

Flood Risk Assessment report

Date: 7th of April 2024
Site: 31 Bennet Street – Lot 2, Curl Curl
Client Name:

Project: Proposed New Building

31 Bennet Street – Lot 2,
Curl Curl NSW

1Ref: **17060/L2-FRAR**



Table of contents

Page

1.0	Introduction	3
2.0	Site Conditions and development description, site plan	3
3.0	Curl Curl Lagoon Description.....	4-6
4.0	Flood Risk Assessment Details and levels.....	6
5.0	Flooding characteristics at 31 Bennet Street.....	7
6.0	Assessment of impact.....	7
8.0	Matrix Table Requirement.....	7-12
9.0	Conclusion.....	13

Appendices:

Appendix 1:	Northern Beaches council flood information.....	14-31
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1.0 Introduction

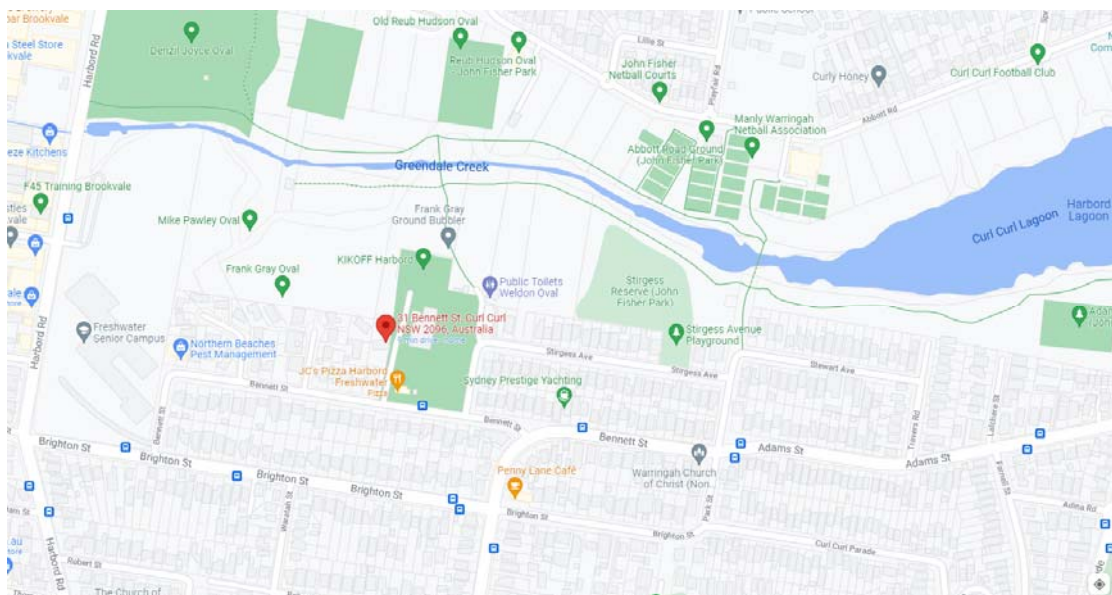
This document has been prepared to provide supporting information for the development application for the proposed new development at **31 Bennet Street, Curl Curl**. The proposed design by **ACCURATE design and drafting**, dated **16.12.2022, issue H** has been reviewed for potential flooding issues. The proposal has been assessed in accordance with Section 6.3 of Warringah Local Environmental Plan 2011 (LEP) and Section E11 of the Development Control Plan (DCP). The site is known as Lot 2 DP 534882, **31 Bennet Street, Curl Curl**. The site area is 450.0m² excluding access handle. The property is zoned as R2 Low density residential. Architectural plans, survey and by council provided flood information (attached) were used to determine flooding extents, impacts and to assess associated risks.

