

# Flood Control Certificate

Date: 04/02/2025  
Client: Bungalow Homes

Job No. 2501065  
Engineer: CF

## Site: 14 Hudson Parade, Avalon

NB Consulting Engineers has assessed the above site address in relation to potential flooding issues for a future new granny flat development.

Flood levels have been obtained from Council. This assessment has been based on the Avalon to Palm Beach Floodplain Risk Management Study and Plan 2017 information and has considered that the development is within the predicted flood extent and flood affected area.

Northern Beaches Council flood management information (refer appendix B) indicates the following:

• Flood Planning Level (FPL) (Max)	22.59 m AHD
• 1% AEP Flood Level (Max)	22.09 m AHD
• 1% AEP Flood Depth (Max)	0.24m
• 1% AEP Flood Velocity (Max)	0.56 m/s
• Probable Maximum Flood Level (PMF) (Max)	22.82 m AHD
• Probable Maximum Flood Depth (PMF) (Max)	0.39 m
• Probable Maximum Velocity (Max)	1.02 m/s
• Climate Change Flood Level (1% AEP) (Max)	22.37 m AHD
• Climate Change Flood Depth (1% AEP) (Max)	0.28 m
• Flood Category	Flood Fringe
• Flood life hazard classification	H1-H2
• Provisional Flood Hazard	Low - Medium Risk Precinct

The proposed ground floor level for the proposed new dwelling must be constructed above the FPL (RL 22.59m AHD). If the new dwelling is proposed within the 1% AEP flood extent, an open subfloor structure must be constructed to allow for the free passage of floodwater beneath the dwelling. Refer to Appendix A for 1% AEP flood extent (Map B).

Provided the advice is adopted, the proposed development will be in general compliance with the Northern Beaches Councils policy, Pittwater 21 DCP (section B3.11 – Flood Prone Land).

### **Structural requirements**

Any new structures are to be constructed of fit for purpose building materials in accordance with the "Reducing vulnerability of buildings to flood damage"<sup>1</sup> manual and are to be designed and constructed to ensure structural integrity up to the FPL, taking into account the forces of floodwater, wave action, flowing water with debris and buoyancy and immersion.

### **Waterproofing requirements**

Furthermore, the switchboard and main circuit unit must be fitted above the FPL. 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 FPL. Electrical conduits must be laid such that they are free draining. All existing electrical equipment and power points located below the FPL within the subject structure must have residual current devices installed that turn off all supply of electricity to the property when flood waters are detected.

### **Emergency response requirements**

The subject site is located within the H1 to H2 flood life hazard categories, therefore a flood emergency assessment is not required in accordance with Northern Beaches Councils policy, Pittwater 21 DCP (section B3.11 – Flood Prone Land).

Considering the architectural plans haven't yet been prepared, NBC recommends the developer consider raising the floor of the secondary dwelling by 230mm to be above the PMF level. Alternatively, a refuge within the main dwelling area could be considered.

The development is not envisaged to have a detrimental effect on neighboring properties provided the advice within this report is adhered to.

We trust that this certificate meets your requirements. Please contact the author if further clarification is required.

## **NORTHERN BEACHES CONSULTING ENGINEERS P/L**

A blue ink signature of Michael Wachjo, consisting of a stylized 'M' followed by a wavy line.

**Michael Wachjo**

Senior Engineer | Director | B.E.(Civil), MIEAust.

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<sup>1</sup>Hawkesbury-Nepean Floodplain Management Steering Committee. (2006). Reducing Vulnerability of Buildings to Flood Damage. Parramatta: Hawkesbury-Nepean Floodplain Management Steering Committee.



## **Appendix A – Northern Beaches Council’s Flood Information**

# COMPREHENSIVE FLOOD INFORMATION REPORT

**Property:** 14 Hudson Parade AVALON BEACH NSW 2107

**Lot DP:** Lot 8 DP 24003

**Issue Date:** 13/12/2024

**Flood Study Reference:** Avalon to Palm Beach Floodplain Risk Management Study and Plan 2017, Manly Hydraulics Laboratory

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## Flood Information<sup>1</sup>:

