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03/02/2025

Webber Architects
Suite 206, 8 Clarke Street
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Attention: Mr. Keiran Brooks

Dear Keiran,

Re: Warringah Recreation Centre – Flood Statement Letter

This letter has been prepared by ACOR Consultants Pty Ltd (ACOR) in response to Natural Environment Referral Response – Flood (DA2024/1171, dated 17/09/2024), and Northern Beaches Council's request (dated 07/11/2024) for further supporting information to address flood hazard for the proposed re-development of Warringah Recreation Centre at Lot 2742/ 9999 Condamine Street, Manly Vale.

In the preparation of this letter, ACOR has relied upon certain data and information contained with the following documents:

- Flood Management Report prepared by Stellen Consulting (29 Feb 2024)
- Email correspondence regarding council carpark earthwork volume with Richard Parry (June 2024)
- Manly Lagoon Floodplain Risk Management Study and Plan prepared by WMA Water (Oct 2018)

Flooding Characteristics

The subject site is located within the Medium Flood Risk Precinct, the relevant flood characteristics are as follows:

- 1% AEP level: 3.30 mAHD
- Flood Planning level: 3.60 mAHD
- Discretionary Flood Planning level for shelter in place: 5.10 mAHD provided by Council
- PMF level: 5.69 mAHD
- Flood Life Hazard Category: H5

ACOR has prepared a Flood Impact Assessment Report (dated 30/07/1024) in support of Development Application submission. Refer to the report for detailed flooding characteristics.

ACOR note that Council have raised concerns about the inability for occupants to safely refuge on site. ACOR note that the use of the site is subject to recreational use and the use of the site will likely not be occurring during any large storm events.

Evacuation Route

The subject site will be evacuated for all storm events greater and equal to the 1% AEP including a warning system and evacuation plan from site.

Review of *Manly Lagoon Floodplain Risk Management Study and Plan*, the site allows occupants to evacuate during any flood event up to 1% AEP. The evacuation route for pedestrian and vehicular access is through Kentwell Road to a higher point located in Corrie Road (Refer to yellow arrows in Figure 1).

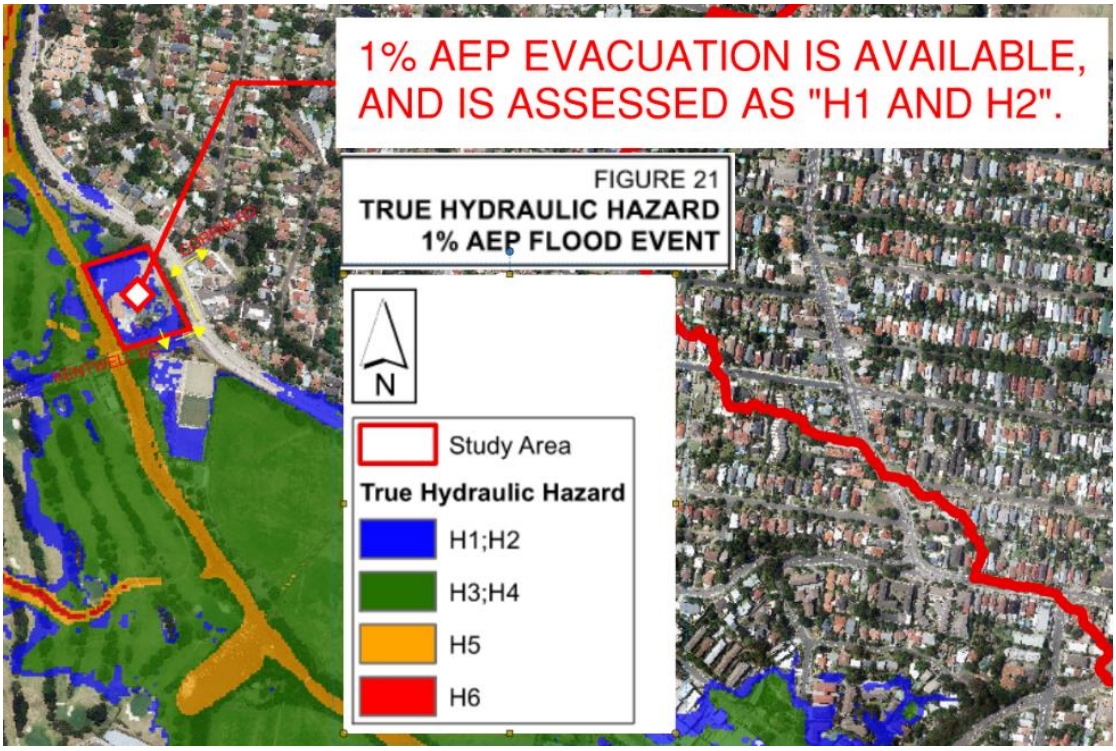

Figure 1: Evacuation Route

Manly Lagoon Floodplain Risk Management Study and Plan Section 6.4.1 outlined the flood-affected road locations. Figure 2 denotes that ID 5 (Intersection Kenneth and Roseberry Road) is located at the upstream end of the site, so it will be adopted to set the warning time for evacuation.

