

Our Job Number: 250302

16 May 2025

Attn: Mona Vale Central Pty Ltd

c/- Walsh Architects: Michael Hatch michael@walsharchitects.com.au

STORMWATER CONCEPT DESIGN STATEMENT

RE: STORMWATER MANAGEMENT PLANS FOR A PROPOSED RESIDENTIAL DEVELOPMENT WITH BASEMENT CARPARK AT 94-96 PARK STREET AND 4 KUNARI PLACE, MONA VALE NSW

At the request of Mona Vale Central Pty Ltd, RTS Civil Consulting Engineers Pty Ltd was engaged to prepare a stormwater management plan for the proposed new residential development with basement carpark at 94-96 Park Street and 4 Kunari Place Mona Vale. The stormwater management plans are referenced below:

- SW001A - COVERPAGE, NOTES & CALCULATIONS SHEET 1 OF 2
- SW002A - COVERPAGE, NOTES & CALCULATIONS SHEET 2 OF 2
- SE100A - SEDIMENT & EROSION CONTROL PLAN
- SE200A - SEDIMENT & EROSION CONTROL PLAN DETAILS
- SW100A - BASEMENT 2 STORMWATER MANAGEMENT PLAN
- SW101A - BASEMENT 1 STORMWATER MANAGEMENT PLAN
- SW102A - LEVEL 2 STORMWATER MANAGEMENT PLAN
- SW103A - SITE STORMWATER CATCHMENT PLAN
- SW200A - STORMWATER DRAINAGE DETAILS SHEET 1 OF 3
- SW201A - STORMWATER DRAINAGE DETAILS SHEET 2 OF 3
- SW202A - STORMWATER DRAINAGE DETAILS SHEET 3 OF 3

The designed stormwater management plans (referenced above) are in general accordance with the intent of the Building Code of Australia, Australian Standards AS3500.3 – Stormwater Drainage, the National Construction Code, Australian Rainfall & Runoff, Northern Beaches Council Council's Water Management Policy (2021), and discussions with Council engineers.

Below is a summary of the stormwater requirements and recommendations:

1. The subject site is described as 94 Park Street (Lot 42 DP11108), 96 Park Street (Lot 2 DP222636), and 4 Kunari Place (Lot 13 DP2226681), Mona Vale.
 - a. The combined development site area is approximately 3,071m².
 - b. The development site is an irregular shaped block situated on the north side of Park Street and the east side of Kunari Place within gentle north-west dipping topography. The survey indicates ground surface levels within the site vary from a high of RL 12.25m AHD along the southern boundary to a low of RL 3.39m AHD at the north-east corner.

- c. The existing sites contain attached single and double storey houses, inground swimming pools and internal concrete driveways.
2. There currently is an existing kerb inlet pit fronting both 94 Park Street and 4 Kunari Place, Mona Vale. These pits are the first pits of two separate existing 375mm diameter Reinforced Concrete Pipes (RFC) Council drainage pipelines draining to separate upstream catchments. See Figure 1.0 for details.
 - a. 94 Park Street is currently draining to Kunari Place kerb via an existing established drainage easement and pipe.
 - b. 94 Park Street is currently draining to Kunari Place kerb.
 - c. 4 Kunari Place is currently draining to Kunari Place kerb.
 - d. It is proposed to connect to the existing kerb inlet pit fronting 4 Kunari Place, which maintains the existing development drainage regime.
3. Although the site is not flood affected, Kunari Place is impacted by overland flooding for the 1% AEP and PMF storm events. Refer attached Council supplied Flood Information Report.
 - a. The basement entrance to the carpark has been designed to above the predicted PMF levels in Kunari Place.
4. Onsite Stormwater Detention (OSD) is required according to Appendix 16 of Council's Water Management for Development Policy. However, the proposed development site is situated at the downstream end of the local catchment and is directly adjacent to a known flood-affected area associated with Cahill Creek. Given this context, the site does not contribute to upstream flow attenuation, and the introduction of OSD would provide no meaningful flood mitigation benefit. In fact, delaying flows via detention could worsen peak flood conditions in the immediately adjacent low-lying areas by releasing flows during critical flood periods.
 - a. This approach is consistent with the principles outlined in the Northern Beaches Council Stormwater Management Policy, which allows for the waiver of OSD requirements where:
 - i. The site is located at the downstream extent of a catchment.
 - ii. OSD would not provide a net benefit to downstream flood risk.
 - iii. Immediate discharge is hydraulically preferable to avoid coinciding with peak flood events.
 - b. Hydraulic analysis confirms that OSD delays site discharge, resulting in a detrimental alignment with downstream flood peaks, contrary to best flood management practices. Refer to Figure 2.0 for hydrograph comparisons from the McCarrs Creek, Mona Vale and Bayview Flood Study (2017).
5. Water Sensitive Urban Design (WSUD) is required to ensure the stormwater quality targets are achieved according to Section 2.2.1 of Council's WSUD & MUSIC Modelling Guidelines.
 - a. The computer program MUSIC was used to model the water quality requirements.

Figures 3.0 and 4.0 of this report displays the MUSIC model calculations which indicate the proposed development meets the stormwater pollutant reduction targets required by Council.

