

Bayview Golf Club
Attention: Craig Pocklington
1825 Pittwater Road
Bayview NSW 2104
(sent by email only to craigpocklington@yahoo.com.au)

27 April 2023

Estuarine Risk Management Report on Course Renovation Works at Bayview Golf Club

1. INTRODUCTION AND BACKGROUND

It is proposed to renovate and replace 12 greens and undertake related works at Bayview Golf Club, hereafter denoted as the 'site'. A Development Application (DA) is to be submitted to Northern Beaches Council for these works. These works are to be undertaken in conjunction with subsurface drainage and stormwater harvesting works proposed as part of DA 2021/1338, which was approved by Council on 7 June 2022. Horton Coastal Engineering completed an Estuarine Risk Management and Water Management Report dated 1 August 2021 as part of this DA, hereafter denoted as the Horton 2021 report.

As the site is potentially affected by estuarine hazards, it is subject to the *Pittwater 21 Development Control Plan (DCP)*¹, in particular Chapter B3.9. It is also subject to the *Estuarine Risk Management Policy for Development in Pittwater* (Estuarine Policy, which is Appendix 7 of the DCP). *State Environmental Planning Policy (Resilience and Hazards) 2021* should also be considered.

Horton Coastal Engineering Pty Ltd was engaged to complete the estuarine risk management report required by Council, as set out herein.

In Pre-lodgement Meeting Notes of Council (PLM2022/0075), it was stated that Clause 7.5 of *Pittwater Local Environment Plan 2014* applied to the proposed development. This is not correct, as Clause 7.5 only applies to land identified on the Coastal Risk Planning Map, and there is no such map covering the site.

The report author is Peter Horton [BE (Hons 1) MEngSc MIEAust CPEng NER]. Peter has postgraduate qualifications in coastal and water engineering and 31 years of coastal and water engineering experience. 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 undertook specific recent inspections of the site on 15 March and 5 April 2021.

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

Note that 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.

2. INFORMATION PROVIDED

Horton Coastal Engineering was provided with:

- a Sediment & Erosion Control and Stormwater & Soil Management Plan (15 drawings, Sheet Nos C100 and C110 to C122, with two C110 sheets) prepared by Chrisp Consulting (Revision B or Revision C, dated 6 March 2023); and
- 12 drawings of the proposed works prepared by Craig Parry Design, dated 10 or 11 January 2022 (except 4th green was dated 4 June 2021 and 12th green was dated 31 January 2023).

3. EXISTING SITE DESCRIPTION

Based on LiDAR point cloud data captured in 2020 (obtained from the NSW Department of Customer Service), most of the lower course (south of Cabbage Tree Road) is at a level between 0.5m and 1.0m AHD. North of Cabbage Tree Road, the course is much steeper and elevations increase to over 30m AHD.

Bayview Golf Course links to the Pittwater waterway via Cahill Creek (which passes through the course) and Winnererremy Bay. However, tidal gates traversing culverts under Pittwater Road at the downstream end of the course essentially disconnect Winnererremy Bay from Cahill Creek and prevent estuarine flow and inundation from entering the course, while they are functioning as designed. It has been assumed herein that the tidal gates have failed, thus allowing estuarine inundation into the course.

4. PROPOSED DEVELOPMENT

It is proposed to reconfigure greens at 12 holes, install various bunkers while removing some former bunkers, and to install three new tees, see Figure 1². The new greens are generally mostly over the footprint of the existing greens (except the 12th green which is new), and slightly larger. Based on the Sediment & Erosion Control and Stormwater & Soil Management Plan, 3,826m³ of cut is proposed, with 2,665m³ of fill, giving a net 1,161m³ of cut.

² This Figure was derived by modifying a PDF file supplied by the Club, with the filename "Bayview GC Contours and setout with 2020 image-Course View 31jan2023 (2).pdf".

