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20 June 2022

Coastal Engineering Advice on 1162 Pittwater Road Collaroy

1. INTRODUCTION AND BACKGROUND

It is proposed to construct a new dwelling at 1162 Pittwater Road Collaroy, with the former dwelling at the property having been demolished around October 2021. A Development Application (DA) is to be submitted to Northern Beaches Council for this new dwelling. Given the proximity of the site to Collaroy-Narrabeen Beach, a coastal engineering assessment is required by Council, as set out herein.

The report author, Peter Horton [BE (Hons 1) MEngSc MIEAust CPEng NER], is a professional Coastal Engineer with 30 years of coastal engineering experience. He has postgraduate qualifications in coastal engineering, and is a Member of Engineers Australia and Chartered Professional Engineer (CPEng) registered on the National Engineering Register. He 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.

In previous employment, Peter was the main author of the *Coastal Zone Management Plan for Collaroy-Narrabeen Beach and Fishermans Beach* (CZMP) prepared for Warringah Council in 2014, and the *Coastal Erosion Emergency Action Subplan for Beaches in Warringah* prepared for Warringah Council in 2012. He has also prepared coastal engineering assessments for DA's at numerous locations along Collaroy-Narrabeen Beach over the last 15 years or so. Peter has inspected the area in the vicinity of the subject property on numerous occasions over the last 15 years or so, and regularly during recent construction of a seawall at the subject property and adjacent properties (at 1150-1168 Pittwater Road Collaroy, as per DA2018/1289, Mod2020/0439 and Mod2020/0626) where he is acting as Superintendent, Owner's Project Manager and coastal engineer.

Note that all levels given herein are to Australian Height Datum (AHD). Zero metres AHD is approximately equal to mean sea level at present.

2. INFORMATION PROVIDED

Horton Coastal Engineering was provided with 10 drawings prepared by Complete Thought Studio, all dated 27 January 2022 and Revision B. A site survey (Reference 4560A) completed by C.M.S. Surveyors and dated 5 July 2021 (Issue 2) was also provided.

3. EXISTING SITE DESCRIPTION

Collaroy-Narrabeen Beach is about 3.5km long, extending between Narrabeen Head and Narrabeen Lagoon entrance in the north, to a cliff at Collaroy Rock Baths in the south. The subject property is located on the eastern side of Pittwater Road between Stuart Street and Wetherill Street. At this location, the beach faces approximately east, and is partially sheltered from the dominant south-easterly storm wave climate offshore of Sydney by Long Reef headland.

Based on the site survey provided, ground levels at the subject property vary from about 6.0m at the landward property boundary, 6.2m AHD at the seaward edge of the former dwelling (which had a finished floor level of 6.3m AHD), and about 6.5m AHD over the seaward backyard area unaffected by excavation associated with seawall construction. The seawall was under construction at the time of the survey and backfill was not complete at that time, but based on survey information obtained as part of the seawall project, the completed backfill area has a ground level of about 6.3m to 6.4m AHD. The seawall has a crest level of about 6.5m AHD. Seaward of the seawall there is a sandy beach, with sand levels varying depending on erosion and accretion cycles. Based on the NSW Beach Profile Database, the typical width of sandy beach to the shoreline at mean sea level is about 40m (varying with erosion and accretion cycles).

Photographs of the subject property are provided in Figure 1 and Figure 2.