The first storm event causing flooding at Location ID 5 is the 50% AEP and it takes 1.8+ hour to reach the 1% AEP flood level.

ACOR recommends the evacuation should take place a minimum of 1 hour (to be conservative) prior to the 1% AEP event and **this should be the preferred strategy rather than shelter in place as the squash courts do not provide a secondary level.** SES notification and local alarm system will be used for evacuation purposes.

This strategy aligns with the council's advice that “watch out for 70mm rainfall in 3 hours and/or 150mm rainfall in 24 hours and when flash flooding is likely, leave low-lying homes and businesses well **before any flooding begins. Evacuation is the best action to take, but only if it is safe to do so”.**

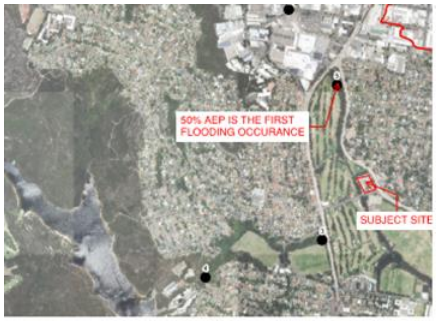

Table 7: Flood Affected Road Locations

ID	Road Location (refer Figure 28)
1	Pittwater Bridge
2	Intersection Kenneth and Balgowlah Road
3	Intersection Balgowlah Road and Golf Parade
4	M6 at Brookvale Creek
5	Intersection Kenneth and Roseberry Road
6	Pittwater Road at Riverview Parade
7	William Street
8	Intersection Condamine Street and M6
9	M6 at Kitchener Street
10	Kenneth Road next to swimming pool
11	Clearview Place
12	Old Pittwater Road Bridge
13	Cross Street at Warringah Mall
14	Intersection Cross and Green Street
15	M6 at Manly Creek
16	Sloane Crescent
17	Warringah Road
18	Intersection Condamine Street and Balgowlah Road
19	Intersection Burnt Bridge Creek Deviation and Sydney Road
20	Wakehurst Parkway near Warringah Aquatic Centre

Table 8: Inundation of Access Roads

Location	Road Level (mAHD)	First Event Flooded (AEP)	Peak Velocity 1% AEP (m/s)	Rate Of Rise 1% AEP (cm/min)	Time Of Inundation 1% AEP (hour)	Peak Flood Depth (mAHD)			
						20% AEP	5% AEP	2% AEP	1% AEP
1	2.08	20%	0.73	1.32	4.67	0.29	0.58	0.73	0.87
2	2.05	50%	0.72	1.09	5.16	0.41	0.70	0.84	0.97
3	2.05	50%	0.49	1.37	6.43	0.72	1.00	1.15	1.27
4	8.37	50%	1.75	1.89	1.10	0.22	0.36	0.43	0.49
5	6.26	50%	0.23	2.54	1.80	0.50	0.78	0.87	0.94

Figure 2: Flood-affected Road Information (extracted from Manly Lagoon Floodplain Risk Management Study and Plan)

Additionally, *Manly Lagoon Floodplain Risk Management Study and Plan* stated that there are some properties on the southern side of the lagoon had floor levels above the 1% flood (but less than the PMF).

This case is comparable to the subject site proposed development and the previously approved DA for the Golf Club (adjoining site). We understand that the single-level squash building provides shelter-in-place arrangement only up to a 1% AEP event.

A flood emergency plan has been developed including procedures for closing the facility in advance of heavy rainfall. An internal platform with a total area of 14m² and 5.64m AHD, has been included, taking into account factors such as forecasted East Coast Lows, any "Flood Watch" or equivalent alerts issued for the area, and/or other appropriate "triggers" indicating expected extreme weather or ocean conditions (with a >0.1% AEP probability). The building has also been designed and constructed to be structurally able to withstand the forces of a PMF.

The shelter, located above the PMF, is considered an appropriate flood mitigation measure, given that the site is a managed facility capable of closing when extremely rare forecastable flood conditions are expected. Extreme flooding in the Manly Lagoon area is primarily influenced by significant ocean conditions that can be forecast well in advance compared to extreme rainfall events.

Furthermore, the duration of isolation during flood levels exceeding the FPL in the Manly Lagoon floodplain is expected to be very short. The 14m² area above this level is considered sufficient, even with consideration of increased flood risk due to climate change.

We trust the above meet your requirements at present. Please contact the undersigned if you require any further clarification.

Yours faithfully,
ACOR Consultants Pty Ltd

Gregory Lyell
Sydney Civil Lead

CPEng, NER, APEC Engineer, IntPE(AUS)