- b. The rainwater tank system and Stormwater Quality Improvement Devices (SQID) located within three associated pits will achieve the Council targets on the treatment train.
 - c. The SQID's proposed to treat the development size, in addition to the rainwater harvesting tanks (16,000L in total), are either:
 - i. 3 x SPEL Stormsacks (by Atlan) located within grated pits and 3 x off SPEL Filters (EMC-45 filters by Atlan) within an 1800 x 1800 pit with 900 x 900 access grate
OR
 - ii. 3 x OceanGuard200um (by Ocean Protect) located within grated pits and 1 x Stormfilter (690Psorb cartridge by Ocean Protect) within an 1800 x 1800 pit with 900 x 900 access grate.
OR
 - iii. Equivalent approved devices.
6. Although there is no Council rainwater harvesting requirement, the development is expected to be required by BASIX to provide a rainwater harvesting system.
- a. A minimum volume of 10,000L of rainwater harvesting is required according to the BASIX certificate.
 - b. The rainwater tank system shall provide for the in accordance with the requirements of the BASIX certificate, Sydney Water and AS3500.3.
 - c. The tanks are to be watertight in accordance with HB 230-2008 Rainwater Tank Design and Installation Handbook of Australia.
 - d. The rainwater harvesting system is to overflow into the adjacent site drainage system directed to the relevant downstream SQID's.
 - e. A total of 16,000L rainwater harvesting volume has been provided.
7. A 9,000L minimum volume pump-out tank with 2 x 10 L/s pumps are required to comply based on the following requirements:
- i. The geotechnical investigation prepared by Crozier Geotechnical Consultants (Report No. 2025-047, dated May 2025) has identified minor groundwater seepage conditions at the site. Based on the report, total seepage inflows during and post-excavation are estimated to be less than 3 L/min. Accordingly, basement drainage infrastructure has been designed to accommodate this minor inflow without the need for significant dewatering systems or tanking. A drained basement solution is considered appropriate, subject to confirmation during detailed design and construction phases.
 - ii. The pump-out system has been designed in accordance with AS3500.3 and Council requirements.

- iii. The pump-out system is to comprise of two (2) submersible type pumps. The two pumps are to be designed and installed to work on an alternative basis to ensure both pumps receive equal use and neither remains continuously idle.
- iv. Each pump shall have a minimum capacity of 10L/s or shall be based on the flow rate generated from a 1% AEP 2-hour duration storm event of the area of the basement that is draining into the system, whichever is greater.
- v. An alarm warning device (including signage and flashing strobe light) shall be provided for the pump-out system to advise the occupant of pump failure. The location of the signage and flashing strobe light shall be shown on the stormwater management plans.
- vi. The volume of the pump-out tank shall be designed with a minimum storage capacity equivalent to the runoff volume generated from of the area of the ramp that is draining into the tank for a 1% AEP 2-hour duration storm event as well as potential basement seepage waters.
- vii. Backflow prevention devices and measures shall be provided to the outlet of the pump-out system to minimise or eliminate the risk of backflows into the basement.

We trust that this design statement and the accompanying stormwater management documentation comprehensively address the site-specific considerations and Council's policy objectives. Given the site's downstream catchment location, proximity to known flood-affected areas, and the demonstrated hydraulic detriment of OSD, we respectfully request that Council formally waive the requirement for OSD in accordance with its Stormwater Management Policy.

Should any further clarification or supporting information be required, including provision of the DRAINS or MUSIC model files, please do not hesitate to contact the undersigned.

Yours sincerely

RTS CIVIL CONSULTING ENGINEERS PTY LTD



Rhys Mikhail

Director | Principal Engineer | Design Practitioner
BEng (Civil) Hons MIEAust CPEng NER RPEQ APEC IntPE(Aus)

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Treatment Train Effectiveness - LPOD 85/65/45

	Sources	Residual Load	% Reduction
Flow (ML/yr)	2.33	1.89	19
Total Suspended Solids (kg/yr)	236	28.5	87.9
Total Phosphorus (kg/yr)	0.529	0.17	67.9
Total Nitrogen (kg/yr)	4.86	1.83	62.3
Gross Pollutants (kg/yr)	47.4	0	100