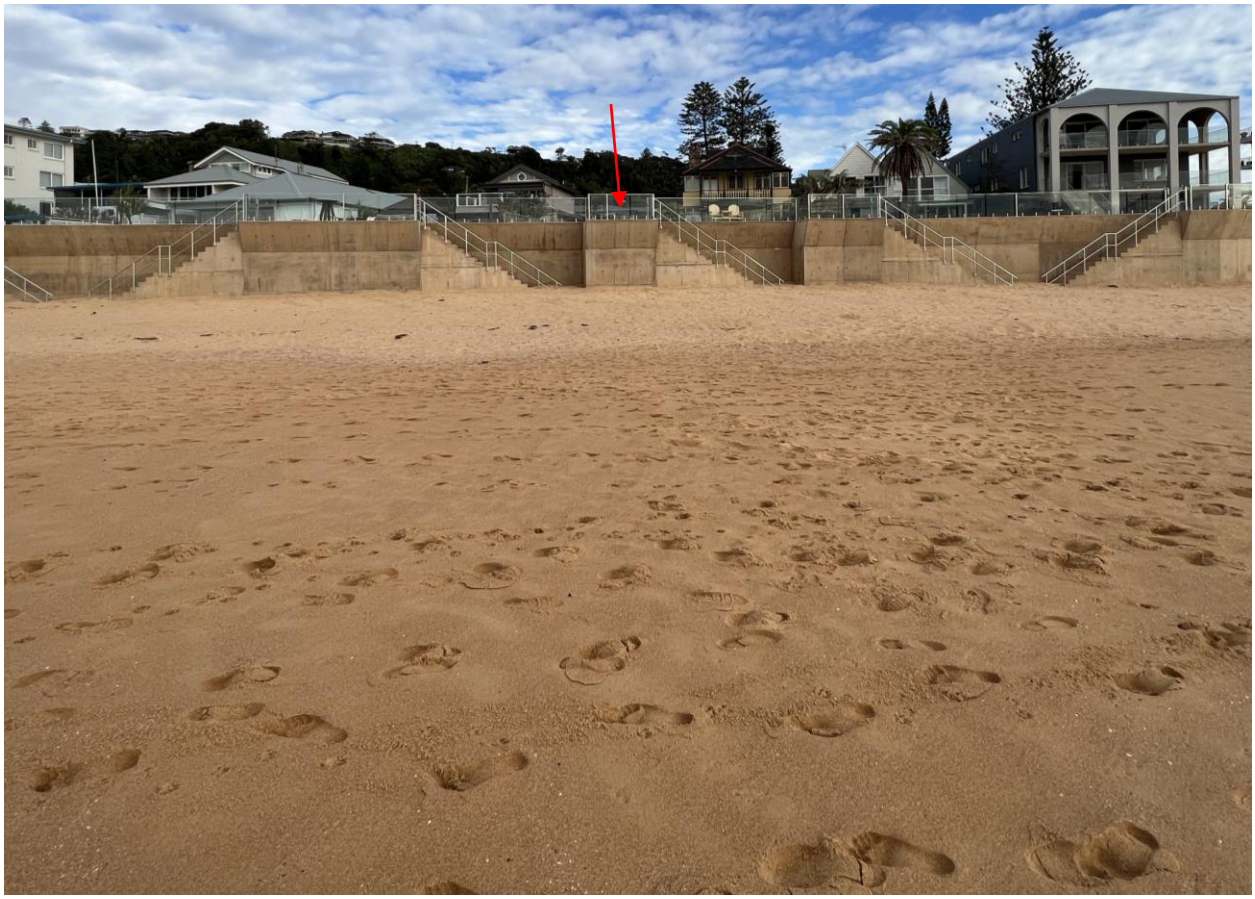


Figure 1: View of subject property (at arrow) from Collaroy Beach, facing west, on 3 June 2022

Figure 2: Oblique aerial view of subject property (at arrow), facing NW, on 5 April 2022

4. PROPOSED DEVELOPMENT

It is proposed to construct a two-storey dwelling with a finished ground floor level of 6.70m AHD, terrace extending 3.3m seaward of the dwelling at a level of 6.69m AHD (with stairs down to natural ground extending 0.6m further seaward), and garage at 6.10m AHD.

5. SUBSURFACE CONDITIONS

A geotechnical investigation has been completed at the subject property by Crozier Geotechnical Consultants (2014), including 3 boreholes. This indicated that the subsurface of the property at that time comprised (in general) medium dense and dense sand, down to the limit of investigation at about 2m to 3m AHD. The area immediately landward of the seawall, over a distance of about 10m, has now been backfilled with imported engineering fill that has been compacted.

6. EROSION/RECESSION COASTLINE HAZARDS

In Figure 3, an outline of the proposed development footprint is shown, along with various CZMP and seawall DA setbacks. With construction of the seawall, coastline hazard zones as per Nielsen et al (1992) do not apply at the subject property. That is, with the seawall in place, there is an acceptably low risk of erosion/recession extending into the property.

Figure 3: CZMP and seawall DA setbacks at subject property, with outline of proposed ground floor in yellow (terrace and steps shown dashed)

The CZMP and seawall DA setbacks in Figure 3 are as follows:

- minimum setback for new beachfront development with upgraded or new coastal protection works from the CZMP (this line is no longer applicable given the vertical concrete type of seawall constructed);
- setback for dwellings as per seawall DA. As noted in the seawall DA, this is the recommended most seaward setback for future dwellings, subject to merit assessment against other planning considerations (including views and overshadowing) and specific engineering (coastal, structural and geotechnical) advice (including potential impacts on the protection works);
- seawall maintenance setback. As noted in the DA, no future structures, except readily relocatable or removable structures that do not interrupt views, can be constructed seaward of this line, to enable 5.5m of clear passage for construction plant as required for future protection works maintenance.

It is evident in Figure 3 that the proposed development is landward of all of these lines, as required (except it is reiterated that the minimum setback for new beachfront development is no longer applicable).

