing building wholly or partly in the foreshore area, if the levels, depth or other exceptional features of the site make it appropriate to do so,
- (b) boat sheds, sea retaining walls, wharves, slipways, jetties, waterway access stairs, swimming pools, fences, cycleways, walking trails, picnic facilities or other recreation facilities (outdoors)”.

It is evident that boatsheds are permissible within the Foreshore Area. Inclinator throughout Pittwater extend down to the foreshore, and may be considered to be equivalent to waterway access stairs.

##### *8.4.4 Clause 7.8(3)*

Based on Clause 7.8(3) of LEP 2014, “development consent must not be granted under this clause unless the consent authority is satisfied that:

- (a) the development will contribute to achieving the objectives for the zone in which the land is located, and
- (b) the appearance of any proposed structure, from both the waterway and adjacent foreshore areas, will be compatible with the surrounding area, and
- (c) the development will not cause environmental harm such as:
  - i) pollution or siltation of the waterway, or
  - ii) an adverse effect on surrounding uses, marine habitat, wetland areas, fauna and flora habitats, or
  - iii) an adverse effect on drainage patterns, or
  - iv) the removal or disturbance of remnant riparian vegetation, and
- (d) the development will not cause congestion or generate conflict between people using open space areas or the waterway, and
- (e) opportunities to provide continuous public access along the foreshore and to the waterway will not be compromised, and
- (f) any historic, scientific, cultural, social, archaeological, architectural, natural or aesthetic significance of the land on which the development is to be carried out and of surrounding land will be maintained, and
- (g) in the case of development for the alteration or rebuilding of an existing building wholly or partly in the foreshore area, the alteration or rebuilding will not have an adverse impact on the amenity or aesthetic appearance of the foreshore, and
- (h) sea level rise, coastal erosion and recession, or change of flooding patterns as a result of climate change, have been considered”.

For Item (a), the site is zoned as C4 Environmental Living, for which the objectives in *Pittwater Local Environmental Plan 2014* are as follows:

- to provide for low-impact residential development in areas with special ecological, scientific or aesthetic values;
- to ensure that residential development does not have an adverse effect on those values;
- to provide for residential development of a low density and scale integrated with the landform and landscape; and
- to encourage development that retains and enhances riparian and foreshore vegetation and wildlife corridors.

The proposed development does not impact on any of these objectives from a coastal engineering perspective.

Items (b), (f) and (g) are not coastal engineering matters so are not considered herein.

For Item (c), the proposed development would not cause any significant pollution or siltation of the waterway and would not adversely impact on adjacent areas, if appropriate construction environmental controls are applied. Also, no remnant riparian vegetation is to be removed as part of the proposed works. In an arborist report submitted with the DA it was noted that the proposal only requires the removal of two trees, with replacement trees proposed. Therefore, this item is satisfied.

For Item (d), the proposed works would not affect public use of the foreshore and would not cause any conflict with waterway uses, as they are entirely on private property.

For Item (e), the proposed works would not compromise any (if any) public access along the foreshore area, with space available for alongshore access.



For Item (h), sea level rise was considered in Section 6.

#### *8.4.5 Clause 7.8(4)*

Based on Clause 7.8(4) of LEP 2014, “in deciding whether to grant consent for development in the foreshore area, the consent authority must consider whether and to what extent the development would encourage the following:

- (a) continuous public access to and along the foreshore through or adjacent to the proposed development,
- (b) public access to link with existing or proposed open space,
- (c) public access to be secured by appropriate covenants, agreements or other instruments registered on the title to land,
- (d) public access to be located above mean high water mark,
- (e) the reinforcing of the foreshore character and respect for existing environmental conditions”.

As stated above, the proposed works would not compromise public access along the foreshore.

### **8.5 State Environmental Planning Policy (Resilience and Hazards) 2021**

#### *8.5.1 Preamble*

Based on *State Environmental Planning Policy (Resilience and Hazards) 2021* (SEPP Resilience) and its associated mapping, the site is within a “coastal environment area” (see Section 8.5.2) and a “coastal use area” (see Section 8.5.3).

#### *8.5.2 Clause 2.10*

Based on Clause 2.10(1) of SEPP Resilience, “development consent must not be granted to development on land that is within the coastal environment area unless the consent authority has considered whether the proposed development is likely to cause an adverse impact on the following:

- (a) the integrity and resilience of the biophysical, hydrological (surface and groundwater) and ecological environment,
- (b) coastal environmental values and natural coastal processes,
- (c) the water quality of the marine estate (within the meaning of the *Marine Estate Management Act 2014*), in particular, the cumulative impacts of the proposed development on any of the sensitive coastal lakes identified in Schedule 1,
- (d) marine vegetation, native vegetation and fauna and their habitats, undeveloped headlands and rock platforms,
- (e) existing public open space and safe access to and along the foreshore, beach, headland or rock platform for members of the public, including persons with a disability,
- (f) Aboriginal cultural heritage, practices and places,
- (g) the use of the surf zone”.