### **Map A - Flood Risk Precincts**

Maximum Flood Planning Level (FPL) <sup>2, 3, 4</sup>: 22.59 m AHD

### **Map B - 1% AEP Flood & Key Points**

1% AEP Maximum Water Level <sup>2, 3</sup>: 22.09 m AHD

1% AEP Maximum Depth from natural ground level<sup>3</sup>: 0.24 m

1% AEP Maximum Velocity: 0.56 m/s

### **Map C - 1% AEP Hydraulic Categorisation**

1% AEP Hydraulic Categorisation: Flood fringe

### **Map D - Probable Maximum Flood**

PMF Maximum Water Level (PMF) <sup>4</sup>: 22.82 m AHD

PMF Maximum Depth from natural ground level: 0.39 m

PMF Maximum Velocity: 1.02 m/s

### **Map E - Flooding with Climate Change**

1% AEP Maximum Water Level with Climate change <sup>3</sup>: 22.37 m AHD

1% AEP Maximum Depth with Climate Change<sup>3</sup>: 0.28 m

### **Map F - Flood Life Hazard Category in PMF**

H2 – H1

### **Map G - Indicative Ground Surface Spot Heights**

- (1) The provided flood information does not account for any local overland flow issues nor private stormwater drainage systems.
- (2) Overland flow/mainstream water levels may vary across a sloping site, resulting in variable minimum floor/ flood planning levels across the site. The maximum Flood Planning Level may be in a different location to the maximum 1% AEP flood level.
- (3) Intensification of development in the former Pittwater LGA requires the consideration of climate change impacts which may result in higher minimum floor levels.
- (4) Vulnerable/critical developments require higher minimum floor levels using the higher of the PMF or FPL

## **Notes**

### **General**

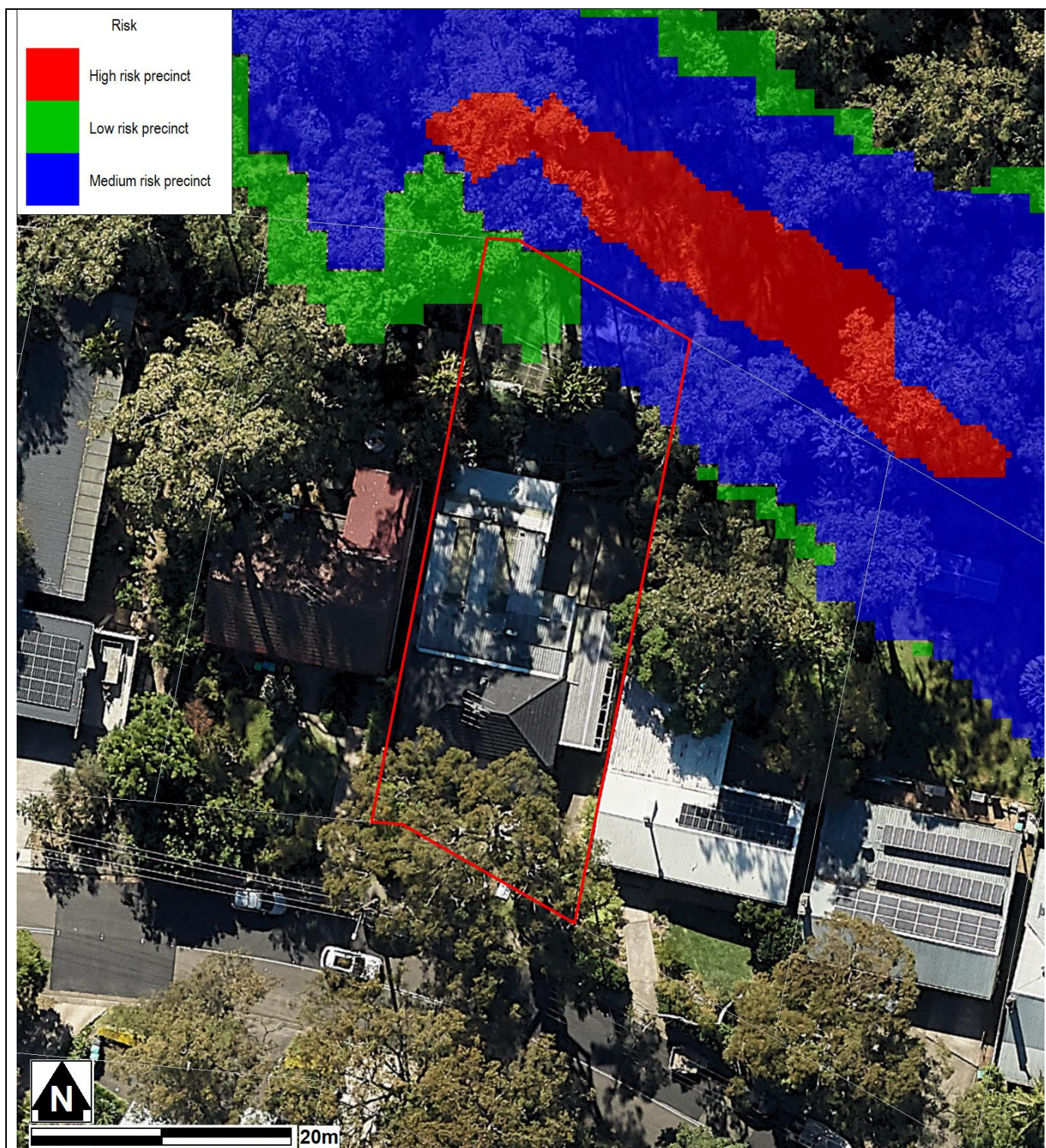
- All levels are based on Australian Height Datum (AHD) unless otherwise noted.
- This is currently the best available information on flooding; it may be subject to change in the future.
- Council recommends that you obtain a detailed survey of the above property and surrounds to AHD by a registered surveyor to determine any features that may influence the predicted extent or frequency of flooding. It is recommended you compare the flood level to the ground and floor levels to determine the level of risk the property may experience should flooding occur.
- Development approval is dependent on a range of issues, including compliance with all relevant provisions of Northern Beaches Council's Local Environmental Plans and Development Control Plans.
- Please note that the information contained within this letter is general advice only as a detail survey of the property as well as other information is not available. Council recommends that you engage a suitably experienced consultant to provide site specific flooding advice prior to making any decisions relating to the purchase or development of this property.
- The Flood Studies on which Council's flood information is based are available on Council's online [Flood Study Reports](#) webpage.
- If the FPL is higher than the PMF level, then the FPL should still be used as the FPL, as it includes freeboard which the PMF does not.
- If the property is affected by an Estuarine Planning Level (EPL) which is higher than the FPL, then the EPL should be used as the FPL.
- Areas affected by an EPL in the former Pittwater LGA are mapped on Council's online [Estuarine Hazard Map](#). Note that areas in the former Manly LGA affected by an EPL have been identified and will be soon added to this map.
- Council's drainage infrastructure is mapped on Council's [Stormwater Map](#). Note that locations are indicative only and may not be exactly as shown.

