

FLOOD MANAGEMENT REPORT

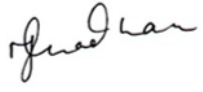
For

THE PROPOSED ADDITIONS AND ALTERATIONS

60 Riverview Parade, North Manly

DECEMBER 2022

Report Description

Report Name	Flood Management Report for the Proposed Additions and Alterations	
Address	60 Riverview Parade, North Manly	
Client	James Smith	
Our Reference	FAR1990/022	
Prepared By	Muna Pradhan Flood and Drainage Engineer MIEAust CPEng NER	

Revision History

Date	Version	Author	Comments
14.02.2022	V ₀	MP	For Submission

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1 Introduction

BMB Engineers was commissioned to prepare the flood risk management report for the proposed additions and alteration to the existing residential dwelling at No. 60 Riverview Parade, North Manly.

This report has been prepared to accompany a Development Application for the proposed development that will address requirements of Council's requirements for the flood control lot. This report describes the existing characteristics of the area, proposed development and quantifies the impact of flooding due to the proposed development and demonstrate how the proposed development will comply with flood planning requirements (as outlined in E11 Flood Prone Land : Warringah DCP 2011).

2 Site Description

The site is located to the western side of Riverview Parade. The site is legally described as Lot 25 DP 12578. A locality plan of the site is provided in Figure 1 below.

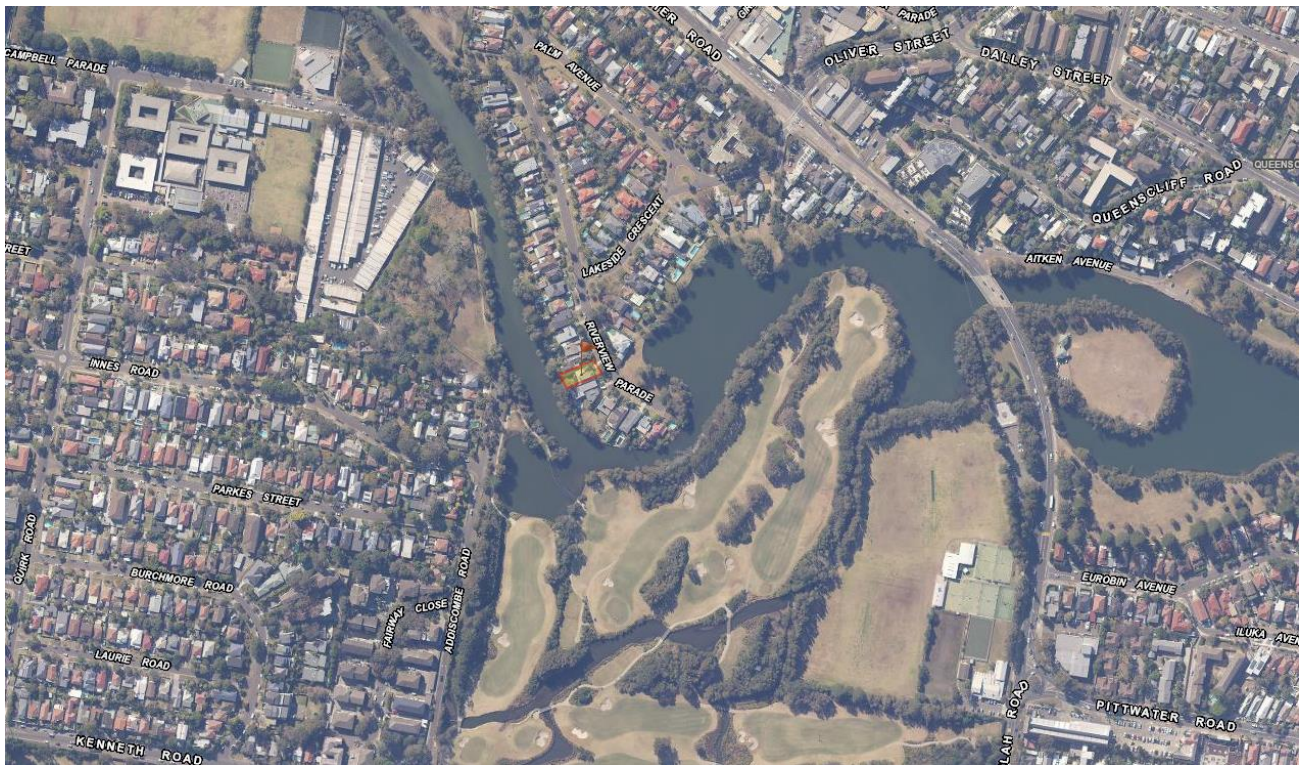


Figure 1 Location of Site (Source: Northern Beaches Council)

The site is currently developed with a two storey clad dwelling with metal roof, a concrete driveway. A Manly creek runs next to the west boundary (rear boundary). The site slopes towards the rear boundary. The Survey plan of the development site is provided in Figure 2.

Figure 2 Survey Plan of Development Site

3 Proposed Development

The proposed development comprises additions and alteration to the existing residential dwelling with swimming pool at rear. The site plan of the proposed development is presented in Figure 3. The proposed development is considered as a residential development. New additions is proposed to construct on suspended slab and pier system with void/open subfloor to allow flood water enter, store and leave easily during flooding events. Figure 4 shows the open subfloor of the proposed dwelling.