With regard to (a), the proposed works are in a developed residential area. The works would not be expected to adversely affect the biophysical and hydrological (surface and groundwater) environments. Existing stormwater drainage pathways to Pittwater are not to be significantly altered, with conventional stormwater management and BASIX requirements such as

rainwater tanks to be installed. The proposed works would not be a source of pollution as long as appropriate construction environmental controls are applied. The works would not be expected to adversely affect the ecological environment based on a report by Kingfisher Urban Ecology & Wetlands submitted with the DA, in which a landscape plan was developed that considered impacts on the Pittwater Spotted Gum Endangered Ecological Community.

With regard to (b), the proposed works would not be expected to adversely affect estuarine processes in Pittwater.

With regard to (c), the proposed works would not adversely impact on water quality as long as appropriate construction environmental controls are applied.

With regard to (d), this is not a coastal engineering matter so is not necessarily definitively considered herein. That stated, there are no undeveloped headlands or rock platforms in proximity to the proposed development, and the proposed works are above 2.32m AHD so would not be expected to impact on marine vegetation as long as appropriate construction environmental controls are applied. Consideration of native vegetation and fauna and their habitats is understood to have been addressed in the report by Kingfisher Urban Ecology & Wetlands submitted with the DA.

With regard to (e), the proposed works would not impact on public open space and access to and along the foreshore, as discussed previously.

With regard to (f), a search of the Heritage NSW “Aboriginal Heritage Information Management System” (AHIMS) was undertaken on 18 October 2023. This resulted in an Aboriginal site being recorded within 50m of the site. Consideration of this issue is not a coastal engineering matter.

With regard to (g), there is no significant or practical surf zone offshore of the site, so this is not applicable. That stated, the proposed works would not be expected to alter wave and water level processes seaward of the site.

Based on Clause 2.10(2) of SEPP Resilience, “development consent must not be granted to development on land to which this clause applies unless the consent authority is satisfied that:

- (a) the development is designed, sited and will be managed to avoid an adverse impact referred to in subclause (1), or
- (b) if that impact cannot be reasonably avoided—the development is designed, sited and will be managed to minimise that impact, or
- (c) if that impact cannot be minimised—the development will be managed to mitigate that impact”.

The proposed development has been designed and sited to avoid the adverse impacts referred to in Clause 2.10(1).

### *8.5.3 Clause 2.11*

Based on Clause 2.11(1) of SEPP Resilience, “development consent must not be granted to development on land that is within the coastal use area unless the consent authority:

- (a) has considered whether the proposed development is likely to cause an adverse impact on the following:



- (i) existing, safe access to and along the foreshore, beach, headland or rock platform for members of the public, including persons with a disability,
  - (ii) overshadowing, wind funnelling and the loss of views from public places to foreshores,
  - (iii) the visual amenity and scenic qualities of the coast, including coastal headlands,
  - (iv) Aboriginal cultural heritage, practices and places,
  - (v) cultural and built environment heritage, and
- (b) is satisfied that:
- (i) the development is designed, sited and will be managed to avoid an adverse impact referred to in paragraph (a), or
  - (ii) if that impact cannot be reasonably avoided—the development is designed, sited and will be managed to minimise that impact, or
  - (iii) if that impact cannot be minimised—the development will be managed to mitigate that impact, and
- (c) has taken into account the surrounding coastal and built environment, and the bulk, scale and size of the proposed development”.

With regard to (a)(i), the proposed works would not impact on foreshore access, as discussed previously.

With regard to (a)(ii), (a)(iii), (a)(iv) and (c), these are not coastal engineering matters so are not considered herein.

With regard to (a)(v), the closest environmental heritage item to the site as per Schedule 5 of *Pittwater Local Environmental Plan 2014* is Angophora Reserve in Avalon Beach, which is located about 320m from the site. The proposed development would not be expected to impact on this or more distant heritage items.

With regard to (b), the proposed development has been designed and sited to avoid any potential adverse impacts referred to in Clause 2.11(1).

#### 8.5.4 Clause 2.12

Based on Clause 2.12 of SEPP Resilience, “development consent must not be granted to development on land within the coastal zone unless the consent authority is satisfied that the proposed development is not likely to cause increased risk of coastal hazards on that land or other land”. As discussed in Section 8.1, the proposed development is unlikely to have a significant impact on estuarine (coastal) hazards nor increase the risk of estuarine (coastal) hazards in relation to any other land.

#### 8.5.5 Clause 2.13

Based on Clause 2.13 of SEPP Resilience, “development consent must not be granted to development on land within the coastal zone unless the consent authority has taken into consideration the relevant provisions of any certified coastal management program that applies to the land”. No certified coastal management program applies at the site.

## 9. CONCLUSIONS

It is proposed to undertake demolition works and construction of a dwelling house and secondary dwelling, swimming pool, carport, inclinor and boatshed at 252 Hudson Parade Clareville. Only the inclinor and boatshed are considered herein, with other structures well

above the Estuarine Planning Level (EPL). For a design life of 60 years, the adopted EPL is 2.32m AHD. The boatshed is to have a floor level at the EPL, and the inclinor is to have all components above the EPL.

