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Coastal Engineering Advice on 101 North Steyne Manly

1. INTRODUCTION

It is proposed to demolish the existing residential flat building and to build 7 apartments at 101 North Steyne Manly (the 'site'), for which a Development Application (DA) is to be submitted to Northern Beaches Council. As the site may be impacted by coastal hazards, and is in a 'Coastal Use' area as per *State Environmental Planning Policy (Resilience and Hazards) 2021*, a coastal engineering report (coastal hazard risk assessment) has been prepared for the site, as set out herein.

The report author, Peter Horton [BE (Hons 1) MEngSc MIEAust CPEng NER], is a professional Coastal Engineer with 33 years of coastal engineering experience. He has postgraduate qualifications in coastal engineering, and is a Member of Engineers Australia (MIEAust) and Chartered Professional Engineer (CPEng) registered on the National Engineering Register (NER). 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.

Peter has completed numerous DA coastal engineering studies in the Manly area, and has inspected the area in the vicinity of the site on many occasions over his career. He completed a specific recent inspection of the site on 12 November 2024.

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

2. INFORMATION PROVIDED

Horton Coastal Engineering was provided with 11 drawings prepared by Smart Design Studio (namely Drawings Nos DA099M, 100L, 101J, 102H, 103J, 104J, 105D, 400I, 401J, 450J and 451C), all Revision 5 and dated 29 November 2024. A survey of the site completed by Beveridge Williams was also provided, reference 2302595_DET_A, 3 sheets and dated 4 December 2023.

3. EXISTING SITE DESCRIPTION

The site is located about 45m to 48m landward of the seawall forming the landward edge of Manly Ocean Beach (North Steyne Beach), about 50m NW of North Steyne SLSC and 10m north of opposite a stormwater outfall in the surf zone. An oblique aerial view of the site is provided in Figure 1 (at a time of unusually high wave runup), with site photographs provided in Figure 2 and Figure 3.

Figure 1: Oblique aerial view of site (at arrow) on 22 July 2024, facing west

Figure 2: View of site (at arrow) from North Steyne Beach on 12 November 2024, facing west

Figure 3: View of site (at arrow) from seawall promenade on 12 November 2024, facing west

Based on the survey, ground elevations vary from about 6.0m AHD at the seawall crest (with adjacent beach sand levels at about 3.8m to 4.2m AHD at the time of the survey, making the seawall about 2m high at that time), 5.6m to 5.7m AHD at the seaward edge of the promenade, 6.2m AHD at the seaward edge of the cycleway adjacent to the roadway, 6.1m and 5.7m AHD at the tops of kerbs on the seaward and landward sides of the North Steyne roadway respectively, 5.9m AHD at the seaward property boundary, and 5.8m AHD at the landward property boundary. The finished ground floor level of the residential flat building is about 6.8m AHD.

4. PROPOSED DEVELOPMENT

It is proposed to demolish the existing residential flat building and to build 7 apartments, with a basement at a finished floor level of 0.90m to 1.37m AHD (with car stackers extending below that), and five above-ground levels. The lowest above-ground level (L00) is to be at 6.27m AHD, and with a 6m wide (east-west) terrace at 6.26m AHD seaward.

The driveway to the basement is to be on the landward side of the site, with a driveway crest at 5.97m AHD, and a floodgate extending up to 6.27m AHD when required to deal with rainfall-runoff related flooding risks (which are considered by others in the DA).

5. DESIGN LIFE

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 (Horton et al, 2014; Horton and

Britton, 2015). This design life has been adopted in two gazetted coastal zone management plans of Northern Beaches Council, namely for Collaroy-Narrabeen Beach and Fishermans Beach, and for Bilgola Beach and Basin Beach.

6. SUBSURFACE CONDITIONS

A geotechnical investigation of the site has been undertaken by EI Australia. They found that the site was generally underlain by sand to the limit of investigation at around -7.7m AHD.

7. EROSION/RECESSION COASTAL HAZARDS

In Mariani et al (2012), erosion/recession hazard lines were delineated at Manly Ocean Beach under the assumption that the existing seawall fails in the future and is not maintained. This depicted hazard lines at the landward edge of the Zone of Reduced Foundation Capacity (ZRFC), which is not an area directly impacted by coastal hazards. The 2100 ZRFC, applying a conservative sea level rise of 0.9m from 1990, extended about 9m into the site.

However, the corresponding 2100 landward limit of erosion along with dune slumping to a stable angle of repose (the landward edge of the Zone of Slope Adjustment) in a severe storm is about 4m seaward of the site. That is, the proposed development is at an acceptably low risk of being impacted by erosion/recession over an acceptably long life exceeding 60 years, even if the seawall fails and is not reinstated.