2.0 Site Conditions and development description

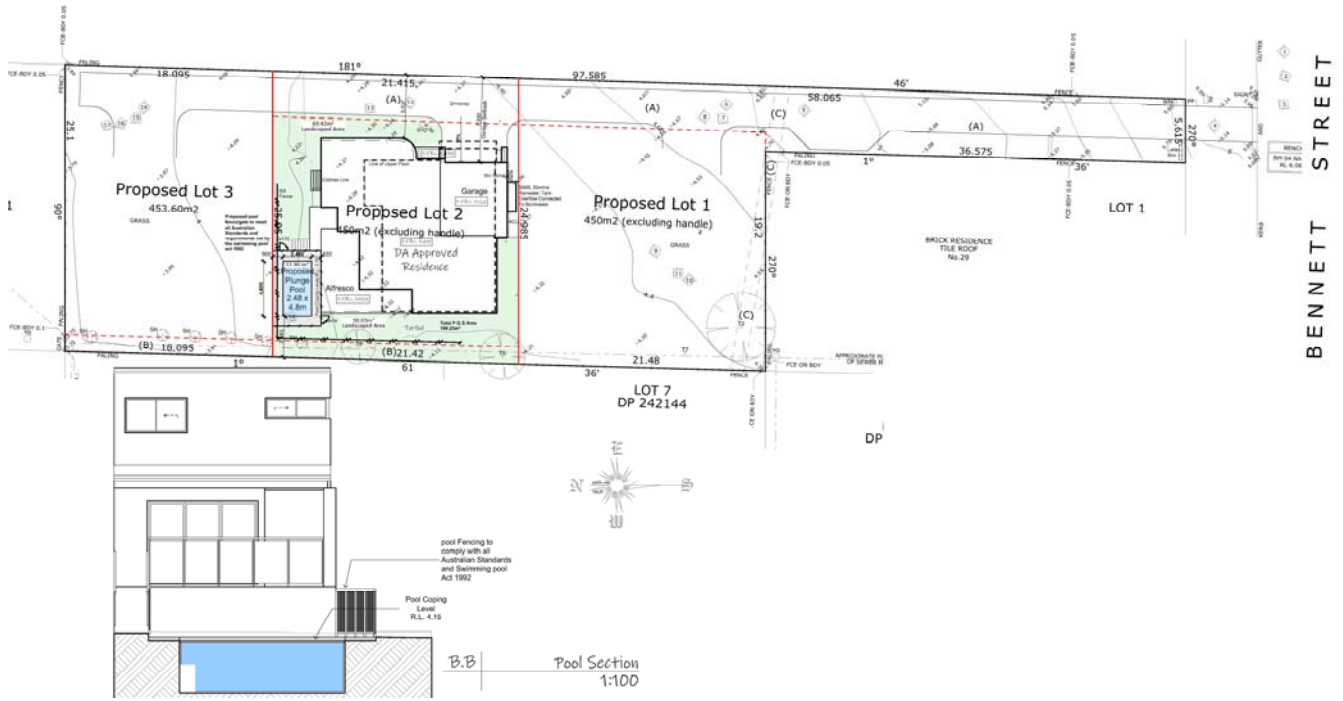
The property at **31 Bennet Street, Curl Curl** is subject to flood related development controls, as detailed in Clause 6.3 of the Warringah Local Environmental Plan 2011 (LEP) and Section E11 of the Warringah Development Control Plan (DCP). The property is located within the Curl Curl Lagoon Catchment. According to the information based on the Dee Why and Curl Curl Lagoon Floodplain Risk Management Study (2005), the property is located in the **Medium Risk Flood Planning Precinct**. The 1% AEP level is 5.12m AHD, the flood planning level (FPL) (absolute **minimum floor level**) for new habitable rooms is **5.61m** AHD and the Probable Maximum Flood (PMF) level is predicted to be **5.86m** AHD.

