FLOOD IMPACT &
RISK MANAGEMENT REPORT

for

Proposed Single Residential Development at

Lot A, DP 161572,
(H/No. 71) George Street,
AVALON BEACH

3 September 2019

Northern Beaches (Old Pittwater) Council
Our Job Number: D3817

Nasseri Associates
Civil, Hydraulic and Structural Engineering
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1. Introduction

Nasseri Associates has been commissioned to carry out a Flood Impact and Risk Management Report as part of the Development Application for the new two storey dwelling development at 71 George Street, Avalon Beach. Site inspection was carried out on 16 August 2019 to check Council's existing road drainage system and overall drainage pattern around the subject site (refer to section 11 for photos).

Figure 1: Aerial view of 71 George Street, Avalon Beach (SIX Maps, 2018)

The 690.10 m^2 site is located on southern side of George Street. The site is a corner block and situated between George Street and Joseph Street at Avalon Beach. The site contains an existing single residential dwelling and an existing garage on south-eastern side of the block at rear. Northern Beaches Council on their Flood Information Letter dated 6 December 2018 has indicated that this site is flood affected as per Avalon to Palm Beach Floodplain Risk Management Study and Plan, Manly Hydraulics Laboratory, 2017. Flood Impact and Risk Management Report should be provided in support of this development.

2. Available Information

- Section 10.7 Certificate from Northern Beaches Council dated 28 November 2018.
- Architectural Plans from Rawson Homes job no. A009118 issue C dated 12 August 2019 (Phone: 02 8765 5500). (Attachment 1).
- Detailed Survey Plan from Rawson Homes job no. A009118 issue C dated 12 August 2019 (Phone: 02 8765 5500). (Attachment 2).
- Flood Information Letter from Northern Beaches Council dated 6 December 2018 (Attachment 3).

The proposed development is considered as a residential development.

3. Flood Risk Precincts

Each of the floodplains within the local government area can be divided into precincts based on different levels of potential flood risk. The relevant Flood Risk Precincts (FRP's) for each of the floodplains are outlined below.

High Flood Risk Precinct - The high flood risk precinct is where high flood damages, potential risk to life and/or evacuation problems would be anticipated or where development would significantly or adversely alter flood behaviour. Development in this precinct requires detailed risk management strategies and careful design to reduce the risk to life and property to an acceptable level.

Medium Flood Risk Precinct - The medium risk precinct includes all land that is inundated by the 100 year ARI flood that is not classified as high risk. Areas on the edge of the identified 100 year ARI floodplain where the topography provides low hazard rated excavation routes (using the provisional hazard criteria published in Appendix L of the Floodplain Development Manual) would generally be classified as medium risk.

Low Flood Risk Precinct - In the low flood risk precinct the likelihood of damages, occurring from flooding, is low. This area can be identified as land within the floodplain that is above the 100 year ARI flood but below the extent of the PMF.

This site is within LOW to MEDIUM Flood Risk Precincts (Refer to Figure 2).

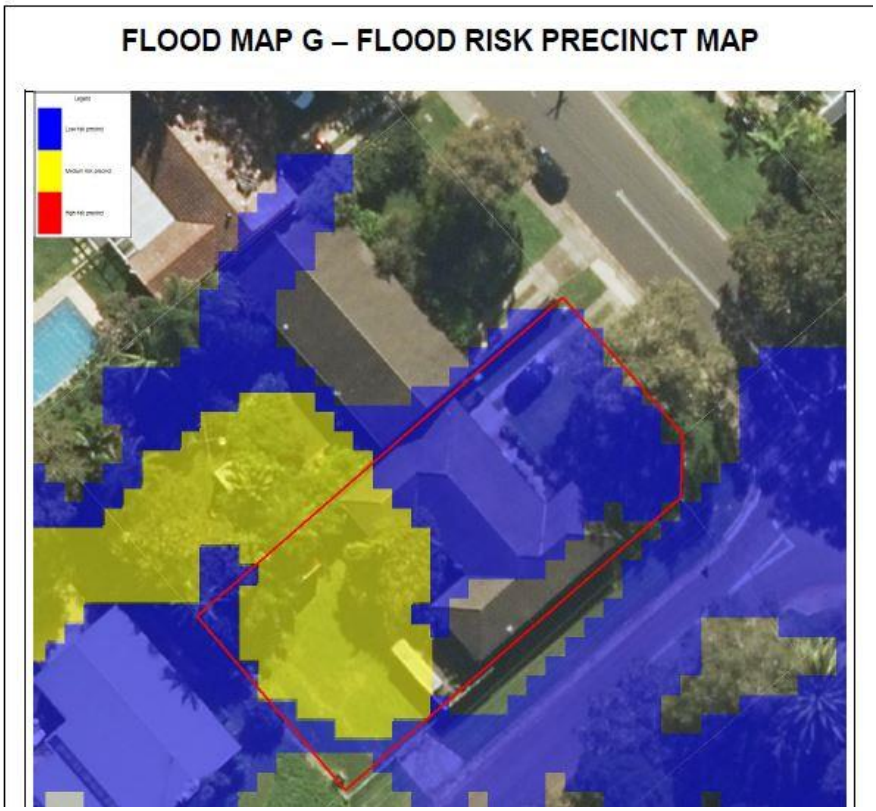


Figure 2: Map showing flood hazard level around the subject site and adjacent properties (From Flood Information Letter from Northern Beaches Council dated 6 December 2018).