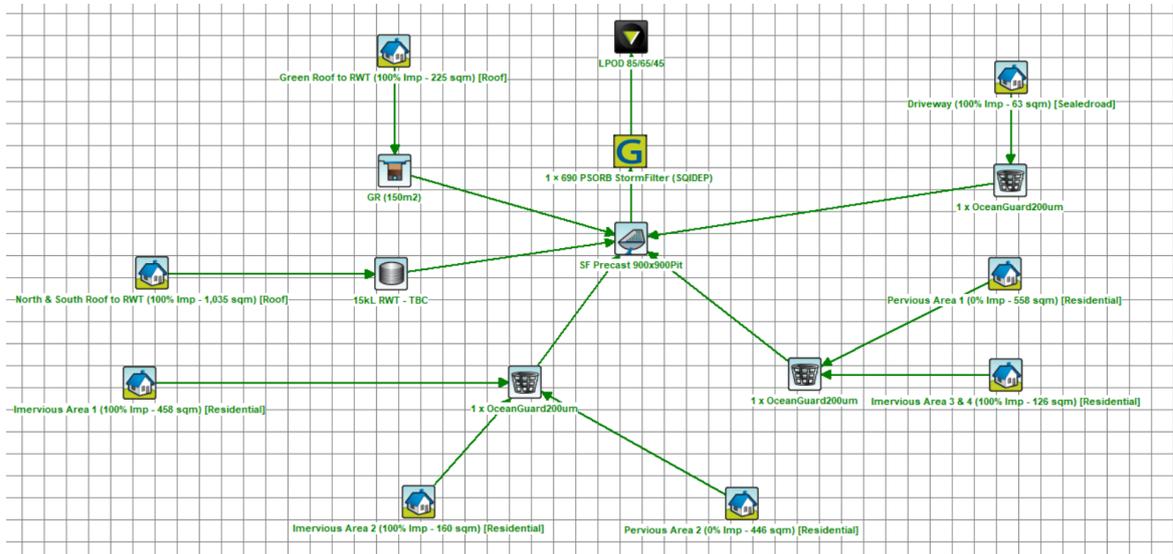


Figure 3.0 - Calculation Summary of the Development MUSIC Model (Ocean Protect)

Treatment Train Effectiveness - LPOD 85/65/45

	Sources	Residual Load	% Reduction
Flow (ML/yr)	2.29	1.84	19.4
Total Suspended Solids (kg/yr)	264	37.4	85.9
Total Phosphorus (kg/yr)	0.545	0.0927	83
Total Nitrogen (kg/yr)	4.94	1.39	71.8
Gross Pollutants (kg/yr)	47.4	0	100

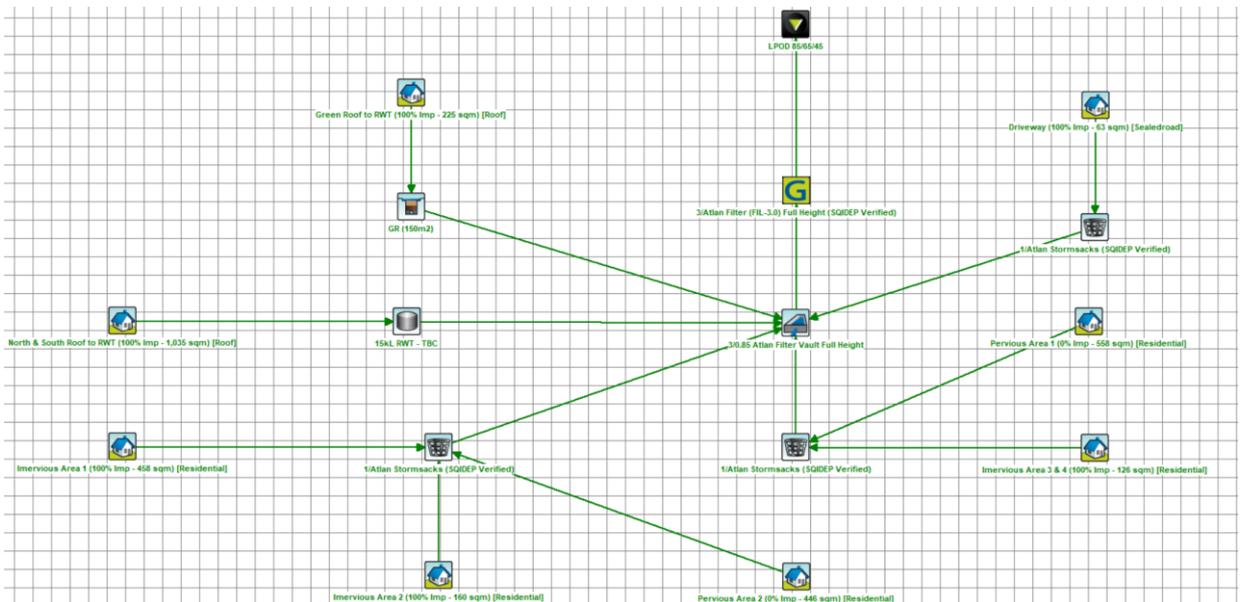


Figure 4.0 - Calculation Summary of the Development MUSIC Model (Atlan)

COMPREHENSIVE FLOOD INFORMATION REPORT

Property: , "163 Darley Street West MONA VALE NSW 2103", "167 Darley Street West MONA VALE NSW 2103", "3 Kunari Place MONA VALE NSW 2103", "4 Kunari Place MONA VALE NSW 2103", "5 Kunari Place MONA VALE NSW 2103", "6 Kunari Place MONA VALE NSW 2103", "7 Kunari Place MONA VALE NSW 2103", "8 Kunari Place MONA VALE NSW 2103", "9 Kunari Place MONA VALE NSW 2103", "90 Park Street MONA VALE NSW 2103", "92 Park Street MONA VALE NSW 2103", "94 Park Street MONA VALE NSW 2103", "96 Park Street MONA VALE NSW 2103"

Lot DP: , "Lot 1 DP 11108", "Lot 11 DP 226681", "Lot 12 DP 226681", "Lot 13 DP 226681", "Lot 2 DP 11108, Lot 3 DP 11108", "Lot 2 DP 222636", "Lot 3 DP 226681", "Lot 4 DP 226681", "Lot 40 DP 11108", "Lot 41 DP 11108", "Lot 42 DP 11108", "Lot 5 DP 226681", "Lot 6 DP 226681"