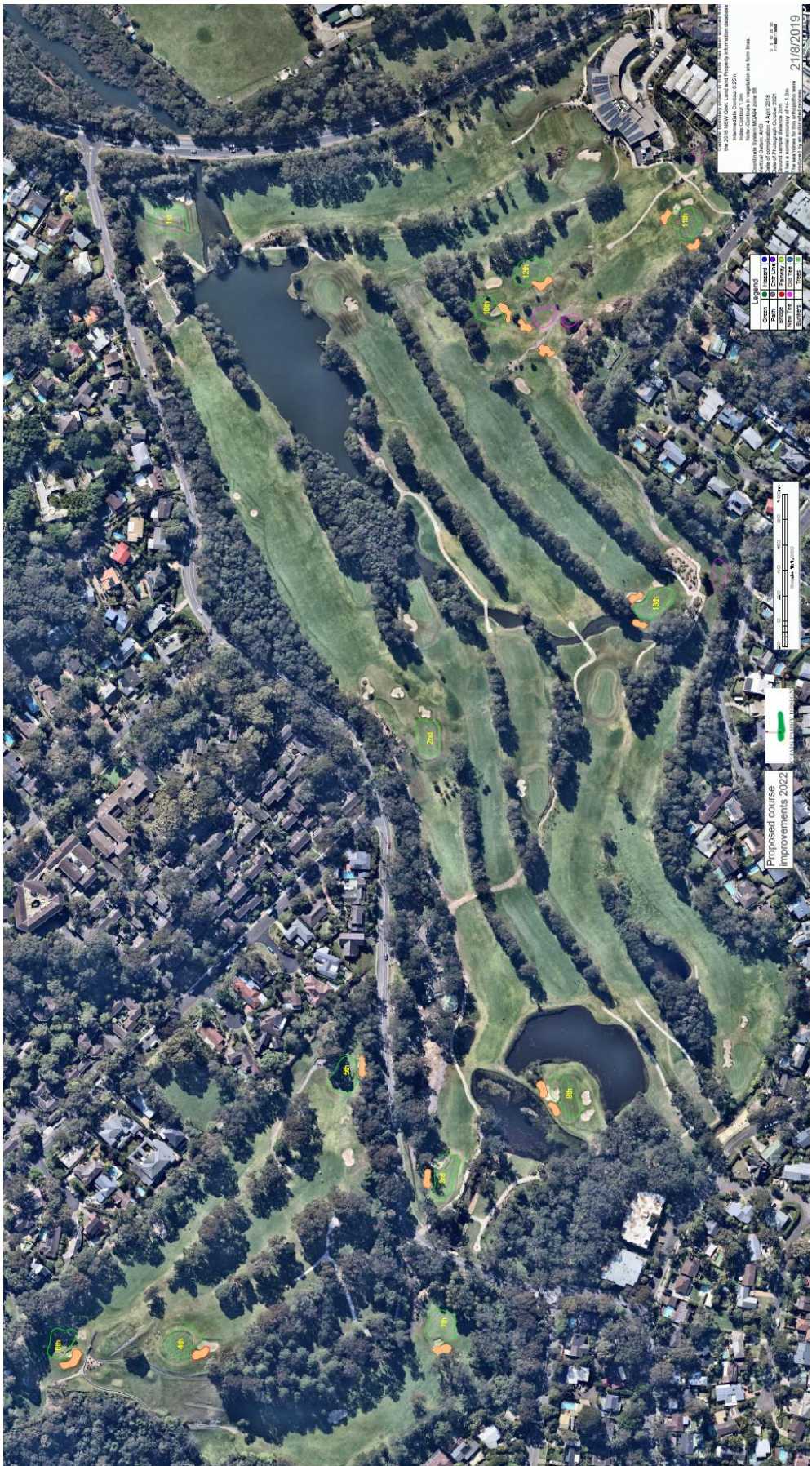


Figure 1: Aerial view of Bayview Golf Club, with proposed works shown (new greens in green, new bunkers shaded orange, and new tees in magenta)

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 25-year design life (that is, at 2048) is considered to be appropriate for the proposed non-habitable development.

6. ESTUARINE PROCESSES

In Cardno (2015), the 100-year Average Recurrence Interval (ARI) present day water level in the region covering the site is reported as 1.54m AHD. This includes the effects of astronomical tide and storm surge (combined level of 1.44m AHD), plus local wind setup (0.1m). Significant wave action cannot propagate up Cahill Creek, so the Estuarine Planning Level at the site only consists of the still water level. That stated, while the tidal gates are operational, estuarine inundation cannot propagate into the site at all.

If the tidal gates are not operational, Mean High Water is approximately 0.5m AHD and Mean High Water Springs is about 0.6m AHD at present at the site. The combined astronomical tide and storm surge level for a monthly and bi-annual event is about 1.0m and 1.2m AHD respectively, which would inundate most of the golf course (which demonstrates the importance of the tidal gates in allowing the golf course to function). 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 values were derived relative to 1990, and historical sea level rise has not been discounted. Appropriate equivalent 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.

However, it is considered most appropriate to derive sea level rise for the proposed design life of 25 years (at 2048) from Intergovernmental Panel on Climate Change [IPCC] (2021)³, which is widely accepted by competent scientific opinion.