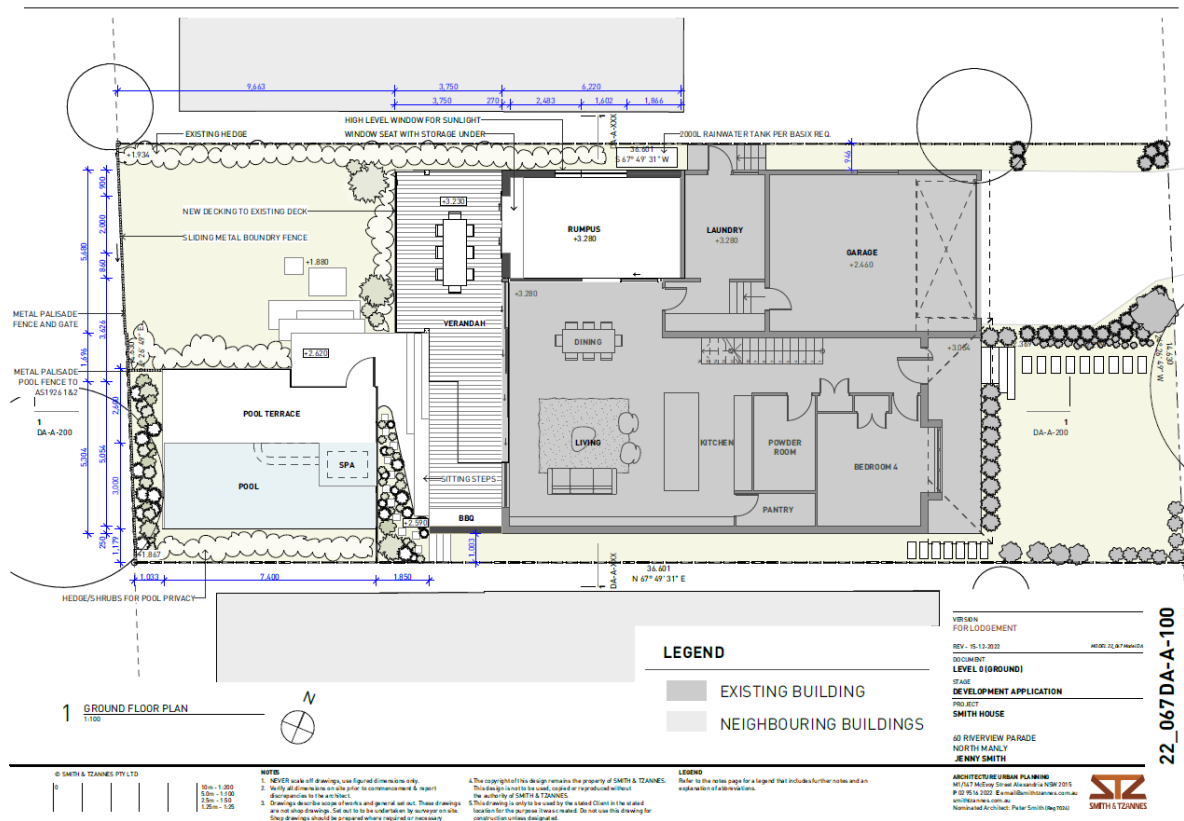
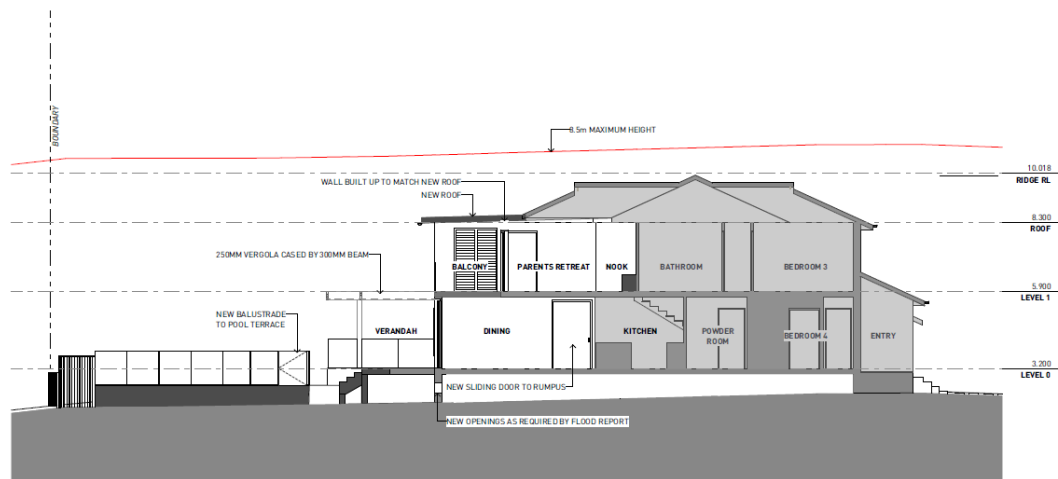


Figure 3 Site Plan of Proposed Development



1 SECTION A
1:100

LEGEND

EXISTING BUILDING

VERSION
FOR LODGEMENT
REV: 15-10-2022
DRAWN BY: JENNY SMITH
SECTION A
STAGE
DEVELOPMENT APPLICATION
PROJECT
SMITH HOUSE
60 RIVERVIEW PARADE
NORTH MANLY
JENNY SMITH

22_067 DA-A-200

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NOTES

1. NEVER scale off drawings, use figured dimensions only.
2. Verify all dimensions on site prior to commencement & report discrepancies to the architect.
3. Drawings describe scope of works and general set out. These drawings are not shop drawings. Set out to be undertaken by competent on-site. Shop drawings should be prepared where required or necessary.

4. The copyright of this design remains the property of SMITH & TZANAKIS. This design is to be used, copied or reproduced without the authority of SMITH & TZANAKIS.
5. This drawing is to be used by the client in the stated location for the purpose intended. Do not use this drawing for construction unless designated.

LEGEND

Refer to the notes page for a legend that includes further notes and an explanation of abbreviations.