It can also be noted that it is highly likely that the seawall is maintained over the design life, given that:

- it is assumed in the adopted *Manly Ocean Beach Coastline Management Plan* that the seawall will be maintained at its current location into the future;
- the adopted *Manly Ocean Beach Emergency Action Plan for Coastal Erosion* includes actions to protect the seawall in an erosion event, if required; and
- the promenade and open space landward of the seawall are highly valued recreational areas.

8. COASTAL INUNDATION AND WAVE RUNUP

In Mariani et al (2012), the landward extent of wave runup was determined at Manly Ocean Beach in a severe storm at present, in 2050 and in 2100. For North Steyne between Pine Street and Pacific Street, where the site is located, an overtopping bore propagation distance of 30m landward of the seawall was determined in the 2100 event. Wave runup is thus highly unlikely to impact on the proposed development over the design life, given that:

- the site is located 45m to 48m landward of the seawall, about 15m to 18m landward of the 2100 bore propagation distance;
- the lowest proposed above-ground floor level is 6.27m AHD, about 0.4m above adjacent natural ground;
- there is a 6m wide terrace extending seaward of the lower ground apartments, which would assist in dissipating wave energy in the unlikely event that wave runup did reach the site; and
- the driveway to the basement is on the landward side of the site, about 89m landward of the seawall, and landward of the proposed development that would generally act as an obstruction to the flow of wave runup.

Therefore, the proposed development is at an acceptably low risk of being impacted by coastal inundation and wave runup over an acceptably long life exceeding 60 years, including consideration of projected sea level rise.

9. MERIT ASSESSMENT

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

9.1.1 Preamble

Based on *State Environmental Planning Policy (Resilience and Hazards) 2021* (SEPP Resilience) and its associated mapping, the site is within a "coastal use area" (see Section 9.1.2).

9.1.2 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 is entirely on private property and about 45m to 48m landward of the Manly Ocean Beach seawall, so 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), a search of the Heritage NSW "Aboriginal Heritage Information Management System" (AHIMS) was undertaken on 5 December 2024. This resulted in no Aboriginal sites being recorded nor Aboriginal places being declared within at least 200m of the site.

With regard to (a)(v), the nearest environmental heritage items listed in Schedule 5 of *Manly Local Environmental Plan 2013* are:

- stone kerbs that run along the western side of North Steyne roadway adjacent to the site;
- the beach reserve (Merrett Park) between the seawall and North Steyne roadway, including the Norfolk Pine trees therein, which are at least 20m seaward of the site; and
- North Steyne SLSC, located about 50m SE of the site.

As long as care is taken not to damage the stone kerbs at the seaward edge of the footpath seaward of the site (noting that the two current driveway entries at this location are to be removed), the proposed development would not be expected to impact on these 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) for the matters considered herein.

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

9.1.3 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 at an acceptably low risk of being damaged by coastal erosion/recession and wave runup over an acceptably long life exceeding 60 years, and sufficiently landward or elevated to be beyond expected erosion/recession and wave runup coastal processes for an acceptably rare storm over an acceptably long life exceeding 60 years.

9.1.4 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.

9.2 Coastal Management Act 2016

The management objectives for the coastal use area are described in Section 9 of the *Coastal Management Act 2016*. By addressing Clause 2.11 of SEPP Resilience in Section 9.1.2 herein, these management objectives have essentially been addressed. There are no other matters relevant to the subject DA that need to be considered in the *Coastal Management Act 2016*.

10. CONCLUSIONS

It is proposed to demolish the existing residential flat building and to build 7 apartments at 101 North Steyne Manly.

The proposed development is at an acceptably low risk of being impacted by erosion/recession over an acceptably long life exceeding 60 years, even if the Manly Ocean Beach seawall fails and is not reinstated, which is highly unlikely. The proposed development is at an acceptably low risk of being impacted by coastal inundation and wave runup over an acceptably long life exceeding 60 years, including consideration of projected sea level rise.

The proposed development satisfies the requirements of *State Environmental Planning Policy (Resilience and Hazards) 2021* and the *Coastal Management Act 2016* for the matters considered herein.

11. REFERENCES

Horton, Peter and Greg Britton (2015), "Defining Beachfront Setbacks Based on 'Acceptable Risk' – is it the New Approach", *Australasian Coasts & Ports Conference 2015*, Auckland, New Zealand, 15-18 September

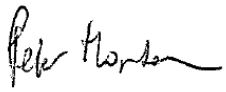
Horton, Peter; Britton, Greg; Gordon, Angus; Walker, Bruce; Moratti, Mark and Daylan Cameron (2014), "Drawing a Line in the Sand – Defining Beachfront Setbacks Based On Acceptable Risk", *23rd NSW Coastal Conference*, Ulladulla, 11-14 November

Mariani, A; Carley, JT; Lord, DB and TD Shand (2012), "Identification of Coastal Hazard Risk Areas to Projected Sea Level Rise for the Manly Local Government Area", *WRL Technical Report 2011/19*, Water Research Laboratory, University of New South Wales, Manly Vale, Version 2a, Final, 26 April

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



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