7. FOUNDATION DESIGN REQUIREMENTS

There are no foundation design requirements for the proposed dwelling from a coastal engineering perspective, so the foundations may be designed by structural and geotechnical engineers as part of detailed design in a conventional manner, except that these engineers should:

- consider the potential for the loads on the foundations to place a surcharge load on the seawall; and
- ensure (in consultation with Horton Coastal Engineering) that ground anchors associated with the seawall construction, that are likely to extend as far landward as a few metres seaward of the terrace, are not interfered with.

8. COASTAL INUNDATION COASTLINE HAZARDS

As discussed in the seawall DA, the seawall is unlikely to experience significant oceanic inundation (wave overtopping) in a severe storm at present, and may experience overtopping volumes in the order of 5L/s/m in a severe storm at the end of the 60 year seawall design life.

Overtopping would tend to travel as a sheet flow at shallow depth, and the proposed ground floor level of 6.7m AHD is considered to be acceptable as long as natural ground levels are maintained at least 300mm below this level adjacent to the dwelling (except at the garage). At the garage, ground levels shall be contoured so that any wave overtopping that reaches the garage is directed towards Pittwater Road.

9. CONSENT MATTERS

9.1 *Warringah Local Environmental Plan 2011*

Based on Clause 6.5(3) of the *Warringah Local Environmental Plan 2011* (LEP), "development consent must not be granted unless the consent authority is satisfied that the development:

(a) will not significantly adversely affect coastal hazards, and

(b) will not result in significant detrimental increases in coastal risks to other development or properties, and
(c) will not significantly alter coastal hazards to the detriment of the environment, and
(d) incorporates appropriate measures to manage risk to life from coastal risks, and
(e) avoids or minimises exposure to coastal hazards, and
(f) makes provision for relocation, modification or removal of the development to adapt to coastal hazards and NSW sea level rise planning benchmarks".

With regard to Clauses 6.5(3)(a), (b) and (c), the proposed development is unlikely to have a significant impact on coastal hazards or increase the risk of coastal hazards in relation to any other land (or the environment), as it is landward of a seawall. The proposed development has an acceptably low risk of being affected by coastal hazards given the seawall that is in place, and Clauses 6.5(3)(d) and (e) are therefore satisfied.

With regard to Clause 6.5(3)(f), the proposed development has been designed to not be damaged by coastline hazards for an acceptably rare storm and acceptably long design life, rather than relocated or removed. This is consistent with the CZMP.

Based on Clause 6.5(4), "development consent must not be granted unless the consent authority is satisfied that the foundations of the development have been designed to be constructed having regard to coastal risk". As noted in Section 7, given the seawall that is in place, there are no foundation design requirements for the proposed dwelling from a coastal engineering perspective, except to consider the foundation loads and seawall anchors as part of detailed design.

9.2 *Warringah Development Control Plan 2011*

Part E9 of the *Warringah Development Control Plan 2011* (DCP)[1] has discussion on "Coastline Hazard". An objective of the DCP is to minimise the risk of damage from coastal processes and coastline hazards for proposed buildings and works along Collaroy Beach, which has been achieved in the subject DA as the proposed dwelling is landward of a seawall. The proposed dwelling is also sufficiently setback from the seawall.

Furthermore, based on Part E9 of the DCP, the applicant must demonstrate compliance with the *Northern Beaches Coastal Erosion Policy*, the CZMP and the *Collaroy-Narrabeen Protection Works Design Specifications*. As no protection works are proposed in the subject DA, neither the *Northern Beaches Coastal Erosion Policy* (except as noted below) nor *Collaroy-Narrabeen Protection Works Design Specifications* are generally applicable for the subject DA.

With regard to the *Northern Beaches Coastal Erosion Policy*, as noted above this is mostly focussed on the construction of coastal protection works. However, it can be noted that:

- as per 2(b), the risk of damage to the proposed development from coastal processes is acceptably low; and
- as per 2(d), the proposed development would not adversely impact on adjoining properties or coastal processes.

Therefore, the proposed development complies with the *Northern Beaches Coastal Erosion Policy,* where relevant.

[1] Amendment 21 of the DCP was reviewed, which commenced on 1 June 2022.

Also, based on the DCP, development must be constructed with a suitable floor level or in a manner that minimises the risk of coastal inundation for severe coastal storms occurring over the next 50 years. This is the case for the proposed development, as discussed in Section 8.

9.3 *State Environmental Planning Policy (Resilience and Hazards) 2021*

9.3.1 Preamble

Based on *State Environmental Planning Policy (Resilience and Hazards) 2021* (SEPP Resilience) and its associated mapping, the subject property is within a "coastal environment area" and "coastal use area".