4. Flood Study Information

The site is located on southern side of George Street. Northern Beaches Council on their Section 10.7 Certificate has indicated that the site is subject flood related development controls.

7A. Flood related development control Information

(1) Development on the land or part of the land for the purposes of dwelling houses, dual occupancies, multi dwelling housing or residential flat buildings (not including development for the purposes of group homes or seniors housing) is subject to flood related development controls.

(2) Development on the land or part of the land for any other purpose is subject to flood related development controls.

Figure 3: Part of Section 10.7 Certificate from Northern Beaches Council.

Flood Information for lot:

Flood Life Hazard Category – See Map A

1% AEP – See Flood Map B

1% AEP Maximum Water Level[3]: 4.88 mAHD

1% AEP Maximum Peak Depth from natural ground level[3]: 0.36 m

1% AEP Maximum Velocity: 0.53 m/s

1% AEP Provisional Flood Hazard: Low See Flood Map E

1% AEP Hydraulic Categorisation: Flood fringe See Flood Map F

Flood Planning Area – See Flood Map C

Flood Planning Level (FPL)[1,2, 3 &4]: 5.38 m AHD

Probable Maximum Flood (PMF) – See Flood Map D

PMF Maximum Water Level[2]: 5.159 m AHD

PMF Maximum Depth from natural ground level: 0.49 m

PMF Maximum Velocity: 1.71 m/s

Flood Risk Precinct – See Map K

Figure 4: Various flood related data from Council including flood levels (From Flood Information Letter from Northern Beaches Council dated 6 December 2018).

FLOOD MAP B: FLOODING - 1% AEP EXTENT

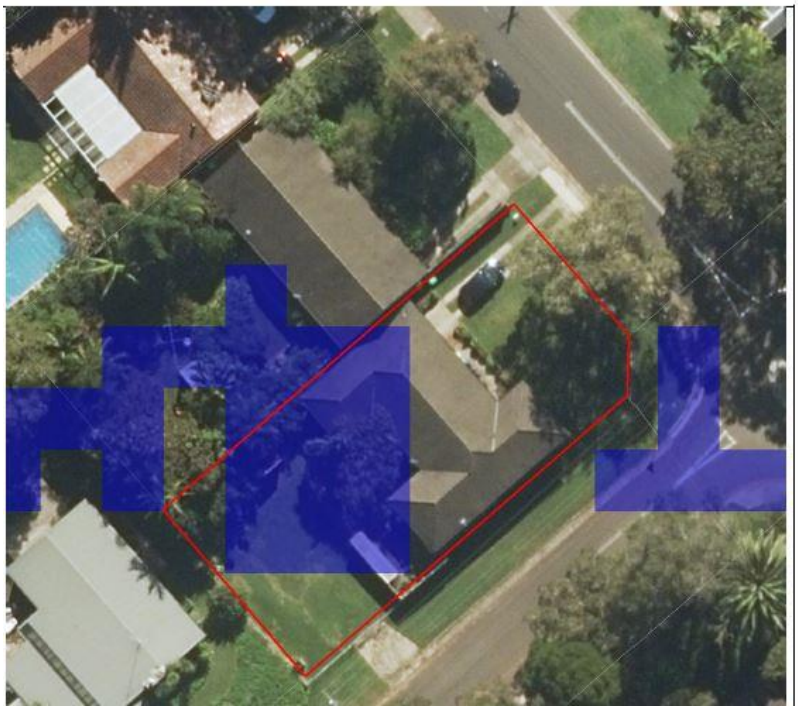


Figure 5: Map showing 1% AEP flood extent around the subject site and surrounding areas, mainly on south-western corner of the site (from Flood Information Letter from Northern Beaches Council dated 6 December 2018).