Issue Date: 24/03/2025

Flood Study Reference: McCarrs Creek, Mona Vale and Bayview Flood Study Review 2017, Royal HaskoningDHV

Flood Information¹:

Map A - Flood Risk Precincts

Maximum Flood Planning Level (FPL) ^{2, 3, 4}: N/A

Map B - 1% AEP Flood & Key Points

1% AEP Maximum Water Level ^{2, 3}: N/A

1% AEP Maximum Depth from natural ground level³: N/A

1% AEP Maximum Velocity: N/A

Map C - 1% AEP Hydraulic Categorisation

1% AEP Hydraulic Categorisation: N/A

Map D - Probable Maximum Flood

PMF Maximum Water Level (PMF) ⁴: N/A

PMF Maximum Depth from natural ground level: N/A

PMF Maximum Velocity: N/A

Map F - Flood Life Hazard Category in PMF

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

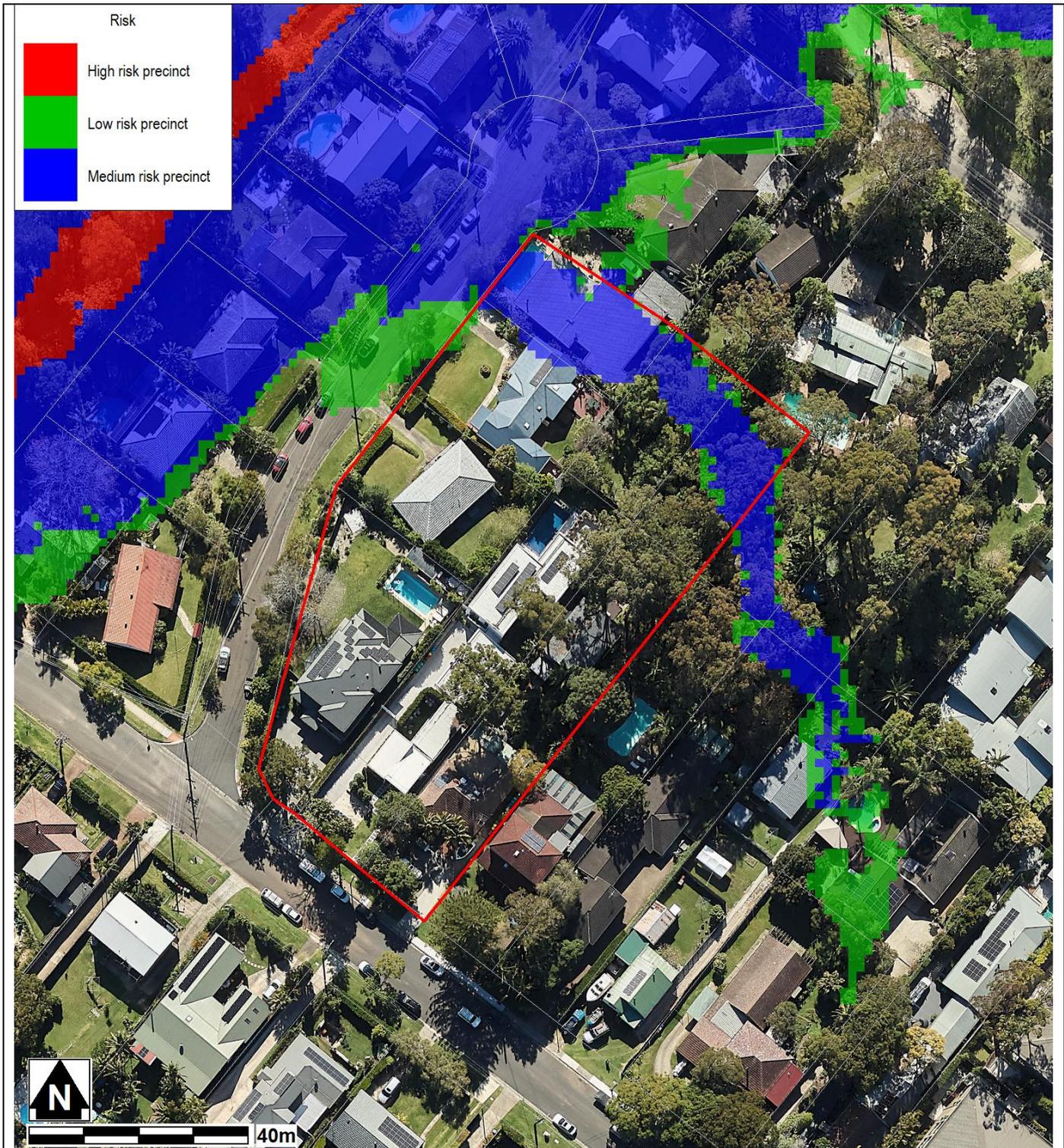
General

- 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 as the property (4 Kunari Place) is outside 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. The attached Flood Information Report together with this email would be sufficient.
- Unfortunately, climate change data is unavailable for this property.