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Figure 4 Elevation showing Open Subfloor

4 Existing Flood Characteristics

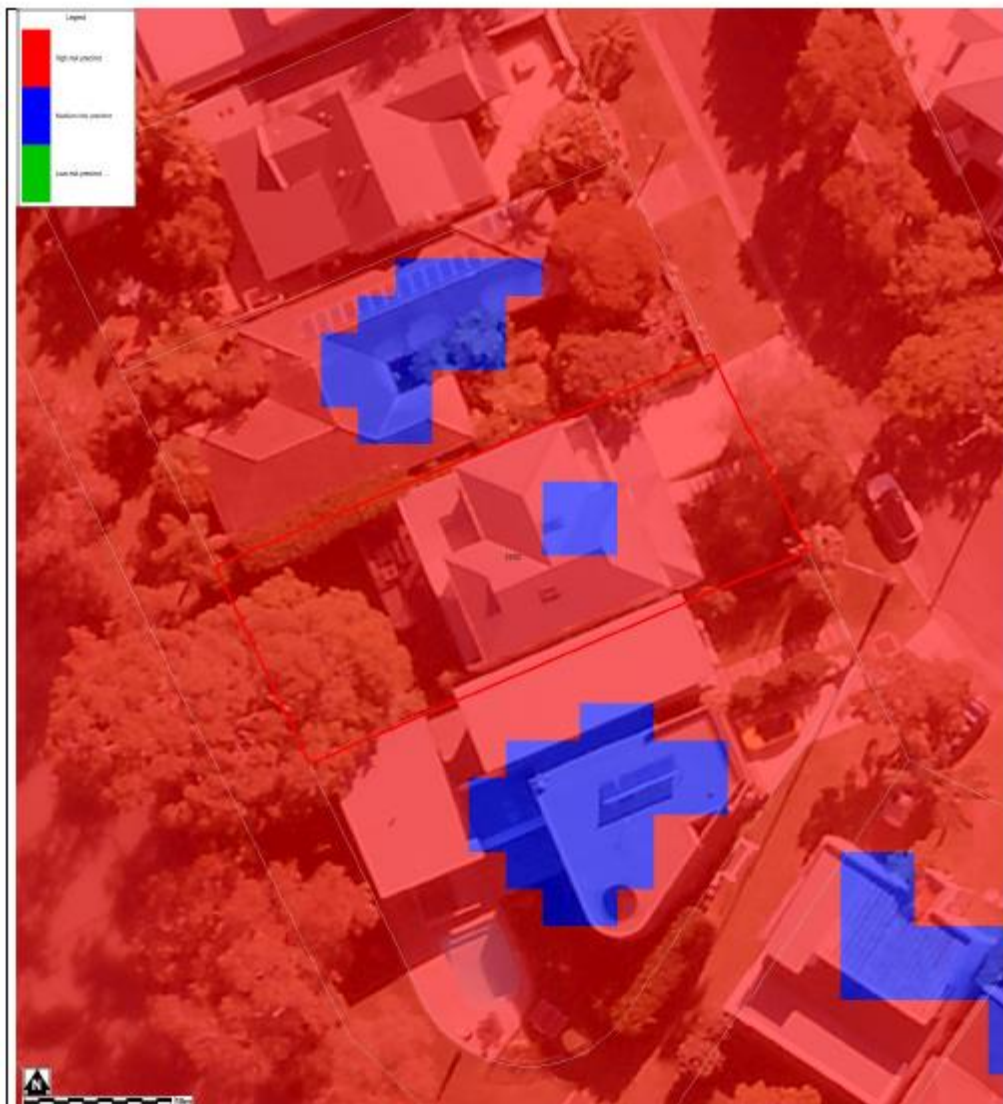
Council has advised that the proposed development site is affected by the flooding from Manly creek. Flood information at the development site provided by Northern Beaches Council is presented in Table 1 and Appendix A. Figures 5 and 6 show the flood risk precinct and flood life hazard map around the development site.

Table 1 Flood Information at the Development Site

Flood Characteristics	
Maximum Flood Planning Level (FPL)	3.65 m AHD
1% AEP Flood Level (Maximum)	3.16 m AHD
1% AEP Maximum Depth	1.54 m
1% AEP Maximum Velocity	0.57 m/s
Hydraulic Category	Flood Storage
PMF Level	5.65 m AHD
PMF Maximum Depth	4.04 m
PMF Velocity	0.74 m/s
Flood Risk Precinct	High
Flood Life Hazard Category	H5

(Source: Northern Beaches Council)

FLOOD MAP A: FLOOD RISK PRECINCT MAP



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.

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Figure 5 Flood Risk Precinct of the Development Site



Figure 6 Flood Life Hazard Map around the Development Site

5 Flood Related Development Controls

The proposed addition and alteration with swimming pool at No. 60 Riverview Parade, North Manly has been assessed against E11-Flood Prone Land: Warringah Development Control Plan 2011. The land use groups for the proposed development is 'Residential: Additions/ Alterations to residential dwelling'. The council has advised that the development site is a high flood risk prescient. A summary of compliance table is shown in Table 2. The assessments for the flood controls are presented below.

Table 2 Prescriptive Controls Compliance Table

SN	Performance Criteria	Compliance		
		Not Applicable	Yes	No
A	Flood effects caused by Development		√	
B	Drainage Infrastructure & Creek Works	√		
C	Building Components and Structural		√	
D	Storage of Goods		√	
E	Flood Emergency Response		√	
F	Floor Levels		√	
G	Car Parking	√		
H	Fencing		√	
I	Pools		√	

5.1 Flood Effects caused by Development

The proposed additions of Rumpus, Verandah and Pool Terrace will be constructed on the suspended slab system with void under the floor so that there will be no/negligible loss to a flood storage area. The proposed filling for the swimming pool will cause a flood storage loss. The flood storage loss due to filling of 592mm high swimming pool is estimated to 13.2 m³ (swimming pool area – 22 m² and filling height above the natural ground level – 592mm). Therefore it is recommended to cut 140mm at rear area under the proposed Rumpus area, Verandah and Pool Terrace area around 95 m² that provides additional storage of 13.3 m³. Figure 7 presents the recommended measure to compensate the flood storage loss. In addition to this, the pool fence shall be open type of fence so that there will be no obstruction to flood water and no loss of flood storage. In such case, there will be no adverse impact on the existing flooding behaviours due to the proposed additions and alterations.