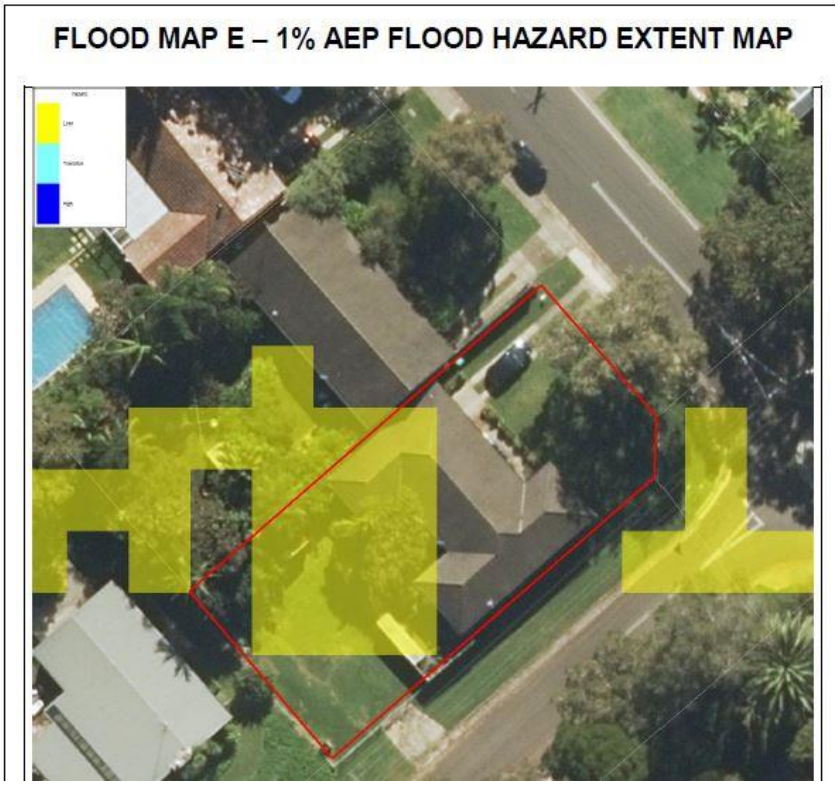


Figure 6: Map showing 1% AEP flood hazard extent around the subject site and surrounding areas (From Flood Information Letter from Northern Beaches Council dated 6 December 2018). This site is within low to medium hazard area.

It is evident from the architectural plans by Rawson Homes (attachment 2) that the proposed habitable **FFL 5.400 m AHD (flood level 4.88 m + 0.5 m freeboard = min. 5.38 m AHD)** and the non-habitable (garage) **FFL 4.900 m AHD (flood level 4.88 m + no freeboard = min. 4.88 m AHD)** are higher than the 1% AEP flood levels.

The proposed dwelling will be constructed on bearers and joists. The garage will have reinforced concrete slab.

The existing ground levels around this property are varied; RL 3.90 m AHD at George Street frontage, RL 4.24 m AHD at Joseph Street frontage on eastern side, RL 4.77 m AHD on western sideway and RL 4.44 m AHD at rear of the site.

The existing building and garage on side of the property will be removed. The site generally falls towards the eastern corner. There is an existing gully pit (at low point) on eastern corner in front of the property between the intersection of Joseph Street and George Street (refer to the photos section of the report below).

With the new development, the proposed western side has approximately 1720-mm open space for overland flow, while the eastern side has a minimum of 4130-mm open space to improve overland flow path. There are no permanent structures on both sideways of the proposed development to provide unobstructed overland flow path for excess stormwater runoff from upstream catchment. There are two aboveground RWT/OSD tanks behind the garage, at rear of the property, which will not obstruct any overland flow path around the subject site. The hydraulic design has provided overland flow paths on both eastern and western sides with no permanent structure to obstruct the flow.

The architectural plans by Rawson Homes (attachment 2) have adequately addressed the requirements in regards to levels and provided adequate space for overland flows.
The structure can withstand the forces of floodwater, debris and buoyancy and 100-year ARI flood event.

5. Flood Risk Management

The table below sets out the summary of flood information in reference to Northern Beaches Council's local Floodplain Risk management Policy, Council's Flood Studies and available information from the NSW Government Floodplain Management Manual.

Hazard Classification	**Site is flood affected (LOW to MEDIUM risk)**
1 in 20 year ARI flood level	N/A
1 in 100 year ARI flood level (1% AEP Flood Level)	**4.88m AHD**
Maximum PMF flood level	**5.159m AHD**
Average ground levels on site	RL 3.90 m AHD (Approximate) in northern side (front) RL 4.24m AHD (Approximate) on eastern sideway RL 4.44 m AHD (Approximate) on western sideway RL 4.77 m AHD (Approximate) at rear

Proposed Floor Level – Habitable Area	**Flood level 4.88 m AHD + 0.5 m Freeboard** **= Min. FFL 5.38 m AHD** **House FFL 5.400 m AHD**
Proposed Floor Level – Non-Habitable Area (Garage and Alfresco)	**Flood level 4.88 m AHD + no Freeboard** **= Min. FFL 4.88 m AHD** **Garage FFL 4.900 m AHD**
Flood storage	**Insignificant** The footprint of the existing building and proposed building are approximately similar and the set back on western side has been improved with the new development. The existing ground level in front and rear of the property remain unchanged. New development will provide adequate overland flow paths.
Impact on surrounding properties	**No Impact** - There will be no impact on surrounding properties due to no increase in flood levels and no reduction in flood storage.
Buoyancy	**Low**
Structural Soundness With the extreme flood event the proposed structural elements (concrete, timber, brick columns and beams) are able to fully withstand the force of flood water. The proposed dwelling is on bearers and joists. The garage is on reinforced concrete slab with DEB around.	
Building Components (Types of materials) All structures are to have flood compatible building components/ materials (e.g. concrete, timber, steel and brickwork).	
Management and Design Provide adequate overland flow paths at rear and on both side of the dwelling. Both sideways must be open and no permanent structures within these areas are allowed.	