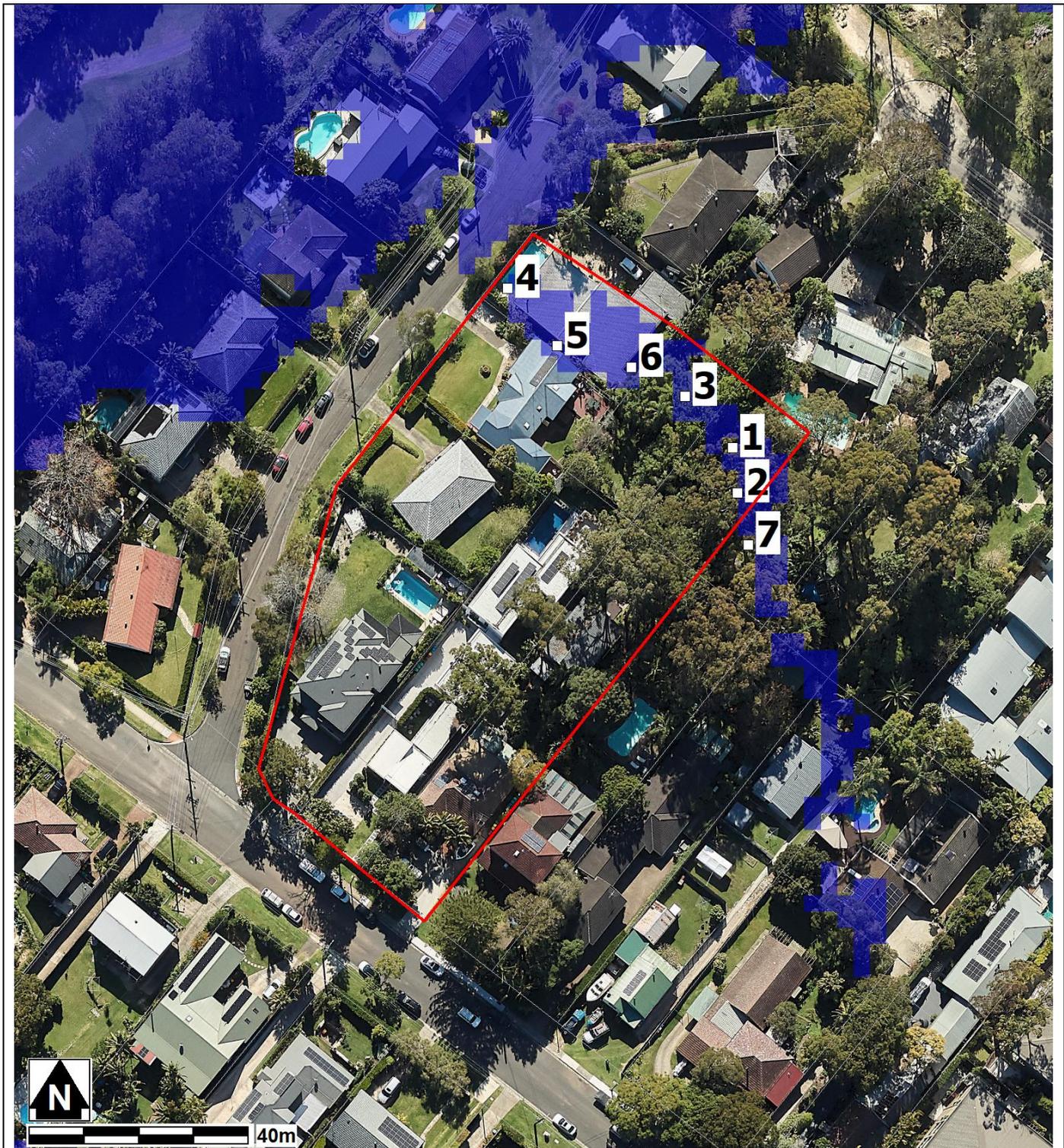
MAP A: FLOOD RISK PRECINCTS



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: McCarrs Creek, Mona Vale and Bayview Flood Study Review 2017, Royal HaskoningDHV) 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: McCarrs Creek, Mona Vale and Bayview Flood Study Review 2017, Royal HaskoningDHV) 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	6.50	N/A	N/A	7.00	6.71	0.31	0.77
2	N/A	N/A	7.03	N/A	N/A	7.53	7.19	0.22	0.27
3	5.09	0.23	5.12	0.25	0.37	5.62	5.28	0.41	0.66
4	N/A	N/A	3.23	N/A	N/A	3.73	3.17	0.40	1.24
5	3.57	0.29	3.60	0.32	0.28	4.10	3.77	0.49	0.41
6	3.75	0.44	3.79	0.48	0.24	4.29	3.98	0.67	0.48
7	N/A	N/A	7.58	N/A	N/A	8.08	7.75	0.23	0.35