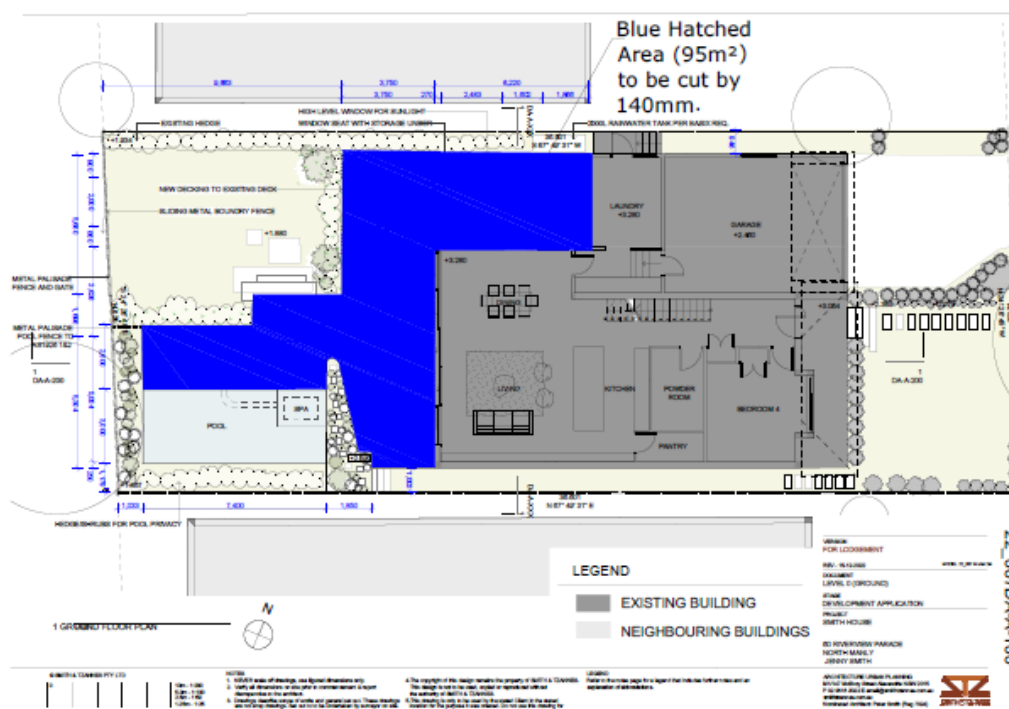


Figure 7 Recommended Measure to Compensate Flood Storage Loss

5.2 Building Components and Structural Soundness

All structural components to be constructed with flood compatible materials up to the flood planning level (3.65 m AHD). All new electrical equipment, power points, and wiring will be water proofed or installed above the flood planning level. All existing electrical equipment and power points located below the flood planning level within the subject structure must have residual current devices installed that turn off all electricity supply to the property when flood water are detected. Table 3 presents the flood compatible materials that can be used for the proposed development.

Table 3 Flood Compatible Materials

Building Component	Flood Compatible Materials	Building Component	Flood Compatible Materials
Flooring and Sub-floor Structure	- Concrete slab-on ground - Monolith construction - Suspended reinforced concrete slab	Doors	- Solid panel with water proof adhesives - Flush door with marine ply filled with closed cell foam - Painted metal construction - Aluminium or galvanised steel frame

Floor Covering	- Clay tiles - Concrete, precast or in situ - Concrete tiles - Epoxy, form in place - Mastic flooring, formed in-place - Rubber sheets or tiles with chemical-set adhesives - 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 and Ceiling Linings	- Fibro-cement board - 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
Wall Structure	- Solid brickwork, blockwork, reinforced concrete or mass concrete	Insulation Windows	- Foam (closed cell types) - Aluminium frame with stainless steel - Rollers or similar corrosion and water resistant material
Roofing Structure (for Situations where the Relevant Flood Level is Above the Ceiling)	- Reinforced concrete construction - Galvanised metal construction	Nails, Bolts, Hinges and Fittings	- Brass, nylon or stainless steel - Removable pin hinges - Hot dipped galvanised steel wire, nails or similar
Electrical and Mechanical Equipment For dwellings constructed on land, where this plan applies, mechanical and electrical materials, equipment and installation should conform to the following requirements.		Heating and Air Conditioning Systems Heating and air conditioning systems should be installed at levels above the relevant flood level, to the maximum height possible. If this is not feasible, care should be taken to minimise the potential damage caused by submersion according to the following guidelines.	
Main power supply The main commercial power service equipment, including metering equipment, shall be located above the relevant flood level, subject to the approval of the relevant authority. A provision for easily disconnecting the dwelling from the main power supply shall be supplied.		Fuel Gas or oil fuelled heating systems should have a manually operated valve, which is to be located in the fuel supply line, to enable fuel cut-off.	