6. Evacuation and Emergency Strategy

- Flood Characteristics

The property is situated within low flood risk precinct.

- Flood Warnings

Flood prediction services are provided by the Bureau of Meteorology and the State Emergency Service (SES) has the responsibility to issue flood warnings to the community, along with local information about the implications of flooding.

The State Emergency Service (SES) provides flood updates on the hour over local radio and TV stations. These warnings include:
- Expected flood peak;
- Road closures;
- Long term weather forecasts;
- Emergency advice.

- Preparations

Listen to the local radio and be prepared for an expected flood event. Emergency equipment and clothing:-

Wet weather clothing	Battery radio
Basic food stuffs	Torch
Prescription medicines	Spare batteries

- Evacuation Procedure

Upon flood warning advice indicating a flood event may impact on the property, all activities should immediately be discontinued to allow for sufficient time to evacuate and relocate to a safe area.

If flood warnings indicate severe flooding in the locality, it is important that occupants evacuate in time to ensure that any other location on the route has not been inundated by flood waters. The objective of timely evacuation ensures emergency personnel are not required to take undue risks providing assistance. The evacuation route would be advised at the time of warning through radio.

Floods in Avalon Beach are considered as "flash floods" and no warning system is available. During severe flooding, it may be advisable and safer for the residents to evacuate to higher ground (towards western side of George Street or southern side of Joseph Street or stay on the second storey of the dwelling). The flood levels in the area can rise and dissipate quickly.

- Notification

In an unlikely event that residents/occupants seek alternative accommodation, contact should be made to the local SES/police offices to avoid confusion as to people's safety and potential costly searches.

- Contacts Details

Contact Name	Contact Details
NSW SES Warringah-Pittwater Unit	Gate 3, Thompson Drive, Terrey Hills, NSW 2084 Phone: 132 500 http://www.ses.nsw.gov.au/
Mona Vale Police Station	1707 Pittwater Road, Mona Vale, NSW 2103 Phone: (02) 9998 0699
Avalon Public School	Old Barrenjoy Road, Avalon Beach, NSW 2107 Phone: (02) 9973 1439
Integral Energy	131061
Telstra	1800 687 629

Local Radio Stations	
2GB	Freq: 873am (02) 8570 0000
ABC	Freq: 702am (02) 8333 1500
Nova	Freq: 96.9fm (02) 9564 9999
2-Day FM	Freq: 104.1fm (02) 9375 1041
The Edge	Freq: 96.1fm (02) 9611 1961

7. Recommendations

In addition to the above-mentioned items, it is recommended that the following matters are considered as part of the development at **71 George Street, Avalon Beach:**

- The existing ground levels on eastern and western boundaries and street frontage of the property should remain unchanged, except the areas that has been mentioned on the architectural plans for to the construction of the dwelling.
- The existing ground levels at rear of the property should remain unchanged.
- In addition to ensuring that the dwelling is not inundated as a result of ponding from upstream flows, it is also necessary to ensure that there are sufficient waterway areas along the southern and northern side boundaries to carry overland flow away from the site.
- Gates and fences within the overland flow paths must be of lightweight and permeable to allow for the free flow of water. No permanent structure is allowed within the overland flow path to ensure an unobstructed overland flow for excess stormwater runoff from upstream catchment areas.
- No brick or other masonry type fence is allowed on the boundaries - fence to be replaced or altered to allow the conveyance of the flow through the site without obstructions. A gap of minimum 200-mm for front fences within the overland flow paths are required.
- With an adequate landscaping, retaining walls (if required) and required systems within the hydraulic design job no D3817 dated 3 September 2019, ensure no water pondage on the sideways and especially the front of the dwelling. During the heavy storms, the runoff from upstream properties will enter this property and it is up to the client to ensure the dwelling is well protected from excessive flows.

8. Declaration

The undersigned has no objection of supporting the above-mentioned development, as long as all the details mentioned above are to be followed accordingly (also refer to hydraulic plans from Nasseri Associates job No. D3817 dated 3 September 2019).

Please note that at the time of our site inspection, the dwelling was not constructed and according to the architectural plans from Rawson Homes, the final levels for the dwelling and the garage are as follows:

- FFL (Dwelling) = **5.400 m AHD**
- FFL (Garage) = **4.900 m AHD**

The undersigned certifies that the above-mentioned development is not being any of the following (Under the SEPP 2008 Regulation 3.5):

a) A flood storage area,
b) A floodway area,
c) A flow path,
d) A high hazard area,
e) A high risk area.