### **Property**

- Please note that if a development on the property is proposed completely outside of the Flood Planning Area (Medium Flood Risk Precinct), a formal Flood Management Report would not need to be submitted to council with a Development Application for Residential Development.



# MAP A: FLOOD RISK PRECINCTS



## Notes:

- **Low Flood Risk precinct** means all flood prone land not identified within the High or Medium flood risk precincts.
- **Medium Flood Risk precinct** means all flood prone land that is (a) within the 1% AEP Flood Planning Area; and (b) is not within the high flood risk precinct.
- **High Flood Risk precinct** means all flood prone land (a) within the 1% AEP Flood Planning Area; and (b) is either subject to a high hydraulic hazard, within the floodway or subject to significant evacuation difficulties (H5 or H6 Life Hazard Classification).
- The **Flood Planning Area** extent is equivalent to the Medium Flood Risk Precinct extent and includes the High Flood Risk Precinct within it. The mapped extent represents the 1% annual Exceedance Probability (AEP) flood event + freeboard.
- None of these mapped extents include climate change.
- Cadastre Lines (Source: NSW Government Land and Property Information), flood levels/extents (Source: Avalon to Palm Beach Floodplain Risk Management Study and Plan 2017, Manly Hydraulics Laboratory) and aerial photography (Source: NearMap)

2014) are indicative only.



## MAP B: FLOODING - 1% AEP EXTENT & KEY POINTS



### Notes:

- Extent represents the 1% Annual Exceedance Probability (AEP) flood event.
- Flood events exceeding the 1% AEP can occur on this site.
- Extent does not include climate change.
- Cadastre Lines (Source: NSW Government Land and Property Information), flood levels/extents (Source: Avalon to Palm Beach Floodplain Risk Management Study and Plan 2017, Manly Hydraulics Laboratory) and aerial photography (Source Near Map 2014) are indicative only.