9.3.2 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".

This is not a coastal engineering matter, but it can be noted that with regard to (a), the proposed development would not be expected to adversely affect the biophysical, hydrological (surface and groundwater) and ecological environments, being in an existing developed area. Stormwater will be discharged to Pittwater Road as at present, and to a stormwater pit on the seaward side of the dwelling that was constructed as part of the seawall DA, which is connected to an inter-allotment drainage system over 1150-1162 Pittwater Road that discharges at Stuart Street.

With regard to (b), the proposed development would not be expected to adversely affect coastal environmental values or natural coastal processes over an acceptably long design life, as it is located landward of a seawall on an already developed site.

With regard to (c), the proposed development would not be expected to adversely impact on water quality, with the residential land use. No sensitive coastal lakes are located in the vicinity of the proposed development.

With regard to (d), the proposed development would not impact marine vegetation, native vegetation and fauna and their habitats (of significance, which are not known to exist at the property), undeveloped headlands and rock platforms, with none of these items in proximity. No significant impacts on marine fauna and flora would be expected as a result of the proposed

development, as the development would not interact with subaqueous areas with the seawall in place.

With regard to (e), it can be noted that the proposed development is entirely within the subject property boundary and will not alter existing public access arrangements seaward of the property, or north and south of the property at Wetherill Street and Stuart Street respectively.

With regard to (f), a search of the Heritage NSW "Aboriginal Heritage Information Management System" (AHIMS) was undertaken on 4 June 2022. This resulted in no Aboriginal sites nor Aboriginal places being recorded or declared within at least 1km of the subject property.

With regard to (g), the proposed development would not interact with the surf zone for an acceptably rare storm occurring over an acceptably long life with the seawall in place, so would not impact on use of the surf zone.

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 any potential adverse impacts referred to in Clause 2.10(1).

9.3.3 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 Clause (a)(i), the proposed development will not affect public beach access.

Clauses (a)(ii) and a(iii) are not coastal engineering matters so are not considered herein.

With regard to (a)(iv), there are no Aboriginal sites nor Aboriginal places recorded or declared within at least 1km of the subject property.

With regard to (a)(v), the nearest environmental heritage item listed in Schedule 5 of the LEP is a house at 1184–1186 Pittwater Road Narrabeen, located about 150m north of the subject property. The proposed development would not be expected to impact on this heritage item.

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) for the matters considered herein.

Clause (c) is not a coastal engineering matter so is not considered herein.

9.3.4 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".

The proposed development is unlikely to have a significant impact on coastal hazards or increase the risk of coastal hazards in relation to any other land, as it is located landward of a seawall.

9.3.5 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".

The CZMP operates as a certified coastal management program, and with the proposed development designed to not be damaged by coastline hazards for an acceptably rare storm and acceptably long design life (as it is landward of a seawall), and appropriately setback landward of the seawall, it is consistent with the CZMP.

10. CONCLUSIONS

It is proposed to construct a new dwelling at 1162 Pittwater Road Collaroy.

The proposed development is at an acceptably low risk of damage from erosion/recession coastline hazards over the next 60 years as it is located landward of a seawall. As discussed in Section 7, there are no foundation design requirements for the proposed dwelling from a coastal engineering perspective, so the foundations may be designed by structural and geotechnical engineers as part of detailed design in a conventional manner (except they must consider the dwelling foundation loads and seawall anchors as part of detailed design). If this is undertaken, the proposed development would be consistent with the coastal engineering requirements listed in *Warringah Local Environmental Plan 2011,* Part E9 of the *Warringah Development Control Plan*, the CZMP, and the *Northern Beaches Coastal Erosion Policy*.

Oceanic inundation (wave overtopping) is not expected to be a significant risk at the subject property for a severe coastal storm over a design life of 60 years, as long as natural ground levels are maintained at least 300mm below the ground floor level adjacent to the dwelling (except at the garage). At the garage, ground levels shall be contoured so that any wave overtopping that reaches the garage is directed towards Pittwater Road.

11. REFERENCES

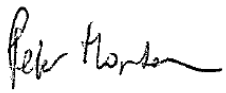
Crozier Geotechnical Consultants (2014), *Report on Geotechnical Investigation for Proposed New House at 1162 Pittwater Road, Collaroy*, Project: 2014–017, February

Nielsen, AF; Lord, DB and HG Poulos (1992), "Dune Stability Considerations for Building Foundations", *Australian Civil Engineering Transactions*, Institution of Engineers Australia, Volume CE34, No. 2, June, pp. 167-173

12. SALUTATION

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

Yours faithfully
HORTON COASTAL ENGINEERING PTY LTD



Peter Horton
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