The attached Flood Impact and Risk Management Report is to be approved by either Northern Beaches Council or Principle Certifying Authority (PCA), prior to any works commencing on the site

J. NASSERI
BE, FIEAust.
NER, CPEng.

9. Attachments

- Architectural Plans from Rawson Homes job no. A009118 issue C dated 12 August 2019 (Phone: 02 8765 5500). (Attachment 1).
- Detailed Survey Plan from Rawson Homes job no. A009118 issue C dated 12 August 2019 (Phone: 02 8765 5500). (Attachment 2).
- Flood Information Letter from Northern Beaches Council dated 6 December 2018 (Attachment 3).

10. References

- Section 10.7 Certificate from Northern Beaches Council dated 28 November 2018.
- Northern Beaches (Pittwater Council) Development Control Plan (DCP)
- Avalon to Palm Beach Floodplain Risk Management Study and Plan, Manly Hydraulics Laboratory, 2017
- Institute of Engineers Australia (1987) Australian Rainfall and Runoff.
- NSW Floodplain Development Manual 2005
- Australian Standards

11. Site Investigation Photos (16.08.2019)

Photo 1: Front view of the property from George Street and Joseph Street intersection.

Photo 2: Closer look at the property from eastern corner. Existing house, grass area in front and part of kerb and gutter and lintel of existing gully pit in front can be seen.

Photo 3: Rear part of the existing house and back yard can be seen. This photo was taken from Joseph Street frontage.

Photo 4: The overall features on eastern side of the property can be seen. Part of existing house, existing steel mesh fencing, back yard, nature strip in front, existing vehicle crossing and part of Joseph Street can be seen.

Photo 5: Existing fencing at rear of the property can be seen.

Photo 6: Existing fencing on western side of the property at rear can be seen. Part of existing garage at rear and part backyard can also be seen.

Photo 7: Existing fencing on western side of the property (towards front) and western sideway can be seen.

Photo 8: Existing metal shed at rear can be seen. As per architectural plans from the builder, it will remain.

Photo 9: Existing garage at rear, part of existing house and existing grass area in backyard can be seen.

Photo 10: Eastern side of Joseph Street (towards George Street) next to the property in front can be seen. Part of existing vehicle crossing, nature strip, existing roll top kerb and vegetation can be seen.

Photo 11: Southern side of Joseph Street as seen from the property frontage. Existing vehicle crossing, electric pole, part of fencing on southern corner of the property and surrounding trees can be seen.

Photo 12: The intersecting roundabout between George Street and Joseph Street can be seen. This roundabout is exactly in front of the subject site. Eastern side of George Street can also be seen.

Photo 13: Western side of George Street can be seen.

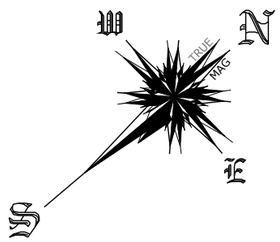
Photo 14: The existing gully pit in front of the property can be seen.

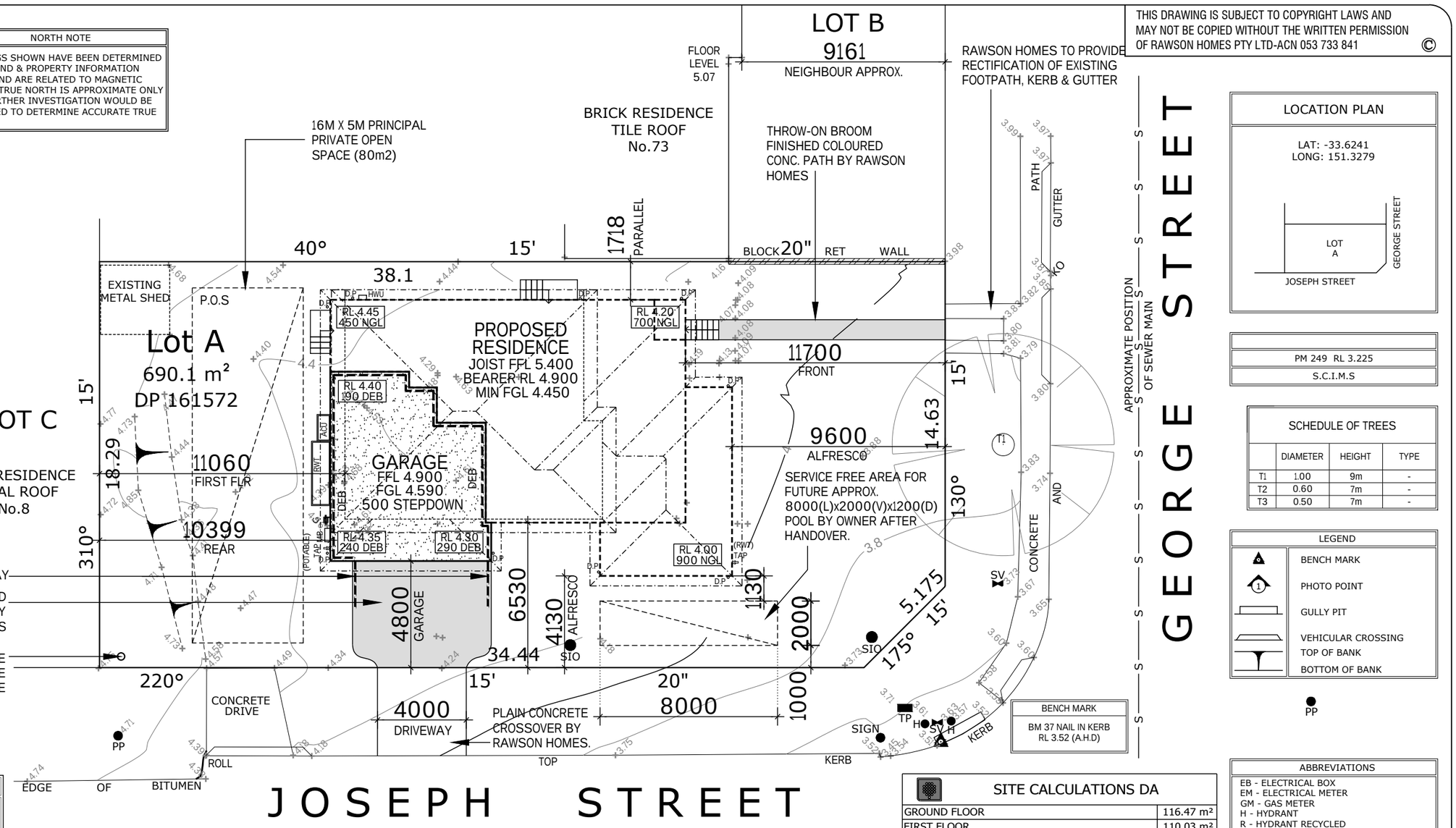
Photo 15: Existing 375 dia. RCP outlet pipe at the bottom of existing gully pit can be seen. This gully pit is approximately 520-mm deep from the grate.