## Flood Levels

ID	5% AEP Max WL (m AHD)	5% AEP Max Depth (m)	1% AEP Max WL (m AHD)	1% AEP Max Depth (m)	1% AEP Max Velocity (m/s)	Flood Planning Level (m)	PMF Max WL (m AHD)	PMF Max Depth (m)	PMF Max Velocity (m/s)
1	N/A	N/A	N/A	N/A	N/A	N/A	22.64	0.24	0.69
2	N/A	N/A	22.02	0.11	0.26	22.49	22.13	0.22	0.44
3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
5	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
7	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

## Climate Change Flood Levels (30% Rainfall intensity and 0.9m Sea Level Rise)

ID	CC 1% AEP Max WL (m AHD)	CC1 % AEP Max Depth (m)
1	N/A	N/A
2	22.05	0.14
3	N/A	N/A
4	N/A	N/A
5	N/A	N/A
6	N/A	N/A
7	N/A	N/A

WL – Water Level

PMF – Probable Maximum Flood

N/A - No Peak Water Level/Depth/Velocity Available.

### Notes:

- The flood planning levels above are calculated by adding a 0.5m freeboard to the 1% AEP water level. However, if the depth of flow is less than 0.3m and a Velocity X Depth product is less than 0.3m<sup>2</sup>/s, a freeboard of 0.3m may be able to be justified for development.

# MAP C: 1% AEP FLOOD HYDRAULIC CATEGORY EXTENT MAP



## Notes:

- Extent represents the 1% Annual Exceedance Probability (AEP) flood event
- Extent does not include climate change
- Cadastre Lines (Source: NSW Government Land and Property Information), flood levels/extents (Source: Avalon to Palm Beach Floodplain Risk Management Study and Plan 2017, Manly Hydraulics Laboratory) and aerial photography (Source: NearMap 2014) are indicative only