The Property is gradually sloping down to North towards Mike Pawley Oval, the highest RL of 5.81 is located in the SE corner and the lowest RL of 4.06 along the northern boundary. The design of the proposed dwelling is indicated on architectural drawings by **ACCURATE design and drafting**, drawing number Issue H dated 6th Sept 2021. The design consists of 2 levels home with brick veneer construction of the ground floor and timber frame construction of the first floor.

Locality Map



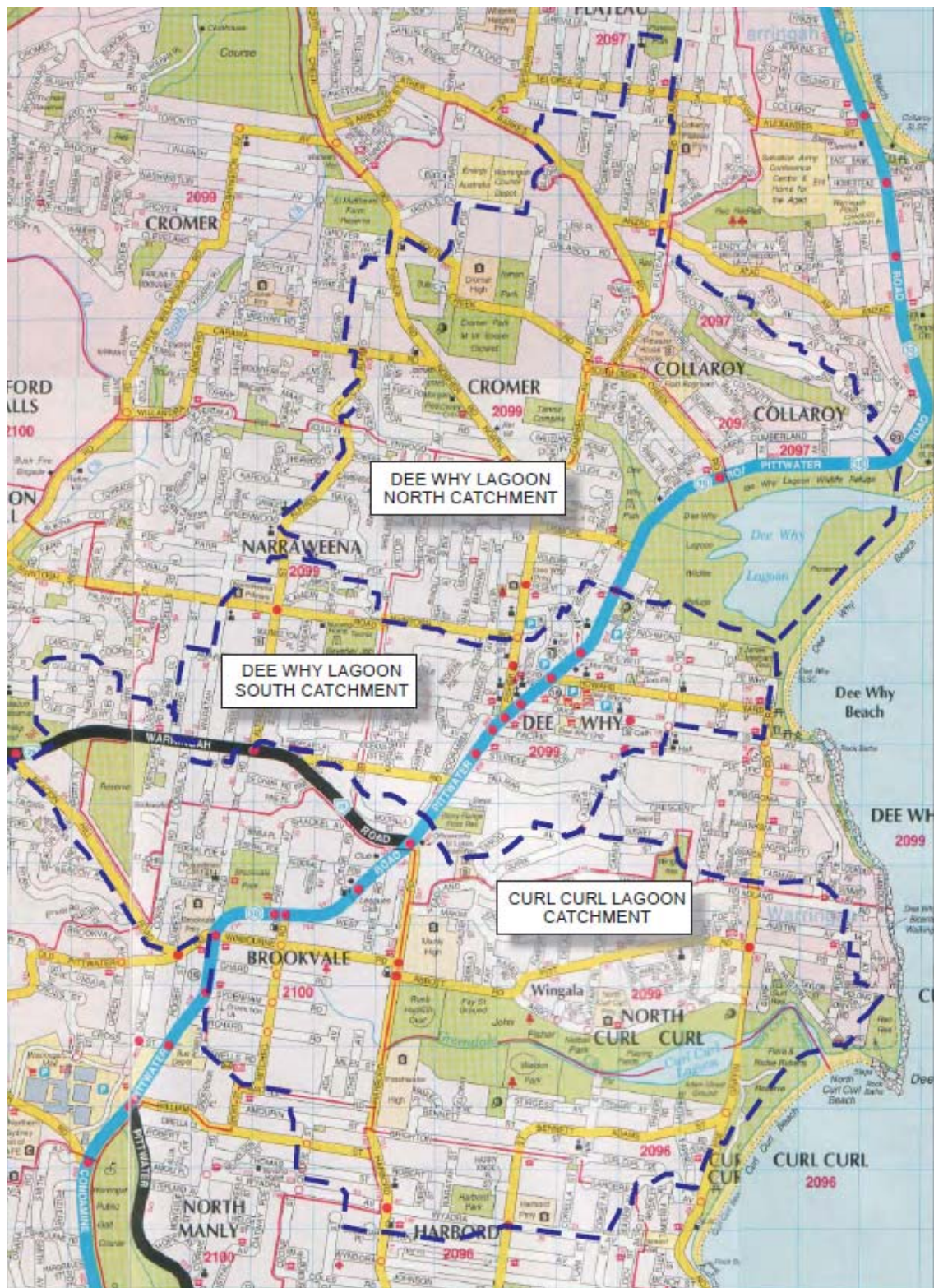
DA site plans



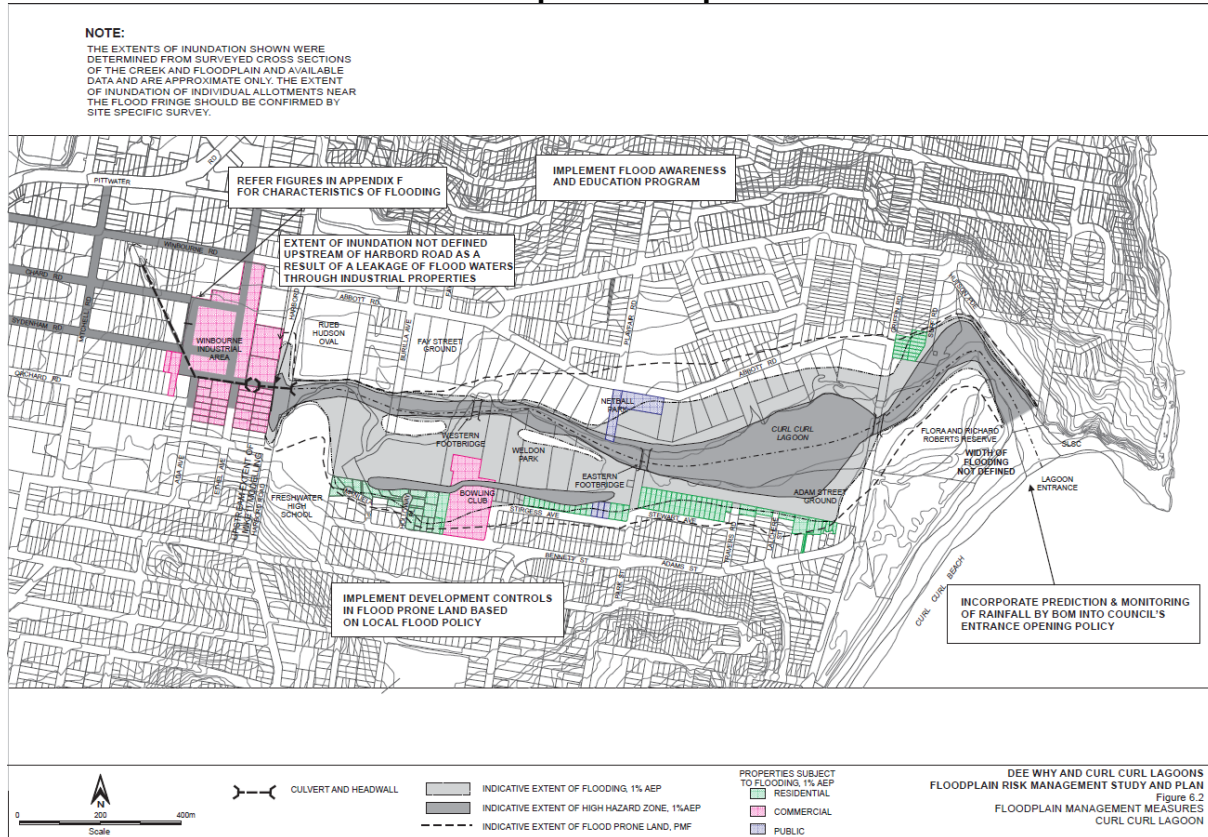
3.0 Curl Curl Lagoon Description

The final report on Dee Why and Curl Curl lagoons floodplain risk management study and appendices (2005) has been prepared by **Lyall & Associates Consulting Water Engineers** for the (now) Northern Beaches Council to define the existing flood behaviour in the Curl Curl catchment and establish the basis for subsequent floodplain management activities. A map of the location of the Curl Curl lagoon catchment is shown below. The catchment occupies a total area of approximately 4.7km², extending from Beacon Hill and flowing generally east towards its entrance to the Tasman Sea via Curl Curl Lagoon (which is prior fed by Greendale Creek).