Photo 16: The intersecting roundabout between George and Joseph Street can be seen. This photo was taken from eastern front yard of the property.

NORTH NOTE

BEARINGS SHOWN HAVE BEEN DETERMINED FROM LAND & PROPERTY INFORMATION PLANS AND ARE RELATED TO MAGNETIC NORTH. TRUE NORTH IS APPROXIMATE ONLY AND FURTHER INVESTIGATION WOULD BE REQUIRED TO DETERMINE ACCURATE TRUE NORTH.





LOCATION PLAN

LAT: -33.6241
LONG: 151.3279

PM 249 RL 3.225
S.C.I.M.S

SCHEDULE OF TREES

	DIAMETER	HEIGHT	TYPE
T1	1.00	9m	-
T2	0.60	7m	-
T3	0.50	7m	-

LEGEND

- BENCH MARK
- PHOTO POINT
- GULLY PIT
- VEHICULAR CROSSING
- TOP OF BANK
- BOTTOM OF BANK
- PP

BENCH MARK

BM 37 NAIL IN KERB
RL 3.52 (A.H.D)

FLOOD AFFECTED

NOTES:

CONTOURS SHOWN HAVE BEEN INTERPOLATED FROM SPOT LEVELS TAKEN ON-SITE AND ARE A REPRESENTATION OF THE TOPOGRAPHY ONLY.

DIMENSIONS SHOWN (BEARINGS & DISTANCES) HAVE BEEN DETERMINED BY LAND AND PROPERTY INFORMATION PLANS ONLY. BOUNDARIES HAVE NOT BEEN ACCURATELY DETERMINED.

SERVICES SHOWN HAVE BEEN LOCATED WHERE POSSIBLE BY FIELD SURVEY. PRIOR TO ANY SITE WORKS, THE RELEVANT AUTHORITY SHOULD BE CONTACTED TO DETERMINE EXACT POSITION OF ANY UNDERGROUND PIPES, CABLES ETC.

DIMENSIONS OF ANY TREES SHOWN ON THE PLAN ARE APPROX.

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N2 WIND CATEGORY

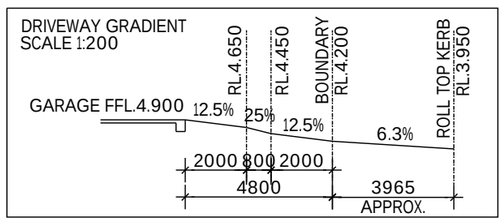
0.45M FALL ACROSS BUILDING ENVELOPE

NOTE:
DRIVEWAY & FRONT PATH TO COMPLY WITH AS2890

NOTE:
EXISTING LAYBACKS ON GEORGE & JOSEPH STREETS TO REMAIN AS PER CLIENT REQUEST

NOTE:
PROVIDE OVERHEAD ELECTRICAL CONNECTION OF SERVICE MAINS FROM SERVICE POLE TO CONSUMER POLE WITHIN PROPERTY BOUNDARIES THEN UNDERGROUND MAINS TO METERBOX.