Using the same methodology as applied in the acceptable risk assessment in the *Coastal Zone Management Plan for Bilgola Beach (Bilgola) and Basin Beach (Mona Vale)* prepared by the author for Council in 2017, 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 2048) were determined for the five illustrative scenarios (shared socioeconomic pathways, SSP's⁴) considered in IPCC (2021)⁵.

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 2048, relative to the average sea level from a 1995-2014 baseline (taken to be at 2005).

³ Note that at the time of the Horton 2021 report, IPCC (2021) had not been released, with IPCC (2013) applied therein.

⁴ Known as representative concentration pathways in the previous IPCC (2013) assessment.

⁵ The five illustrative scenarios represent varying projected greenhouse gas emissions, land use changes and air pollutant controls in the future.

Table 1: Mean sea level rise (m) at Sydney from a 1995-2014 average level (taken at 2005) to 2048 derived from IPCC (2021) and PO.DAAC

Emissions Scenario (Shared Socioeconomic Pathway)	Exceedance Probability		
	95% exceedance	Median	5% exceedance
SSP1-1.9	0.09	0.16	0.27
SSP1-2.6	0.08	0.17	0.30
SSP2-4.5	0.09	0.19	0.32
SSP3-7.0	0.11	0.20	0.33
SSP5-8.5	0.12	0.22	0.36
Average	0.10	0.19	0.31

Taking the median exceedance probability and average of the 5 SSP's, a sea level rise value of 0.19m at 2048 (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 2048 at Sydney is 0.17m.

Therefore, the design 100 year ARI estuarine still water level at 2048 is 1.71m AHD, if the tidal gates are not operational. Conservatively assuming failure of the tidal gates, this can be assumed to be the design still water level at the end of the design life, and the Estuarine Planning Level (EPL), for the purpose of the report herein.

7. CATCHMENT FLOODING

Based on the *McCarrs Creek, Mona Vale and Bayview Flood Study Review* (Haskoning Australia, 2017), approximate design flood levels at Bayview Golf Club (in the lower course only south of Cabbage Tree Road, where estuarine inundation can potentially extend to if the tidal gates fail) for various Annual Exceedance Probability (AEP) events are presented in Table 2.

Table 2: Design flood levels in lower course south of Cabbage Tree Road

AEP	Flood level (m AHD)
20%	1.48
10%	1.58
5%	1.68
2%	1.80
1%	1.92
0.5%	2.03
0.2%	2.21
Probable Maximum Flood	3.14

Therefore, for events more severe than about 2% AEP, catchment flooding produces more elevated water levels than the Estuarine Planning Level (and note that catchment flooding would be more severe than estuarine inundation over all probability events while the tidal gates are in place).

8. RISKS OF DAMAGE TO PROPOSED DEVELOPMENT AND MITIGATION OF THOSE RISKS

The proposed development comprises earthworks and landscaping, so there are no specific estuarine inundation risks that need to be considered. Any items on the course that could be damaged by water inundation should be placed above the 1% AEP flood level of 1.92m AHD (or higher if practical). Materials that are inundation compatible should be selected below this level.

Electrical items below 1.92m AHD, if any, should be waterproofed, or raised above 1.92m AHD. Items that could be damaged by inundation or become polluting should be stored above 1.92m AHD.

9. MERIT ASSESSMENT

9.1 Section B3.9 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, simply involving cut and fill in isolated locations with a net cut (it is understood that a separate report has addressed the effect of the works on flooding, with no net impacts on flood behaviour found).

If the requirements in Section 8 are satisfied (and noting that the proposed earthworks and landscaping are inherently not adversely impacted by estuarine inundation), the risk of the proposed development being adversely affected by estuarine processes would be suitably mitigated, satisfying Item 1.

Item 2 is satisfied with all materials below the EPL (and indeed the higher flood level of 1.92m AHD) being tolerant of inundation.

There are no structures proposed as part of the proposed works, so Item 3 is not applicable.

Items 4 and 5 should apply to the proposed development as conditions of consent.

Item 6 is not applicable.

With regard to Item 7, the golf course would not be accessible in a severe inundation event and any person on the site at that time could shelter-in-place in the elevated clubhouse, if required. That stated, there would be several hours of warning time for both severe estuarine and catchment flooding events, ie sudden unexpected inundation of people on the golf course would not be expected to occur.

9.2 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 Section B3.9 of the Pittwater 21 DCP in Section 9.1.

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 filled in, as provided at the end of the document herein.

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, parts of the proposed development are within a “proximity to coastal wetlands” area (see Section 9.3.2), “coastal environment area” (see Section 9.3.3), and “coastal use area” (see Section 9.3.4). The mapping of these areas, and the “coastal wetlands area” (which is outside any proposed development area) is depicted in Figure 2.