Wiring All wiring, switches and power outlets should be located above the relevant flood level, to the maximum height possible. All electrical wiring, which is installed below the relevant flood level, should be suitable for continuous submergence in water, containing no fibrous components. Earth core linkage systems (or safety switches) are to be installed. Only submersible-type splices are to be used below the relevant flood level. All conducts, located below the relevant flood level, should be self-draining in the event of flooding.	Installation Heating equipment and fuel storage tanks should be mounted on and securely anchored to a footing of sufficient size, in order to withstand buoyancy and to prevent movement capable of damaging the fuel supply line. All storage tanks should be vented to a level 600 millimetres above the relevant flood level.
Equipment Equipment installed below/partially below the relevant flood level should contain a method of disconnection, by a single plug and socket assembly.	Ducting All ductwork, located below the relevant flood level, should have openings for drainage and cleaning. A grade may be introduced within ductwork in order to facilitate self-draining. In the case where ductwork passes through a water tight wall or a floor below the flood level, the ductwork should be covered by a closure assembly which is to be operated from above the flood level.
Reconnection In the event that an electrical device and/or part of the wiring is flooded, it should be thoroughly cleaned or replaced and checked by an approved electrician before reconnecting.	Ancillary Structures (steps, pergolas, etc.) Suitable water tolerant materials, such as masonry sealed hardwood and corrosive resistant metals, should be used. Copper Chrome Arsenate (CCA) treated timber is not a suitable material.

Structural Soundness

All structures to be designed and constructed to ensure structural integrity up to the flood planning level. Structural certification from the qualified engineer shall be provided confirming that the new structures including pool fence can withstand the forces of floodwater debris, wave action, buoyancy and immersion up to the flood planning level.

5.3 Floor Level

The floor level of the proposed addition (Rumpus Room) is proposed to RL 3.28 m AHD which is below than the Flood Planning Level which is 3.65 m AHD. As the proposed addition of rumpus (habitable room) is a one-off addition with floor area 24 m² (< 30m²) and it is an extension to the existing dining room. Moreover, the Flood Planning Level is incompatible with the floor levels of the existing room.

The floor level of the existing rooms, i.e. 3.28 m AHD are higher than the 1% AEP flood level (3.16 m AHD). This complies the council's requirements for the floor level.

The underfloor area of the proposed additions is designed with opening/void to allow clear passage of floodwater. At least 50% of the perimeter of the underfloor area is to be of an open design from the natural ground level up to the 1% AEP flood level. The proposed addition shall be constructed with suspended slab and pier system with opening underfloor area. This will help to maintain flood conveyance between the rear and the front of the property.

Note: There must not be any solid wall at sub floor and no items should be stored at the sub floor as this will reduce flood storage and obstructs flood water.

The proposed steps shall be open type so that there will be no obstruction to flood water passage.

5.4 Car Parking

The proposed development does not involves the construction of car parking area.

5.5 Flood Emergency Response

As 60 Riverview Parade, North Manly is affected by a mainstream flooding (Manly Creek) in the 1% AEP and large storm events, the occupant should be aware of Site Flood Emergency Response Plan. The primary objective of Flood Emergency Response Plan is the protection of life during flooding and a secondary purpose is to minimise damage to the dwelling. It is therefore, important that the residents of the site have adequate warning of a flooding event.

The development site is affected by the 1% AEP and large storm event and life hazard category is H5, the occupant of the premises should be aware of Site Flood Emergency Response Plan. The following table provides an outline of the site emergency response plan.

Table 4: Site Emergency Response Plan

Be Aware	- Relevant Flood levels at the site are: 1% AEP Flood Level – 3.16 m AHD - PMF Level – 5.65 m AHD - Flood Planning Level : 3.65 m AHD - Finished Ground Floor Level- 3.25 m AHD - Second Floor Level : 5.90 M AHD - Front Boundary Level- 2.08 to 2.11 m AHD - Rear Boundary Level- 1.91 m AHD - Add mobile phone number to the SES contact list for the issue of SMS alerts for severe weather warnings. - During prolonged or intense rainfall in Sydney region, 60 Riverview Parade, North Manly is prone to the flooding. - Develop your own Family Flood Plan and prepare an Emergency Kit. You should maintain the Emergency Kit containing important papers, emergency contact details, battery powered radio, spare batteries, torch, first aid kit, candles, waterproof matches, water proof bag for valuables and put them in water proof storage container and check regularly for use by dates and restock. - Consult the Council to determine the safer travel routes that are less likely to be cut by floodwaters. - A laminated cope of this flood plan should be permanently attached to the most visible place, and inside the electrical meter box.
Prior to an Imminent Flood	- When heavy storms or significant rainfall are forecast: - Visit Bureau of Meteorology or Mobile Apps for rainfall forecast and flood/severe warnings for this area. - Turn your radio/TV station to the local ABC station and social media for emergency broadcasts. - Relocate motor vehicles to a higher area with substantially less risk of flooding. - Stack any light items on benches and table placing electrical items on the top. - Relocate any items that may be damaged by water, poisons, chemicals and waste containers to a level as high as possible and secure objects that are likely to float and cause damage. - The flood free evacuation above the PMF is not available. Use the second floor level for a Shelter-in-place as this level is above PMF level. - Locate emergency kit. Gather medicines, special requirements for babies or elderly, fresh food and drinking water, mobiles phones ensuring fully charged, and valuables into one waterproof bag and add in your Emergency Kit and have it ready. - Place wet towels across the bottom and lower sides of external doors to slow down the entry of water through the door.
During Flood	- The existing finished floor level is RL 3.25 m AHD which is 0.09 m above the 1% AEP flood level. The second floor level is higher than the PMF level and can be used for on-site flood refuge. Stay within the premises (second floor) during flooding as much as practical as this is the safest option. - Keep eyes on flood level at Manly Creek. When flood level reaches to rear boundary, relocate valuables to second floor level or as high as possible. - If needed to leave the premises do so early in the flood event, before the flood depth reaches to 0.2m at the surrounding streets. Never drive, ride or walk through floodwater. - In case of a <u>medical emergency ring 000</u> as normal, but explain about the flooding. For emergency help in floods and storms call SES on 132 500. - Remain in the building until SES have contacted the occupants and further advice has been sought. - Keep listening to emergency radio broadcasts. - Follow advice of emergency services.
After a Flood	Never drive, ride or walk through floodwater. - Wait for flood water to reduce before leaving building. - Keep listening to emergency radio broadcasts. - Follow advice of emergency services - After floodwater have receded: - Take photographs of flood marks and damaged areas, and prepare insurance claim for damaged areas (subject to insurance terms). - When returning to your property, the structural stability of the dwelling should be inspected prior to entering. - Arrange for utilities to be inspected and repaired by qualified trades people. - Arrange for cleaning and repair of flood affected areas. - Restock and replace your emergency kit. - This flood response plan should be reviewed every 5 years, particularly with the potential flood level rise due to Climate Change.