NOTE:
RAWSON HOMES TO PROVIDE IMPORT OF FILL



SITE CALCULATIONS DA

GROUND FLOOR	116.47 m²
FIRST FLOOR	110.03 m²
TOTAL LIVING AREA	226.50 m²
SITE AREA	690.10 m²
BUILDING FOOTPRINT	200.27 m²
DRIVEWAY	29.00 m²
PATH	10.53 m²
CROSSOVER	15.88 m²
TOTAL FRONT AREA	180.77 m²
FRONT LANDSCAPE AREA (%)	94.17 %
TOTAL LANDSCAPE AREA	450.30 m²
LANDSCAPE AREA (%)	65.25 %
FLOOR SPACE RATIO	0.33 :1
SITE COVERAGE	29.02 %

ABBREVIATIONS

EB - ELECTRICAL BOX
EM - ELECTRICAL METER
GM - GAS METER
H - HYDRANT
R - HYDRANT RECYCLED
KO - KERB OUTLET
LP - LIGHT POLE
LH - LAMP HOLE
MH - MAN HOLE
MS - MAINTENANCE SHAFT
PP - POWER POLE
SH - SHRUB
SMH - SEWER MAN HOLE
SIO - SEWER INSPECTION OPENING
SV - STOP VALVE
SR - STOP VALVE RECYCLED
SVP - SEWER VENT PIPE
SWP - STORM WATER PIT
T - TREE
TP - TELECOMMUNICATIONS PIT
VER - VERANDAH
WT - WATER TAG
WM - WATER METER
WMR - WATER METER RECYCLED
WC, GC, EC, TC - SERVICE CONDUIT
W/C - WATER CLOSET

NOTES:

PLEASE NOTE: DETAILS SHOWN ON THESE PLANS ARE INTENDED TO BE ACCURATE - HOWEVER INFORMATION WRITTEN INTO INDIVIDUAL CONTRACTS WILL TAKE PRECEDENCE OVER PLANS

* ALL DIMENSIONS ARE IN MILLIMETRES
* DO NOT SCALE - USE WRITTEN DIMENSIONS
* ALL DIMENSIONS ARE TO STRUCTURAL FRAMES ONLY EXCLUDING FINISHED SURFACES

RAWSON HOMES
1 HOMEBUSH BAY DRIVE
BUILDING F, LEVEL 2, SUITE 1
RHODES NSW 2138
TELEPHONE: 02 8765 5500
FAX : 02 8765 8099
BUILDER'S LICENCE No. 33493C