If the requirements in Section 7 are followed, the risk of the proposed development being adversely affected by estuarine processes would be suitably mitigated. The proposed development satisfies the requirements of Chapter B3.7 and Chapter D15.15 of the Pittwater 21 DCP, the *Estuarine Risk Management Policy for Development in Pittwater*, Clause 7.8 of *Pittwater Local Environmental Plan 2014*, and *State Environmental Planning Policy (Resilience and Hazards) 2021* for the matters outlined herein.

## 10. REFERENCES

Cardno (2015), *Pittwater Estuary Mapping of Sea Level Rise Impacts*, LJ2882/R2658v7, Revised Draft, for Pittwater Council, February

Department of Environment, Climate Change and Water [DECCW] (2010), *Coastal Risk Management Guide: Incorporating sea level rise benchmarks in coastal risk assessments*, DECCW 2010/760, August, ISBN 978 1 74232 922 2

Intergovernmental Panel on Climate Change [IPCC] (2013), *Climate Change 2013, The Physical Science Basis, Working Group I Contribution to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change*, [Stocker, TF; Qin, D; Plattner, G-K; Tignor, M; Allen, SK; Boschung, J; Nauels, A; Xia, Y; Bex, V and PM Midgley (editors)], Cambridge University Press, Cambridge, United Kingdom and New York, New York, USA

Intergovernmental Panel on Climate Change [IPCC] (2021), *Climate Change 2021: The Physical Science Basis. Contribution of Working Group I to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change*, [V Masson-Delmotte, P Zhai, A Pirani, SL Connors, C Péan, S Berger, N Caud, Y Chen, L Goldfarb, MI Gomis, M Huang, K Leitzell, E Lonnoy, JBR Matthews, TK Maycock, T Waterfield, O Yelekçi, R Yu and B Zhou (editors)], Cambridge University Press, Cambridge, United Kingdom and New York, New York, USA

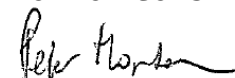
Watson, Phil J (2020), "Updated Mean Sea-Level Analysis: Australia", *Journal of Coastal Research*, Volume 36, Issue 5, September, pp. 915-931

## 11. SALUTATION

If you have any further queries, please do not hesitate to contact Peter Horton via email at [peter@hortoncoastal.com.au](mailto:peter@hortoncoastal.com.au) or via mobile on 0407 012 538.

Yours faithfully

HORTON COASTAL ENGINEERING PTY LTD



Peter Horton

Director and Principal Coastal Engineer

This report has been prepared by Horton Coastal Engineering Pty Ltd on behalf of and for the exclusive use of Marcel Dupont-Louis (the client), and is subject to and issued in accordance with an agreement between the client and Horton Coastal Engineering Pty Ltd. Horton Coastal Engineering Pty Ltd accepts no liability or responsibility whatsoever for the report in respect of any use of or reliance upon it by any third party. Copying this report without the permission of the client or Horton Coastal Engineering Pty Ltd is not permitted.

*Estuarine Risk Management Policy for Pittwater Form No. 1 is provided overleaf*



FORM NO. 1

**To be submitted with Estuarine Risk Management Report**

**Development Application for** Marcel Dupont-Louis

Name of Applicant

**Address of site** 252 Hudson Parade Clareville

***Declaration made by a Coastal Engineer as part of an Estuarine Risk Management Report***

I, Peter Horton on behalf of Horton Coastal Engineering Pty Ltd  
(Insert Name) (Trading or Company Name)

on this the 18<sup>th</sup> October 2023 (date)

certify that I am a Coastal Engineer as defined by the Estuarine Risk Management Policy for Development in Pittwater and I am authorised by the above organisation/company to issue this document and to certify that the organisation/company has a current professional indemnity policy of at least \$2 million.

**Please mark appropriate box**

- ☒ I have prepared the detailed Estuarine Risk Management Report referenced below in accordance with the Estuarine Risk Management Policy for Development in Pittwater
- ☐ I am willing to technically verify that the detailed Estuarine Risk Management Report referenced below has been prepared in accordance with the Estuarine Risk Management Policy for Development in Pittwater
- ☐ I have examined the site and the proposed development/alteration in detail and, as detailed in my report, am of the opinion that the Development Application only involves Minor Development/Alterations or is sited such that a detailed Estuarine Risk Management Report is not required.

**Estuarine Risk Management Report Details:**

Report Title:

Estuarine Risk Management Report on 252 Hudson Parade Clareville

Report Date:

18 October 2023

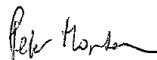
Author: Horton Coastal Engineering Pty Ltd

**Documentation which relate to or are relied upon in report preparation:**

See Section 2 and Section 10 of report

I am aware that the above Estuarine Risk Management Report, prepared for the above mentioned site is to be submitted in support of a Development Application for this site and will be relied on by Northern Beaches Council as the basis for ensuring that the estuarine risk management aspects of the proposed development have been adequately addressed to achieve an acceptable risk management level for the life of the structure, taken as at least 100 years unless otherwise stated and justified in the Report and that all reasonable and practical measures have been identified to remove foreseeable risk.

Signature



Name

Peter Horton

Chartered Professional Status

MIEAust CPEng

Membership No.

452980