5.6 Fencing

The proposed fencing at the property boundary and pool fence shall be open type fencing which complies council's requirement. It is recommended to provide 50% opening (minimum) to the boundary fence and pool fence and opening size should be a minimum of 75mm x 75mm.

5.7 Storage of Goods

No hazardous or potentially polluting materials shall be stored below the Flood Planning Level. Highly water susceptible goods, materials and other products to be located above the Flood Planning Level.

5.8 Pools

The flood storage loss due to the proposed filling for swimming pool is compensated with regrading the existing natural ground level. So there will be no loss of flood storage due to the proposed addition and alteration with pool.

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.

6 Conclusions and Recommendations

The impacts of proposed development (additions and alteration with swimming pool) at No. 60 Riverview Parade, North Manly on the existing flooding characteristics at the site and surroundings have been assessed in this study. This flood management report is primarily based on the flood information provided by council which is extracted from the Manly Lagoon Flood Study 2013, BMT WBM and other relevant documents.

The proposed additions of Rumpus, Verandah and Pool Terrace will be constructed on the suspended slab system with void under the floor so that there will be no/negligible loss to a flood storage area. The proposed filling for the swimming pool will cause a flood storage loss. The flood storage loss due to filling of 592mm high swimming pool is estimated to 13.2 m³ (swimming pool area – 22 m² and filling height above the natural ground level – 592mm). Therefore it is recommended to cut 140mm at rear area under the proposed Rumpus, Verandah and Pool Terrace area around 95m². Figure 7 presents the recommended measure to compensate the flood storage loss. In addition to this, the pool fence shall be open type of fence to that there will be no obstruction to flood water and no loss of flood storage. In such case, there will be no adverse impact on the existing flooding behaviours due to the proposed additions and alterations.

The proposed development is compliance with the requirements for a flood control lot provided that all development controls mentioned in section 5 are implemented.

Appendix A: Flood Information (Source: Northern Beaches Council)

FLOOD INFORMATION REPORT - BASIC

Property: 60 Riverview Parade NORTH MANLY NSW 2100

Lot DP: Lot 65 DP 12578

Issue Date: 14/11/2022

Flood Study Reference: Manly Lagoon Flood Study 2013, BMT WBM

Flood Information for lot ¹:

Flood Risk Precinct – See Map A

Flood Planning Area – See Map A

Maximum Flood Planning Level (FPL) ^{2, 3, 4}: 3.65 m AHD

1% AEP Flood – See Flood Map B

1% AEP Maximum Water Level ^{2, 3}: 3.16 m AHD

1% AEP Maximum Depth from natural ground level³: 1.54 m

1% AEP Maximum Velocity: 0.57 m/s

1% AEP Hydraulic Categorisation: N/A See Flood Map D

Probable Maximum Flood (PMF) – See Flood Map C

PMF Maximum Water Level ⁴: 5.65 m AHD

PMF Maximum Depth from natural ground level: 4.04 m

PMF Maximum Velocity: 0.74 m/s

Flood Life Hazard Category – See Map E

¹ The flood information does not take into account 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.