## MAP D: PMF EXTENT MAP

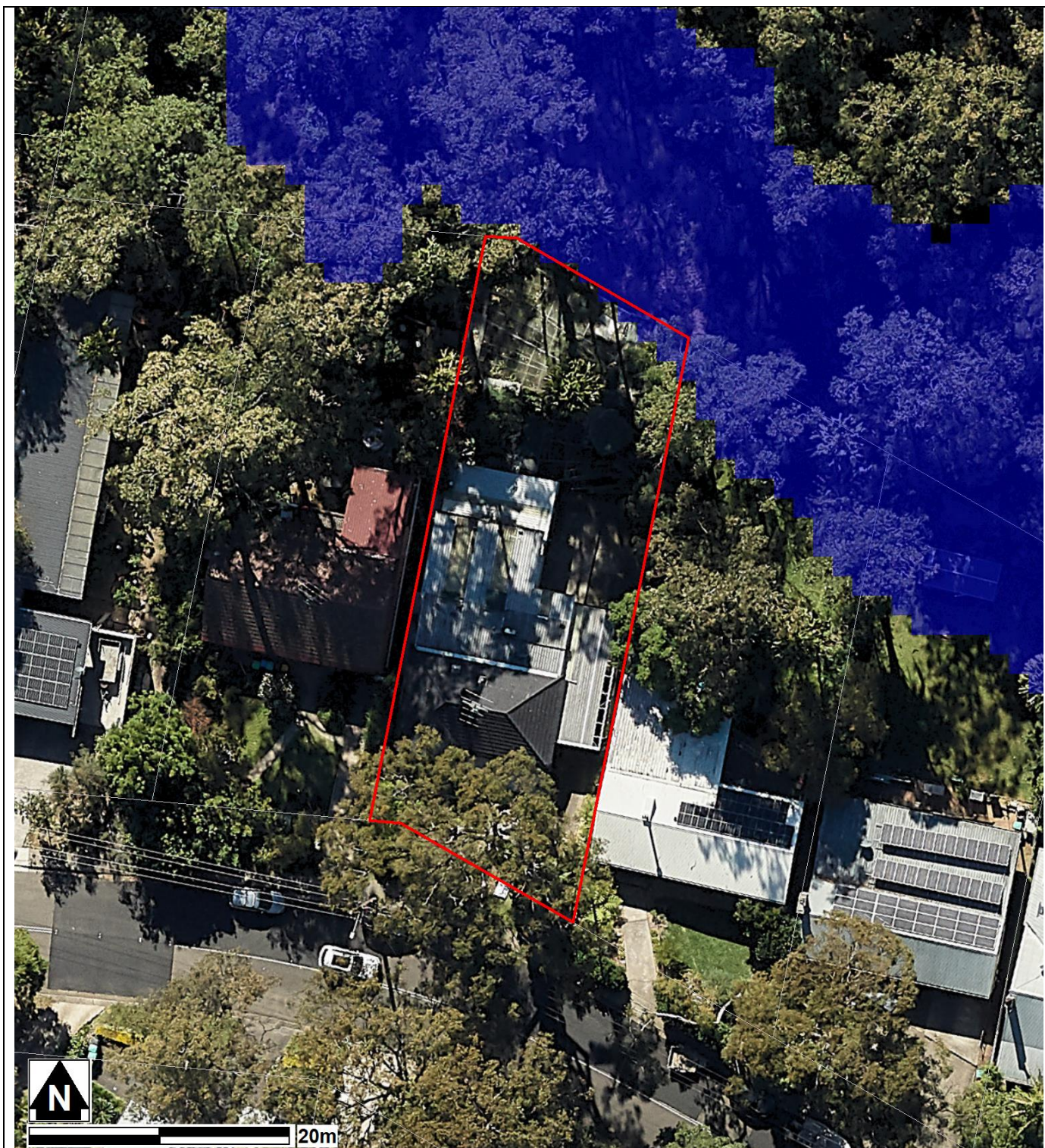


### Notes:

- Extent represents the Probable Maximum Flood (PMF) flood event
- Extent does not include climate change
- Cadastre Lines (Source: NSW Government Land and Property Information), flood levels/extents (Source: Avalon to Palm Beach Floodplain Risk Management Study and Plan 2017, Manly Hydraulics Laboratory) and aerial photography (Source: NearMap 2014) are indicative only