It is evident that the 1st green and 2nd green are at least partially in the proximity to coastal wetlands area, coastal environment area and coastal use area. The 8th green and 13th green are in the coastal environment area and coastal use area.

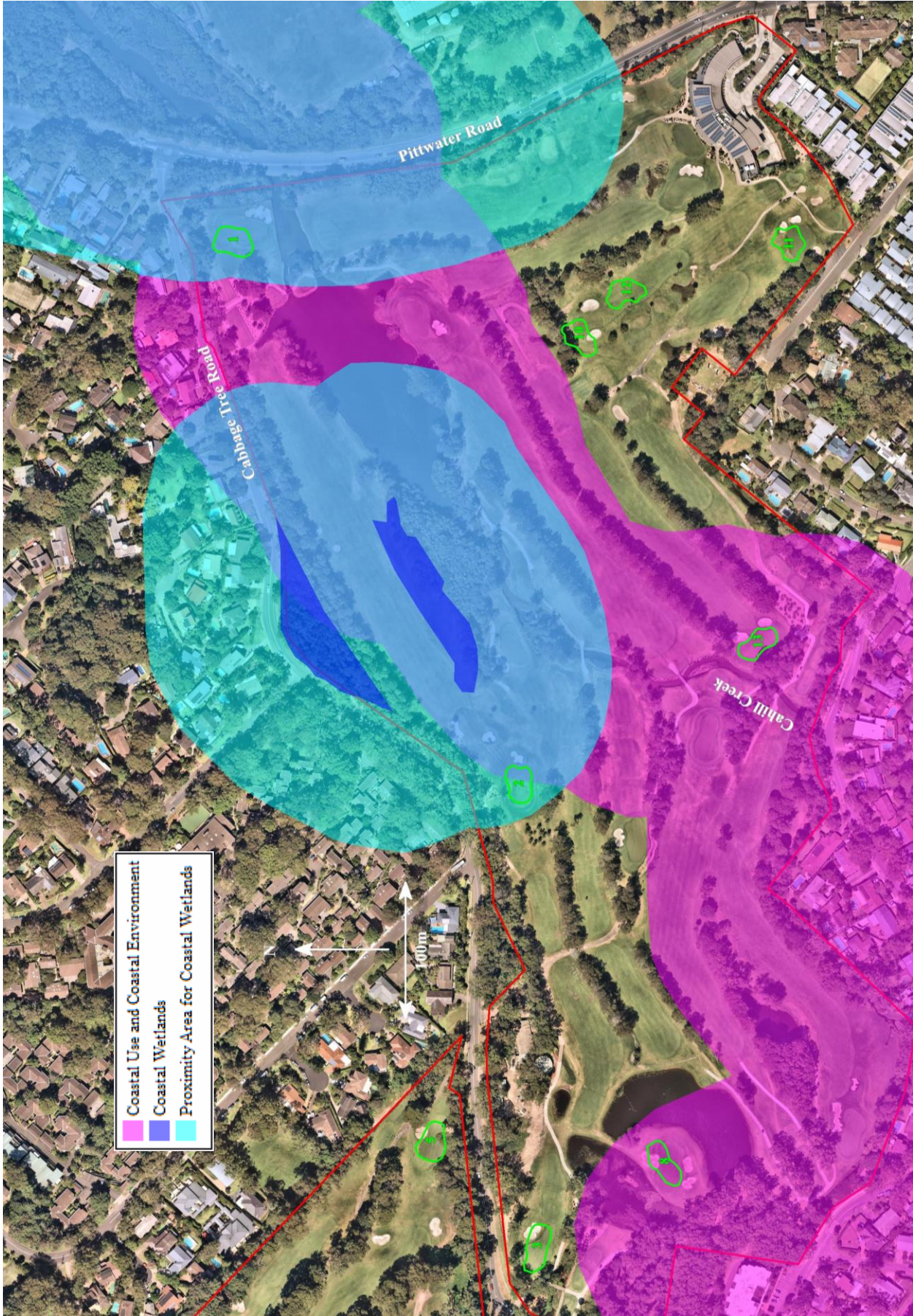


Figure 2: Coastal management areas from SEPP Resilience at Bayview Golf Club

9.3.2 Clause 2.8

Based on Clause 2.8(1) of SEPP Resilience, “development consent must not be granted to development on land identified as ‘proximity area for coastal wetlands’...unless the consent authority is satisfied that the proposed development will not significantly impact on:

- (a) the biophysical, hydrological or ecological integrity of the adjacent coastal wetland or littoral rainforest, or
- (b) the quantity and quality of surface and ground water flows to and from the adjacent coastal wetland or littoral rainforest”.