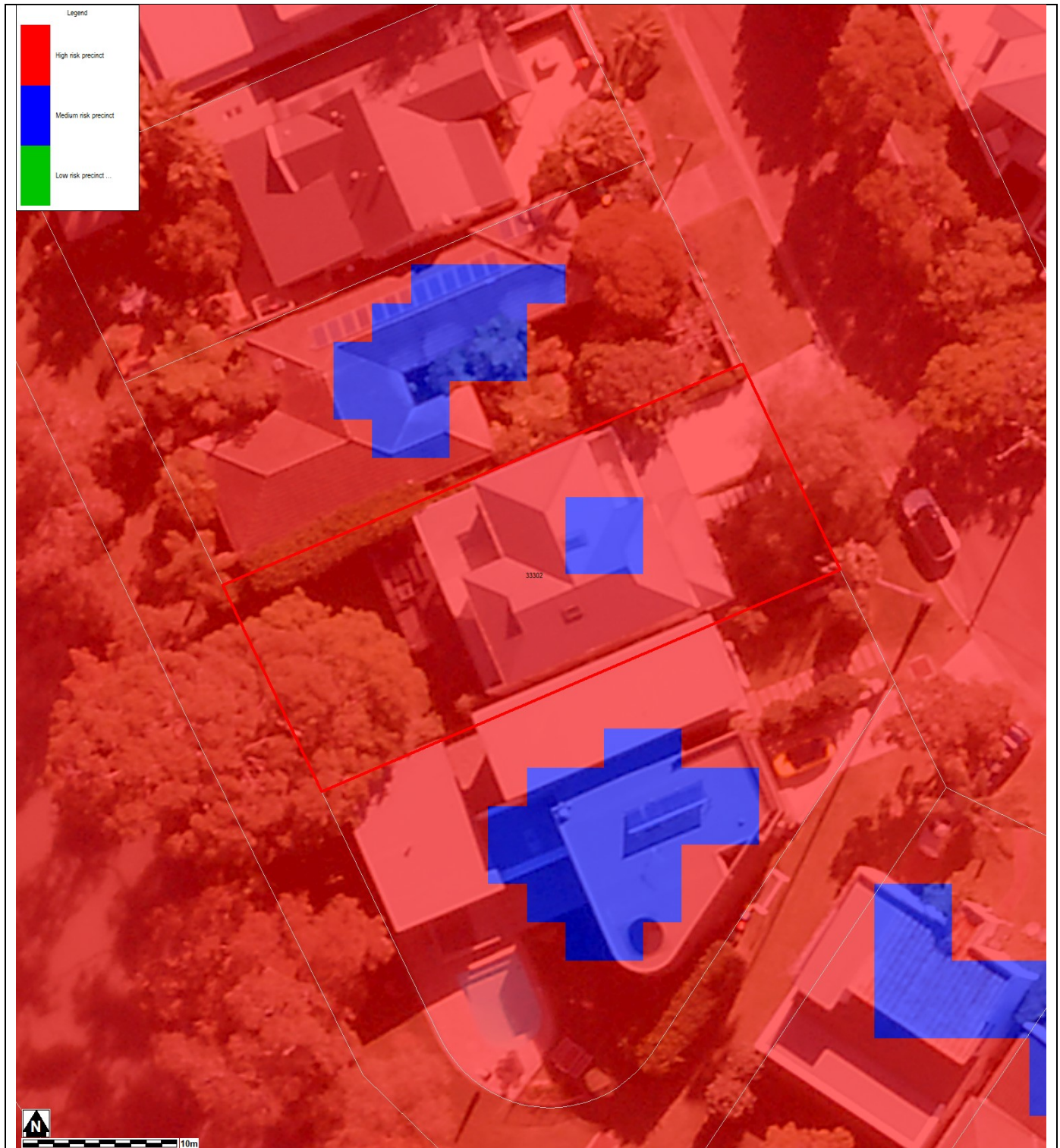
³ Intensification of development in the former Pittwater LGA requires the consideration of climate change impacts which may result in higher minimum floor levels.

⁴ Vulnerable/critical developments require higher minimum floor levels using the higher of the PMF or FPL.

General Notes:

- 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 website.

FLOOD MAP A: FLOOD RISK PRECINCT MAP



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.

FLOOD MAP B: FLOODING - 1% AEP EXTENT



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: Manly Lagoon Flood Study 2013, BMT WBM) and aerial photography (Source: NearMap 2014) are indicative only.

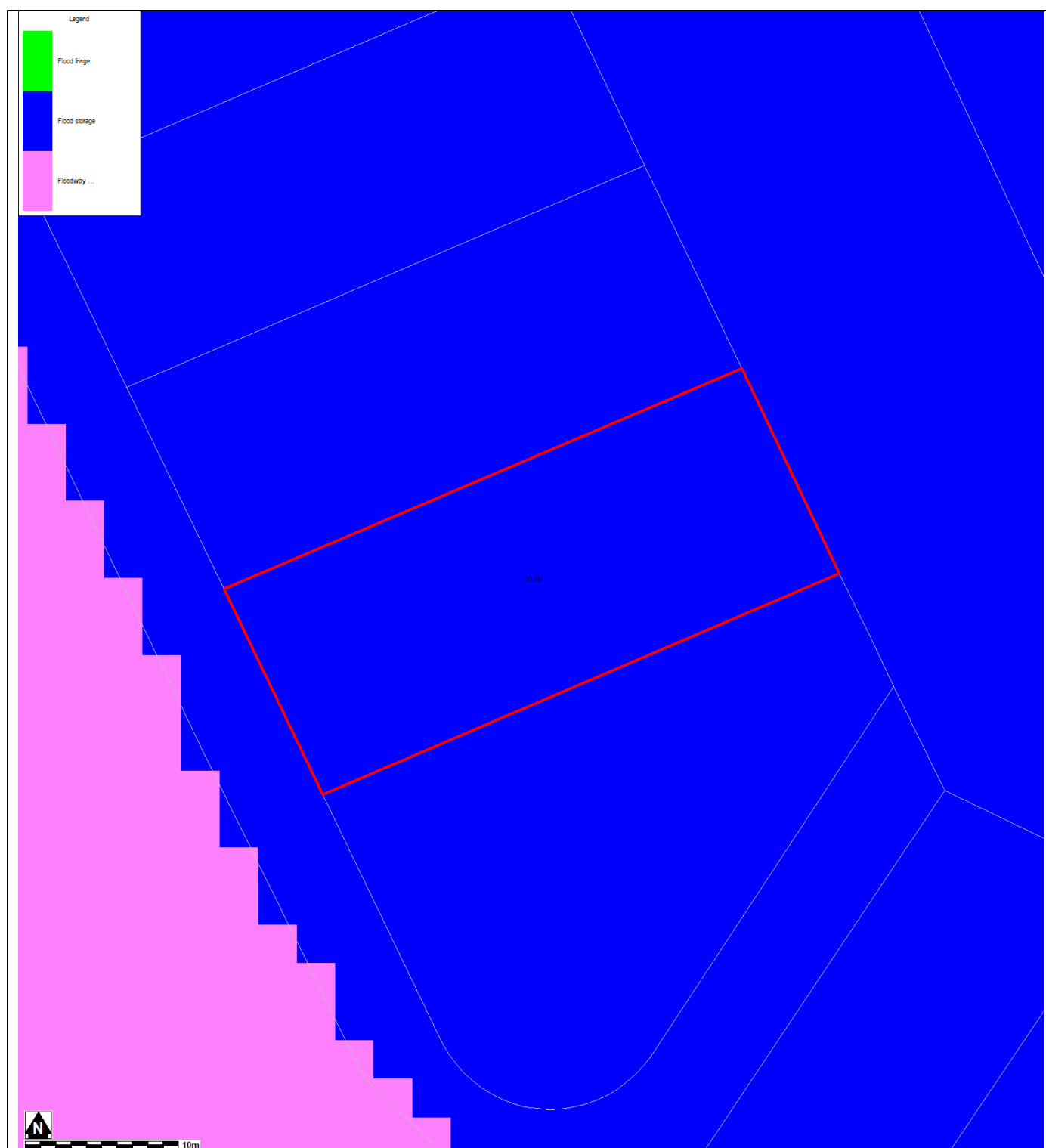
FLOOD MAP C: PROBABLE MAXIMUM FLOOD EXTENT



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: Manly Lagoon Flood Study 2013, BMT WBM) and aerial photography (Source: NearMap 2014) are indicative only.