## MAP E: FLOODING – 1% AEP EXTENT PLUS CLIMATE CHANGE

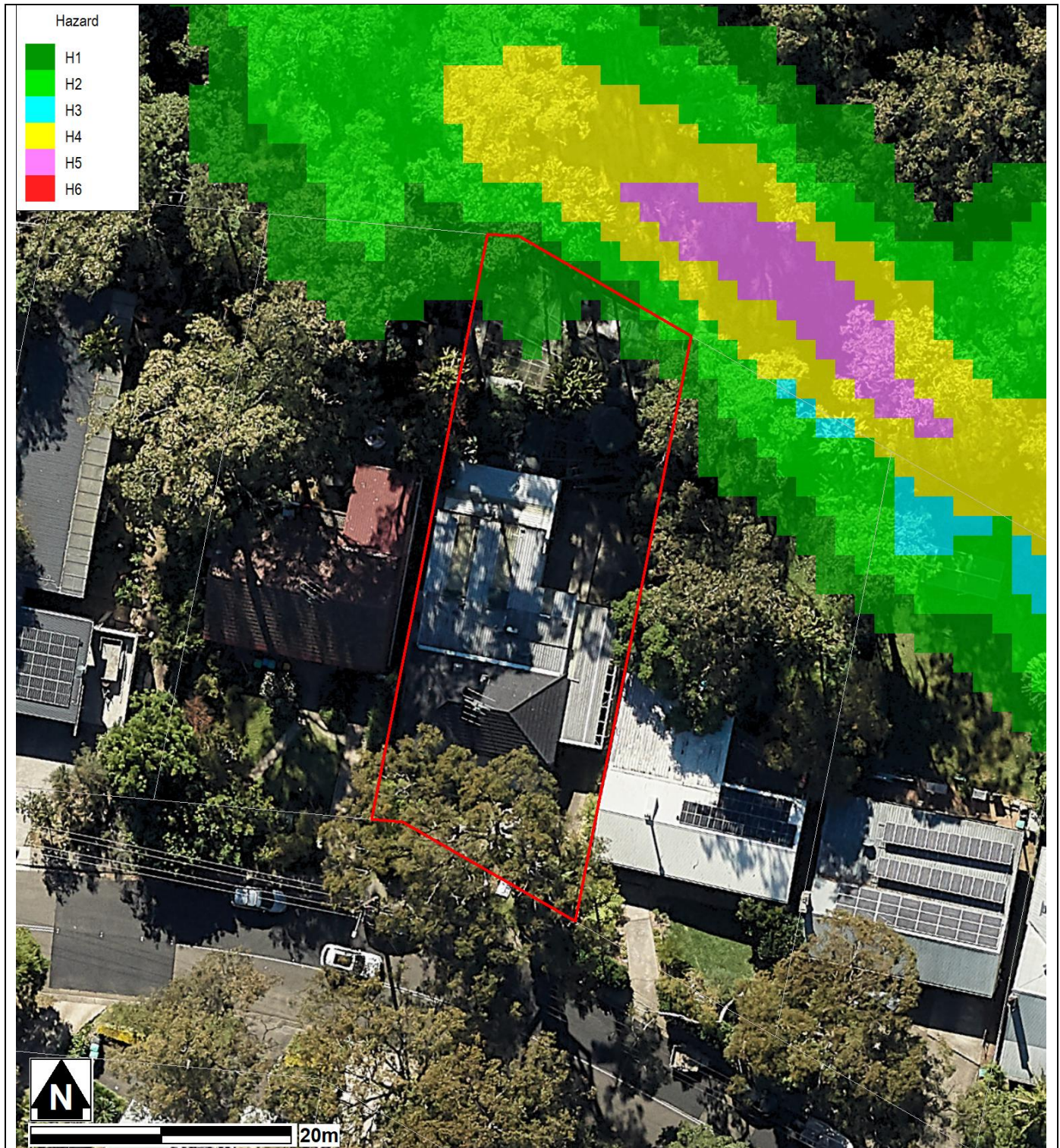


### Notes:

- Extent represents the 1% annual Exceedance Probability (AEP) flood event including 30% rainfall intensity and 0.9m Sea Level Rise climate change scenario
- Flood events exceeding the 1% AEP can occur on this site.
- Cadastre Lines (Source: NSW Government Land and Property Information), flood levels/extents (Source: Avalon to Palm Beach Floodplain Risk Management Study and Plan 2017, Manly Hydraulics Laboratory) and aerial photography (Source: NearMap 2014) are indicative only



## MAP F: FLOOD LIFE HAZARD CATEGORY IN PMF



### Notes:

- Cadastre Lines (Source: NSW Government Land and Property Information), flood levels/extents (Source: Avalon to Palm Beach Floodplain Risk Management Study and Plan 2017, Manly Hydraulics Laboratory) and aerial photography (Source Near Map 2014) are indicative only.



# MAP G: INDICATIVE GROUND SURFACE SPOT HEIGHTS



## Notes:

- The surface spot heights shown on this map were derived from Airborne Laser Survey and are indicative only.
- Accuracy is generally within  $\pm 0.2\text{m}$  vertically and  $\pm 0.15\text{m}$  horizontally, and Northern Beaches Council does not warrant that the data does not contain errors.
- If accuracy is required, then survey should be undertaken by a registered surveyor.



# Preparation of a Flood Management Report

## Introduction

These guidelines are intended to provide advice to applicants on how to determine what rules apply on flood prone land, and how to prepare a Flood Management Report. The purpose of a Flood Management Report is to demonstrate how a proposed development will comply with flood related planning requirements.

## Planning Requirements for Flood Prone Land

Development must comply with the requirements for developing flood prone land set out in the relevant Local Environment Plan (LEP) and Development Control Plan (DCP). There are separate LEPs and DCPs for each of the former Local Government Areas (LGAs), although preparation of a LGA-wide LEP and DCP is currently under way.

The clauses specific to flooding in the LEPs and DCPs are as follows:

LEP Clauses	DCP Clauses
Manly LEP (2013) – 5.21 Flood Planning Manly LEP (2013) – 5.22 Special Flood Considerations	Manly DCP (2013) – 5.4.3 Flood Prone Land
Warringah LEP (2011) – 5.21 Flood Planning Warringah LEP (2011) – 5.22 Special Flood Considerations Warringah LEP (2000) – 47 Flood Affected Land *	Warringah DCP (2011) – E11 Flood Prone Land
Pittwater LEP (2014) – 5.21 Flood Planning Pittwater LEP (2014) – 5.22 Special Flood Considerations	Pittwater 21 DCP (2014) – B3.11 Flood Prone Land Pittwater 21 DCP (2014) – B3.12 Climate Change

\* The Warringah LEP (2000) is relevant only for the “deferred lands” which affects only a very small number of properties, mostly in the Oxford Falls area.