Catchment Area Map



Indicative Map of Flood-prone Areas



4.0 Flood Risk Assessment Details and levels

The flood levels and details are based on the Dee Why and Curl Curl Lagoons Floodplain Risk Management Study 2005, Lyall & Associates. The comprehensive flood information report was provided by the Northern Beaches Council on 23/10/2021.

The property is in the **Medium Risk Flood** Planning Precinct, with medium hazard flooding. The comprehensive flood information report predicted following flood levels:

1% AEP Maximum Water Level: 5.12m AHD

1% AEP Maximum Peak Depth from natural ground level: 1.25 m

Flood Planning Level (FPL): 5.61m AHD

Probable Maximum Flood (PMF) level: 5.86m AHD.

PMF Maximum Depth from natural ground level: 1.99 m

Flood storage area: Yes

5.0 Flooding characteristics at 31 Bennet Street, lot 2, Curl Curl

The flooding of the property is caused by a backwater flooding from Curl Curl Lagoon. The velocity of the flood is expected to be low.

6.0 Assessment of impact

The floor levels of the ground floor habitable rooms must be located at or above flood planning level. All structures of the 1st floor addition are located above FPL. Enclosed garage must be located at or above the 1% AEP level. The velocity of the flood is not indicated on the flood information report. Due to the location of the property the velocity is expected to be low with a minor impact on the structural integrity of proposed structure.

7.0 Matrix Table Requirement

	Compliance			Relevant Controls
	N/A	Yes	No	
A Flood effects caused by Development		✓		A1,2
B Building Components & Structural		✓		B1,2,3
C Floor Levels		✓		C1,3
D Car Parking		✓		D5
E Emergency Response		✓		E1,2,3
F Fencing		✓		F1
G Storage of Goods		✓		G1
H Pools		✓		H1

A: Flood effects caused by Development

A1

Development shall not be approved unless it can be demonstrated in a Flood Management Report that it has been designed and can be constructed so that in all events up to the 1% AEP event:

- a) There are no adverse impacts on flood levels or velocities caused by alterations to the flood conveyance -> **Complies**

- b) There are no adverse impacts on surrounding properties -> **Complies**
- c) It is sited to minimise exposure to flood hazard -> **Complies**

A2

Development shall not be approved unless it can be demonstrated in a Flood Management Report that in all events up to the 1% AEP event there is no net loss of flood storage

The house is to be design with the open sub-floor structure with flood inlet opening allowing flooding of subfloor during the major flood events. A minor reduction of flood storage area by structural elements has to be compensated for by removing of topsoil with the same volume as the volume of implemented structural elements within the 1% AEP level.

B: Building Components and Structural soundness

B1

All buildings shall be designed and constructed with flood compatible materials in accordance with "Reducing Vulnerability of Buildings to Flood Damage: Guidance on Building in Flood Prone Areas", Hawkesbury-Nepean Floodplain Management Steering Committee (2006).

B2

All new structures must be designed and constructed to ensure structural integrity up to the Flood Planning Level (5.61m) taking into account the forces of floodwater, wave action, flowing water with debris, buoyancy and immersion. Where shelter-in-place refuge is to be provided the structural integrity is to be to the Probable Maximum Flood level. Structural certification shall be provided confirming the above.

B3

All new electrical equipment, power points, wiring, fuel lines, sewerage systems or any other service pipes and connections must be waterproofed and/or located above the Flood Planning Level (5.61m). All existing electrical equipment and power points located below the Flood Planning Level must have residual current devices installed that turn off all electricity supply to the property when flood waters are detected.