WL – Water Level

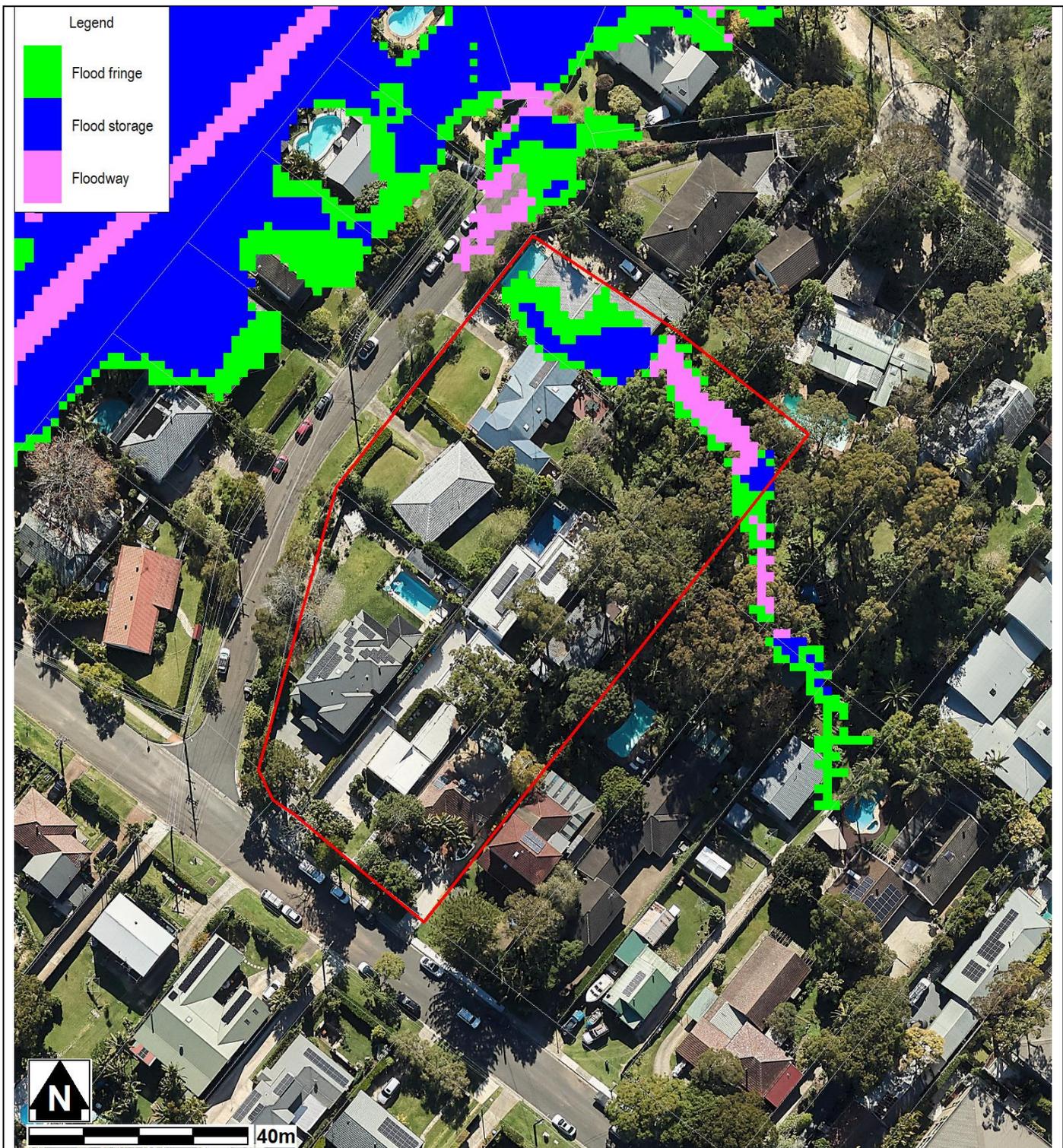
PMF – Probable Maximum Flood

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 0.3m²/s, a freeboard of 0.3m may be able to be justified for development.