Development on flood prone land must also comply with Council's Water Management for Development Policy, and if it is in the Warriewood Release Area, with the Warriewood Valley Water Management Specification and Clause C6.1 of the Pittwater 21 DCP (2014). Guidelines for Flood Emergency Response Planning are available for addressing emergency response requirements in the DCP. These documents can be found on Council's website on the [Flooding page](#).

Note that if the property is affected by estuarine flooding or other coastal issues, these need to be addressed separately under the relevant DCP clauses.

## When is a Flood Management Report required?

A Flood Management Report must be submitted with any Development Application on flood prone land (with exceptions noted below), for Council to consider the potential flood impacts and applicable controls. For Residential or Commercial development, it is required for development on land identified within the Medium or High Flood Risk Precinct. For Vulnerable or Critical development, it is required if it is within any Flood Risk Precinct.

There are some circumstances where a formal Flood Management Report undertaken by a professional engineer may not be required. However the relevant parts of the DCP and LEP would still need to be addressed, so as to demonstrate compliance. Examples where this may apply include:

- If all proposed works are located outside the relevant Flood Risk Precinct extent
- First floor addition only, where the existing ground floor level is above the FPL
- Internal works only, where habitable floor areas below the FPL are not being increased

Note that development on flood prone land will still be assessed for compliance with the relevant DCP and LEP, and may still be subject to flood related development controls.

### What is the purpose of a Flood Management Report?

The purpose of a Flood Management Report is to demonstrate how a proposed development will comply with flood planning requirements, particularly the development controls outlined in the relevant LEP and DCP clauses. The report must detail the design, measures and controls needed to achieve compliance, following the steps outlined below.

A Flood Management Report should reflect the size, type and location of the development, proportionate to the scope of the works proposed, and considering its relationship to surrounding development. The report should also assess the flood risk to life and property.

### Preparation of a Flood Management Report

The technical requirements for a Flood Management Report include (where relevant):

1. Description of development

- Outline of the proposed development, with plans if necessary for clarity
- Use of the building, hours of operation, proposed traffic usage or movement
- Type of use, eg vulnerable, critical, residential, business, industrial, subdivision, etc

2. Flood analysis

- 1% AEP flood level
- Flood Planning Level (FPL)
- Probable Maximum Flood (PMF) level
- Flood Risk Precinct, ie High, Medium or Low
- Flood Life Hazard Category
- Mapping of relevant extents
- Flood characteristics for the site, eg depth, velocity, hazard and hydraulic category, and the relevance to the proposed development

If the property is affected by an Estuarine Planning Level (EPL) which is higher than the FPL, then the EPL should be used as the FPL. If the FPL is higher than the PMF level, then the FPL should still be used as the FPL, as it includes freeboard which the PMF does not.

3. Assessment of impacts

- Summary of compliance for each category of the DCP, as per the table below.

	Compliance		
	N/A	Yes	No
A) Flood effects caused by Development			
B) Building Components & Structural Soundness			
C) Floor Levels			
D) Car parking			
E) Emergency Response			
F) Fencing			
G) Storage of Goods			
H) Pools			

- Demonstration of how the development complies with any relevant flood planning requirements from the DCP, LEP, Water Management for Development Policy, and if it is in the Warriewood Valley Urban Land Release Area, with the Warriewood Valley Water Management Specification (2001)
- For any non-compliance, a justification for why the development should still be considered.
- Calculations of available flood storage if compensatory flood storage is proposed
- Plan of the proposed development site showing the predicted 1% AEP and PMF flood extents, as well as any high hazard or floodway affectation
- Development recommendations and construction methodologies
- Qualifications of author - Council requires that the Flood Management Report be prepared by a suitably qualified Engineer with experience in flood design / management who has, or is eligible for, membership to the Institution of Engineers Australia
- Any flood advice provided by Council
- Any other details which may be relevant

Further information and guidelines for development are available on Council's website at:

<https://www.northernbeaches.nsw.gov.au/planning-and-development/building-and-renovations/development-applications/guidelines-development-flood-prone-land>

Council's Flood Team may be contacted on 1300 434 434 or at [floodplain@northernbeaches.nsw.gov.au](mailto:floodplain@northernbeaches.nsw.gov.au) .