- **Types of material to be used:**

The building or work affected by flooding are to be constructed of flood compatible building materials. Examples of flood compatible materials are identified in table below:

Building Component	Flood Compatible Material
Flooring and Sub Floor Structure	Pier and beam construction or Suspended reinforced concrete slab
Floor Covering	Clay tiles Concrete, precast or in situ Concrete tiles Epoxy formed-in-place Mastic flooring, formed-in-place Rubber sheets or tiles with chemical-set adhesive Silicone floors formed-in-place Vinyl sheets or tiles with chemical set adhesive Ceramic tiles, fixed with mortar or chemical set adhesive Asphalt tiles, fixed with water resistant adhesive
Wall Structure	Solid brickwork, block work, reinforced, concrete or mass concrete
Windows	Aluminium Frame with stainless steel rollers or similar Corrosion and water-resistant material.
Doors	Solid panel with waterproof adhesives Flush door with marine ply filled with closed cell foam Painted material construction Aluminium or galvanised steel frame
Wall and Ceiling Linings	Brick, face or glazed Clay tile glazed in waterproof mortar Concrete, Concrete block Steel with waterproof applications Stone natural solid or veneer, waterproof grout Glass blocks, Glass Plastic sheeting or wall with waterproof adhesive
Insulation	Foam or closed cell types
Nails, Bolts, Hinges and Fittings	Galvanised Removable pin hinges
Fences	Wooden horizontal slatted fences with capacity to allow flood flow through.

Note: The above is not an exhaustive list of Flood compatible materials

C: Floor Levels

C1

New floor levels within the development shall be at or above the Flood Planning Level.

-> Complies

C2

Not applicable

C3

All new development must be designed and constructed so as not to impede the floodway or flood conveyance on the site, as well as ensuring no net loss of flood storage in all events up to the 1% AEP event.

For suspended pier/pile footings:

- a) The underfloor area of the dwelling below the 1% AEP flood level is designed and constructed to allow clear passage of floodwaters, taking into account the potential for small openings to block; and*
- b) At least 50% of the perimeter of the underfloor area is of an open design from the natural ground level up to the 1%AEP flood level; and*
- c) No solid areas of the perimeter of the underfloor area would be permitted in a floodway.*

C4, C6

Not applicable

C5

Not applicable (subdivision previously approved)

D: Car Parking

D1

Open carpark areas and carports shall not be located within a floodway

D2

The lowest floor level of open carparks and carports shall be constructed no lower than the natural ground levels, unless it can be shown that the carpark or carport is free draining with a grade greater than 1% and that flood depths are not increased.

D3

Carports must be of open design, with at least 2 sides completely open such that flow is not obstructed up to the 1% AEP flood level. Otherwise it will be considered to be enclosed.

When undertaking a like-for-like replacement and the existing garage/carport is located on the street boundary and ramping is infeasible, consideration may be given for dry floodproofing up to the 1% AEP flood level.

D4

Where there is more than 300mm depth of flooding in a car park or carport during a 1% AEP flood event, vehicle barriers or restraints are to be provided to prevent floating vehicles leaving the site. Protection must be provided for all events up to the 1% AEP flood event

D5

Enclosed Garages must be located at or above the 1%AEP level (5.12m)

D6, D7 - Not applicable

E: Flood Emergency Response

E1

The property is affected by a Flood Life Hazard Category of H4, hence Control E1 applies and a Flood Emergency Assessment is included: The recommended emergency response is to shelter in place. The dwelling upper floor level is above both the FPL (5.61m AHD) and PMF (5.86m AHD). All residents shall be informed of the flood evacuation procedures and a copy of this report shall be kept on the premises at all times. This Flood Emergency Response Plan shall be executed, on individual assessment, during high intensity rainfalls within the first 5–10 minutes of a storm and monitored accordingly.