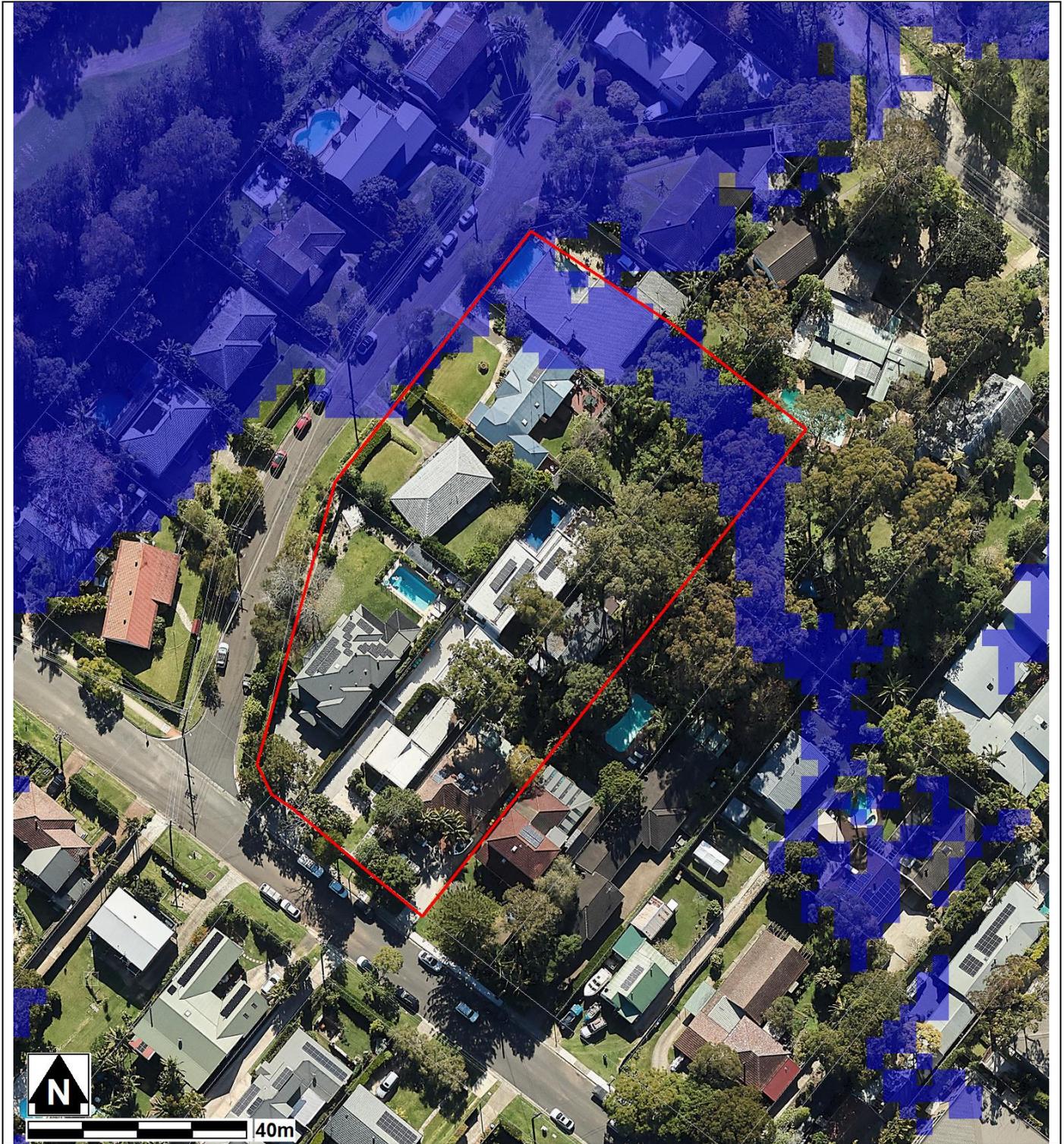
MAP C: 1% AEP FLOOD HYDRAULIC CATEGORY EXTENT MAP



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: McCarrs Creek, Mona Vale and Bayview Flood Study Review 2017, Royal HaskoningDHV) and aerial photography (Source: NearMap 2014) are indicative only