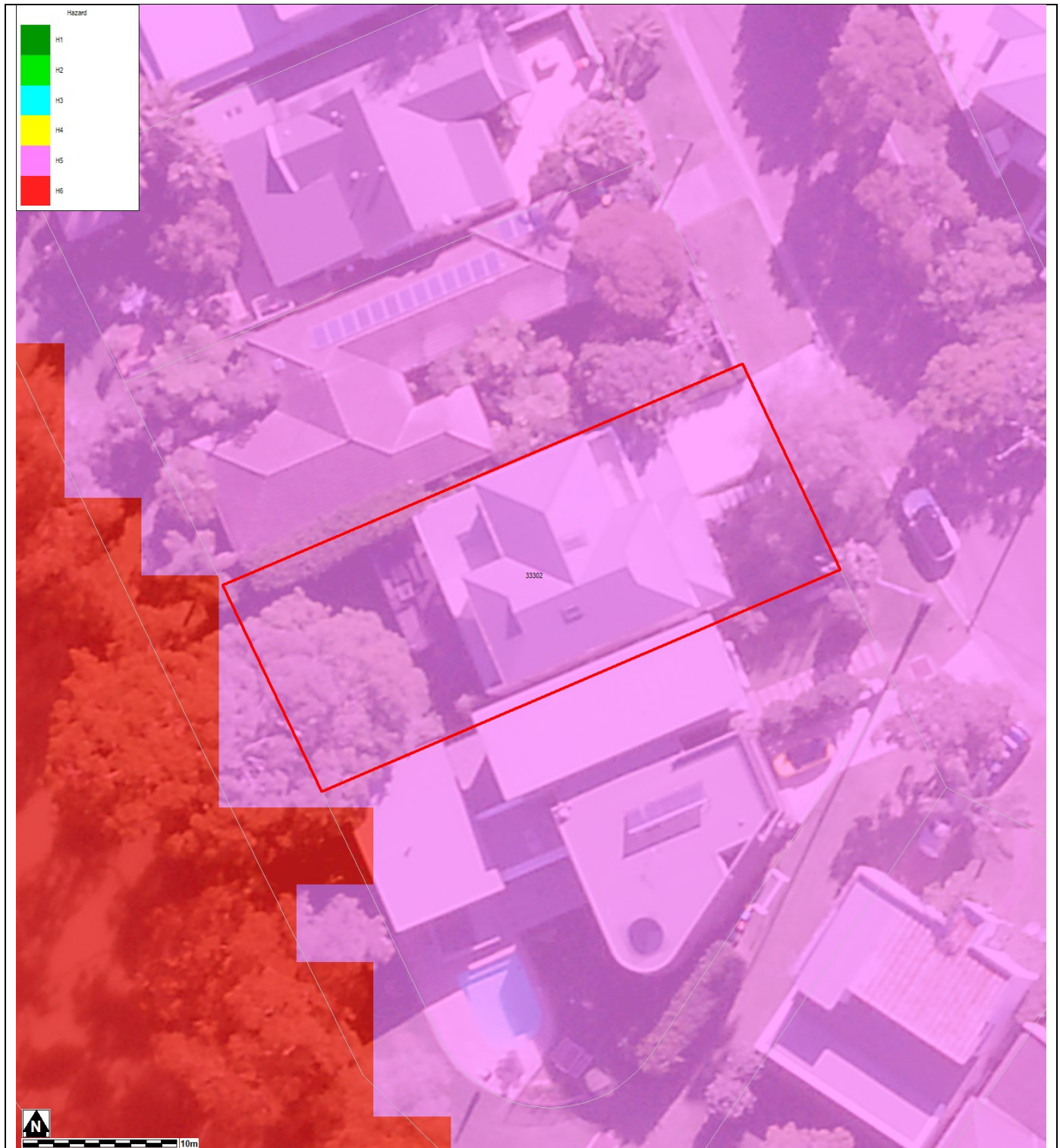
FLOOD MAP D: 1% AEP FLOOD HYDRAULIC CATEGORY EXTENT MAP



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: Manly Lagoon Flood Study 2013, BMT WBM) and aerial photography (Source: NearMap 2014) are indicative only.

FLOOD MAP E: FLOOD LIFE HAZARD CATEGORY



Notes:

- Cadastre Lines (Source: NSW Government Land and Property Information), flood levels/extents (Source: Manly Lagoon Flood Study 2013, BMT WBM) and aerial photography (Source: NearMap 2014) are indicative only.

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) – 6.3 Flood Planning	Manly DCP (2013) – 5.4.3 Flood Prone Land
Warringah LEP (2011) – 6.3 Flood Planning Warringah LEP (2000) – 47 Flood Affected Land *	Warringah DCP (2011) – E11 Flood Prone Land
Pittwater LEP (2014) – 7.3 Flood Planning Pittwater LEP (2014) – 7.4 Flood Risk Management	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. 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 floor level is above the Probable Maximum Flood level
- 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 .