In the event that floodwaters overtop the boundary at any point on the property, the recommended actions are:

- All residents shall be informed of the flood evacuation procedures and a copy of this report shall be kept on the premises at all times. This Flood Emergency Response Plan shall be executed, on individual assessment, during high intensity rainfalls and major storm event. The rising flood shall be monitored accordingly.
- All occupants should consider evacuating the site if alternative accommodation is available and if this can be done prior to inundation of Bennett Street.
- The occupants of the property shall be directed to the proposed upper floor of the dwelling, above the PMF.
- Emergency services shall be contacted stating the property's location; the situation faced, number of people on the property and any evacuation measures to be carried out.
- All cars located within the property should be relocated to higher ground off-site.

Emergency services shall be contacted stating the property's location, the situation faced number of people on the property and any evacuation measures to be carried out. All instructions from emergency services shall take precedence over any instructions within this document.

For emergency help in floods and storms call the State Emergency service (SES) on 132 500. If your emergency is life threatening call 000 (triple zero) for Police/Fire/Ambulance.

E2

For a shelter in place refuge, it is a requirement that it must contain as a minimum: sufficient clean water for all occupants; portable radio with spare batteries; torch with spare batteries; a first aid kit; emergency power; and a practical means of medical evacuation.

E3

It must be demonstrated that a shelter in place refuge in accordance with the requirements of this DCP will be available for any potential development arising from a Torrens title subdivision.

F: Fencing

F1

Fencing, (including boundary fencing), shall be designed so as not to impede the flow of flood waters and not to increase flood affectation on surrounding land. At least 50% of the fence must be of an open design from the natural ground level up to the 1% AEP flood level. Less than 50% of the perimeter fence would be permitted to be solid. Openings should be a minimum of 75 mm X 75 mm.

G: Storage of Goods

G1

Hazardous or potentially polluting materials shall not be stored below the Flood Planning Level unless adequately protected from floodwaters in accordance with industry standards.

H: Pool

H1

Pools located within the 1% AEP flood extent are to be in-ground, with coping flush with natural ground level. Where it is not possible to have pool coping flush with natural ground level, it must be demonstrated that the development will result in no net loss of flood storage and no impact on flood conveyance on or from the site.

All electrical equipment associated with the pool (including pool pumps) is to be waterproofed and/or located at or above the Flood Planning Level.

All chemicals associated with the pool are to be stored at or above the Flood Planning Level.

8.0 Conclusion

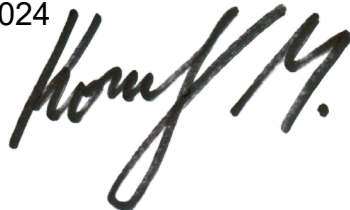
The proposal has been assessed by us against the flood risk management controls outlined in Clause 6.3 of the Warringah Local Environmental Plan 2011 (LEP) and Section E11 of the Warringah Development Control Plan (DCP) and available architectural plans. The proposed development **will not have any effect** on the estimated flood water surface levels for the 100-years ARI if recommendations of this report are met. The development will not increase flooding or negatively impact on the velocities of the flood waters upstream or downstream in a 1% AEP flood event. The proposed structural design has to follow our recommendations.

To meet the controls outlined in Part E11 of the Warringah Council DCP it is recommended that:

- An FPL of **5.61m** AHD be adopted for the site.
- All new structures below the FPL, must be constructed of flood compatible materials and designed/verified as capable of withstanding the forces generated by flood and tidal inundation during the 1% AEP rain event.
- Non-waterproofed electrical services and stored materials (e.g. fuel, pool chemicals) must be located above or the FPL.

Yours sincerely

Michal Korecky MEngSc, MIE Aust NER
Sydney 07/04/2024

A handwritten signature in black ink, appearing to read 'Michal K.', is positioned below the typed name and date.