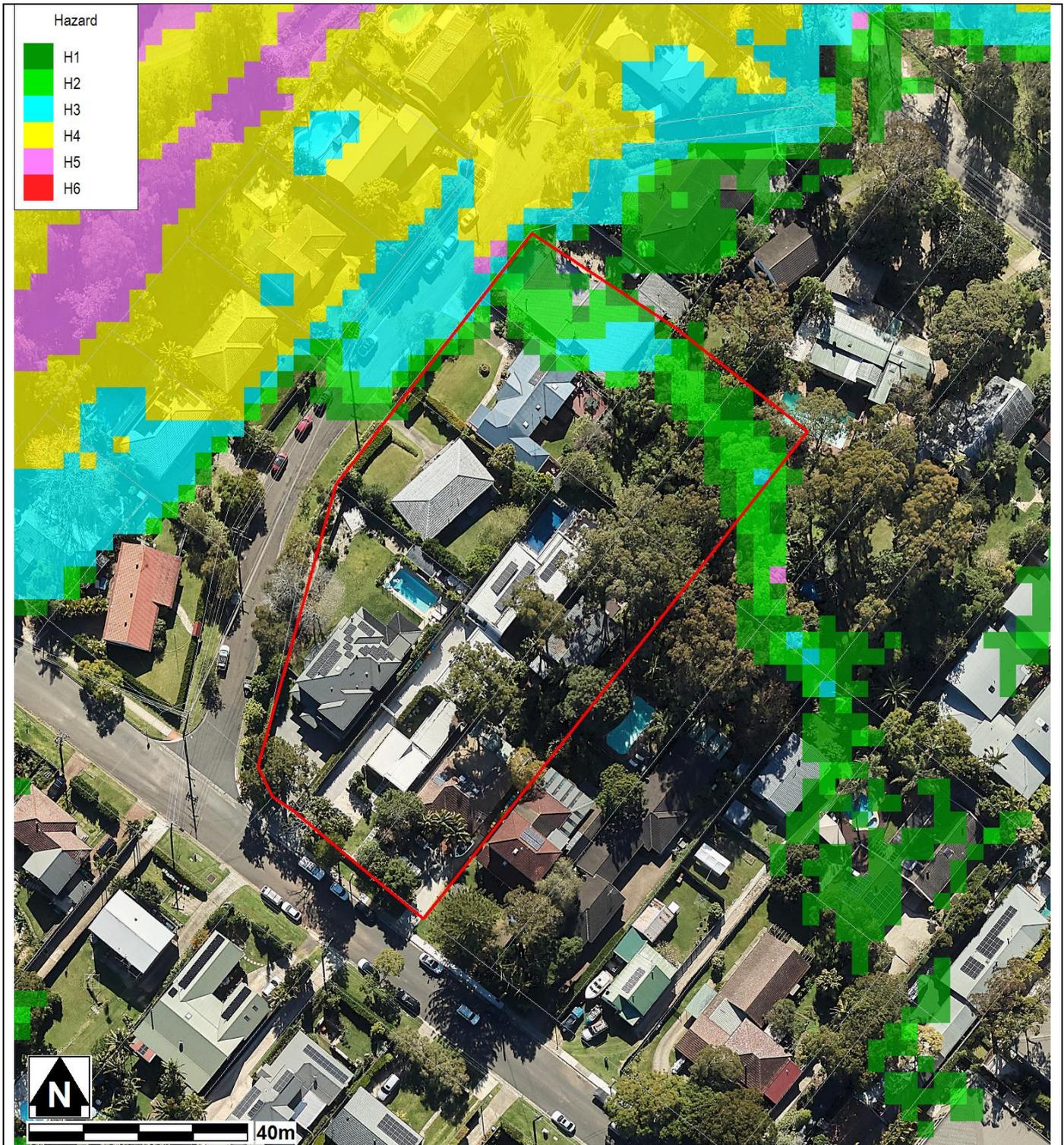
MAP D: PMF EXTENT MAP



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: McCarrs Creek, Mona Vale and Bayview Flood Study Review 2017, Royal HaskoningDHV) and aerial photography (Source: NearMap 2014) are indicative only

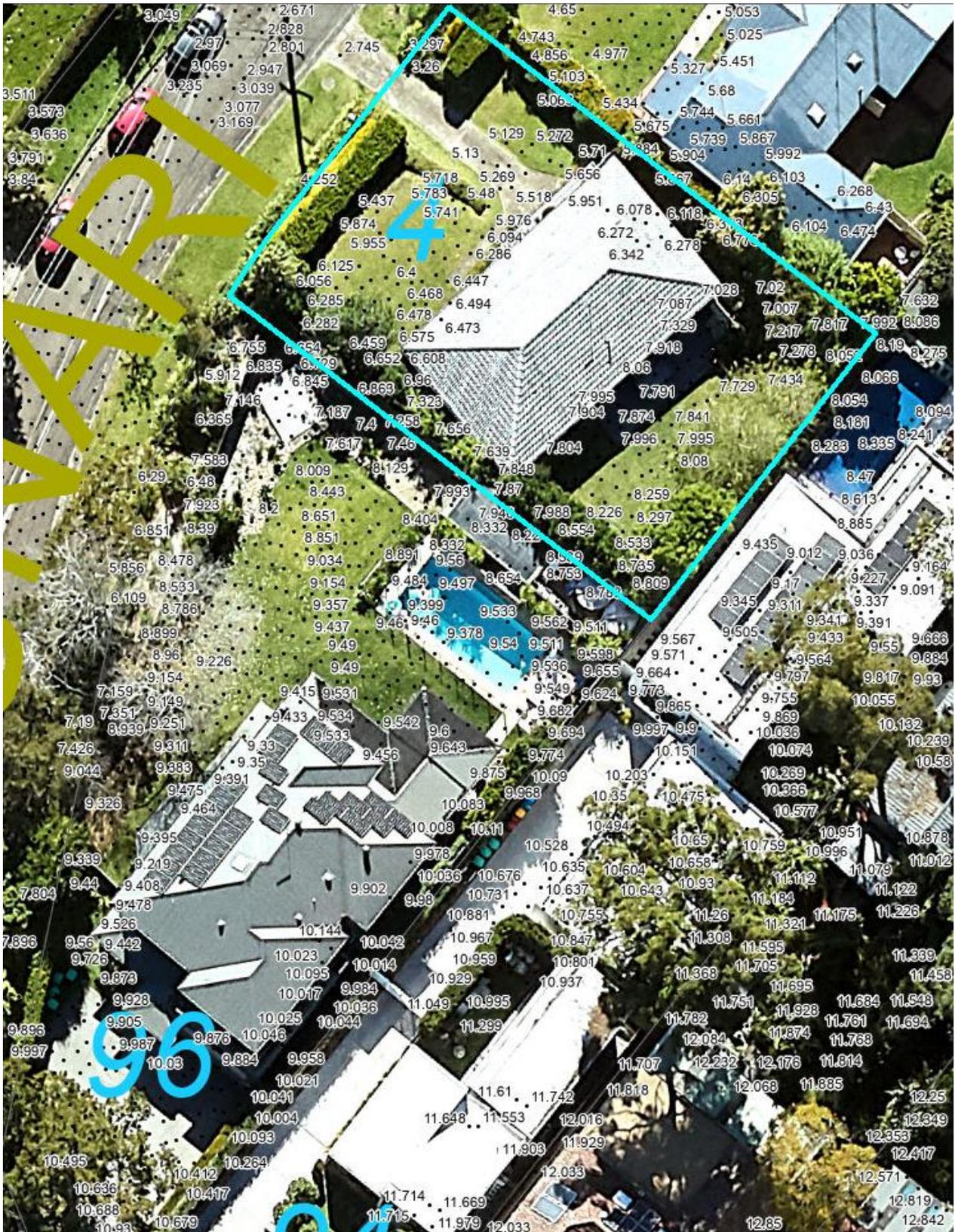
MAP F: FLOOD LIFE HAZARD CATEGORY IN PMF



Notes:

- Cadastre Lines (Source: NSW Government Land and Property Information), flood levels/extents (Source: McCarrs Creek, Mona Vale and Bayview Flood Study Review 2017, Royal HaskoningDHV) 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 .