As evident in Figure 2, the “proximity area for coastal wetlands” areas at Bayview Golf Club cover works on the 1st and 2nd greens. These works involve localised cut and fill in areas that are currently greens, and would not be expected to significantly alter the water table at the course or drainage (surface and groundwater flows) into the wetlands located between the 1st and 2nd greens.

The water levels in Cahill Creek and the watercourse to the north are the main drivers of surface water and groundwater levels in the “coastal wetlands” areas, and these would not be significantly altered as a result of the proposed works. Therefore, the biophysical, hydrological and ecological integrity of the wetlands between the 1st and 2nd greens would not be expected to be significantly impacted by the proposed works.

9.3.3 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), these matters have been discussed in Section 9.3.2 in relation to proximity to coastal wetlands. The broader works away from the wetlands would also not significantly alter the water table level or drainage patterns, and hence would not adversely affect the biophysical, hydrological (surface and groundwater) and ecological environments. The proposed works would not be a source of pollution as long as appropriate construction environmental controls are applied.

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

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), there are no undeveloped headlands, rock platforms nor marine vegetation in proximity to the proposed development. Based on an Arboricultural Impact Assessment prepared by Bellevue Tree Consultants dated 21 April 2023, a total of 23 trees are to be removed as part of the proposed works, and compensatory replacement trees are to be provided. Therefore, acceptable impacts on native vegetation and fauna and their habitats can be expected.

With regard to (e), the proposed works would not impact on public open space and access to and along the foreshore, being entirely within private property.

With regard to (f), a search of the Heritage NSW “Aboriginal Heritage Information Management System” (AHIMS) was undertaken on 1 August 2021. This resulted in no Aboriginal sites being recorded nor Aboriginal places being declared within the golf course.

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 offshore 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).

9.3.4 *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), and (c), these are not coastal engineering matters so are not considered herein.

With regard to (a)(iv), there are no Aboriginal sites recorded nor Aboriginal places declared within the site, as noted in Section 9.3.3.

With regard to (a)(v), the nearest environmental heritage item as per Schedule 5 of *Pittwater Local Environmental Plan 2014* is a house at 2 Binnowee Place Bayview, which is located about 50m north of the golf course. The proposed development would not be expected to impact on this site.

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).

9.3.5 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 golf course is located landward (upstream) of tidal gates and hence would not generally interact with estuarine (coastal) processes. If estuarine inundation did enter the site, the proposed development would not cause increased risk of estuarine inundation on the site or other land.

9.3.6 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.

10. CONCLUSIONS

It is proposed to renovate and replace 12 greens at Bayview Golf Club. For a design life of 25 years, and assuming that the tidal gates traversing culverts under Pittwater Road at the downstream end of the course have failed, the Estuarine Planning Level is 1.71m AHD.

However, for events more severe than about 2% AEP, catchment flooding produces more elevated water levels than the Estuarine Planning Level (and catchment flooding would be more severe than estuarine inundation over all probability events while the tidal gates are in place). The 1% AEP flood level is 1.92m AHD in the lower course (south of Cabbage Tree Road).

If the requirements in Section 8 are satisfied (and noting that the proposed earthworks and landscaping are inherently not adversely impacted by estuarine inundation), the risk of the proposed development being adversely affected by estuarine processes would be suitably mitigated.

The proposed development satisfies the requirements of Section B3.9 of the Pittwater 21 DCP, the *Estuarine Risk Management Policy for Development in Pittwater*, and *State Environmental Planning Policy (Resilience and Hazards) 2021*, for the matters outlined herein.

11. 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

Haskoning Australia (2017), *McCarrs Creek, Mona Vale and Bayview Flood Study Review*, Revision 04, Final, 7 July

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

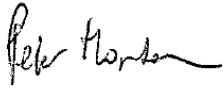
Intergovernmental Panel on Climate Change [IPCC] (2021), *Climate Change 2021: The Physical Science Basis. Contribution of Working Group I to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change*, [V Masson-Delmotte, P Zhai, A Pirani, SL Connors, C Péan, S Berger, N Caud, Y Chen, 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

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
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 Bayview Golf Club (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 Bayview Golf Club Name of Applicant
Address of site 1825 Pittwater Road Bayview

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 27th April 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.

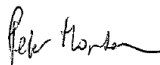
Estuarine Risk Management Report Details:

Report Title: Estuarine Risk Management Report on Course Renovation Works at Bayview Golf Club
Date: 27 April 2023
Author: Horton Coastal Engineering Pty Ltd

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

See Section 2 and Section 11 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