CLIENT: MR M.J. EVANS & MRS J.R. EVANS

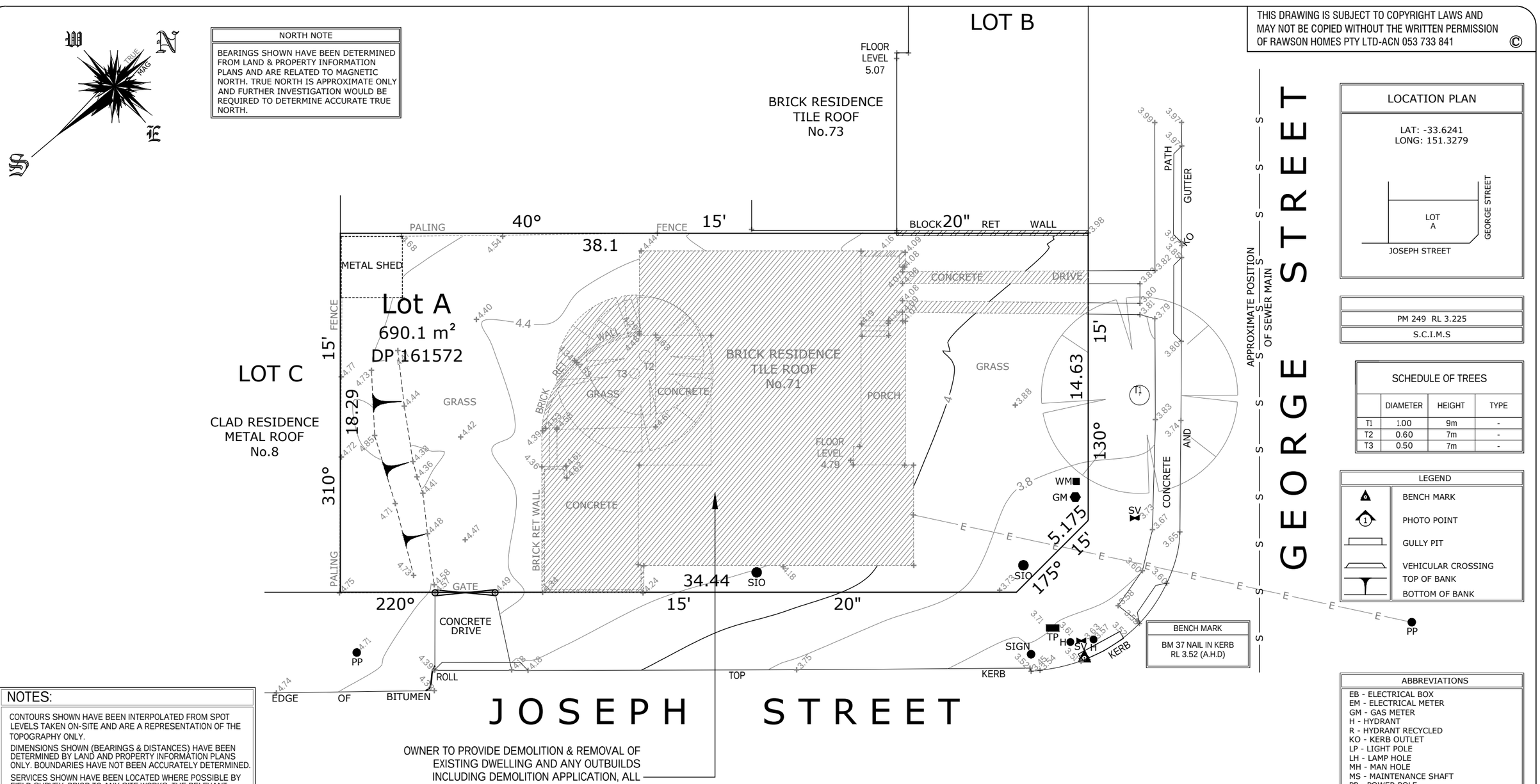
SITE ADDRESS:
LOT A, DP 161572
71 GEORGE STREET
AVALON BEACH NSW 2107

HOUSETYPE:
MODEL: CHIFLEY 32
FACADE: CLASSIC
TYPE: DOUBLE GARAGE
SPECIFICATION: LUX

DRAWING TITLE: SITE PLAN

DRAWN BY:	DATE DRAWN:	CHECKED BY:	APPROVED FOR CONSTRUCTION:
DTT	12.08.19	DTT	

COUNCIL AREA: NORTHERN BEACHES
SCALE: 1:200
JOB No: A009118
DRWG No.: 03
ISSUE: C



OWNER TO PROVIDE DEMOLITION & REMOVAL OF EXISTING DWELLING AND ANY OUTBUILDS INCLUDING DEMOLITION APPLICATION, ALL VISIBLE ASBESTOS SHEETING AND CLEARING TO SITE OF OLD FOOTINGS, SERVICE PIPES, TREES, SHRUBS, ALL RETAINING WALLS & ON-SITE DRIVEWAY

NOTES:

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DIMENSIONS OF ANY TREES SHOWN ON THE PLAN ARE APPROX.

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NOTE:
NO ALLOWANCE HAS BEEN MADE FOR TREE REMOVAL OR AN ARBORISTS REPORT. THE OWNER IS TO PROVIDE ARBORISTS REPORT (IF REQUIRED) PRIOR TO LODGEMENT OF DEVELOPMENT APPLICATION

NOTE:
OWNER TO PROVIDE CLEARANCE CERTIFICATE, TO ENSURE THAT THE SITE IS CLEAR OF ANY HAZARDOUS MATERIALS

NOTE:
OWNER TO PROVIDE A SERVICES DISCONNECTION CERTIFICATE (GAS & ELECTRICITY)

NOTES:

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CLIENT: MR M.J. EVANS & MRS J.R. EVANS

SITE ADDRESS:
LOT A, DP 161572
71 GEORGE STREET
AVALON BEACH NSW 2107

HOUSETYPE:
MODEL: CHIFLEY 32
FACADE: CLASSIC
TYPE: DOUBLE GARAGE
SPECIFICATION: LUX

DRAWING TITLE: SITE DEMOLITION PLAN

DRAWN BY:	DATE DRAWN:	CHECKED BY:	APPROVED FOR CONSTRUCTION:
DTT	12.08.19	DTT	

COUNCIL AREA: NORTHERN BEACHES

SCALE: 1:200

JOB No: A009118

DRWG No.: 02

ISSUE: C

NORTHERN BEACHES COUNCIL

FLOOD INFORMATION REQUEST - COMMON

Property: 71 George St, Avalon Beach
Lot DP: A//161572
Issue Date: 06/12/2018
Flood Study Reference: Avalon to Palm Beach Floodplain Risk Management Study and Plan, Manly Hydraulics Laboratory, 2017

Flood Information for lot:

Flood Life Hazard Category – See Map A

1% AEP – See Flood Map B

1% AEP Maximum Water Level[3]: 4.88 mAHD

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Flood Planning Level (FPL)[1,2, 3 &4]: 5.38 m AHD

Probable Maximum Flood (PMF) – See Flood Map D

PMF Maximum Water Level[2]: 5.159 m AHD

PMF Maximum Depth from natural ground level: 0.49 m

PMF Maximum Velocity: 1.71 m/s

Flood Risk Precinct – See Map K

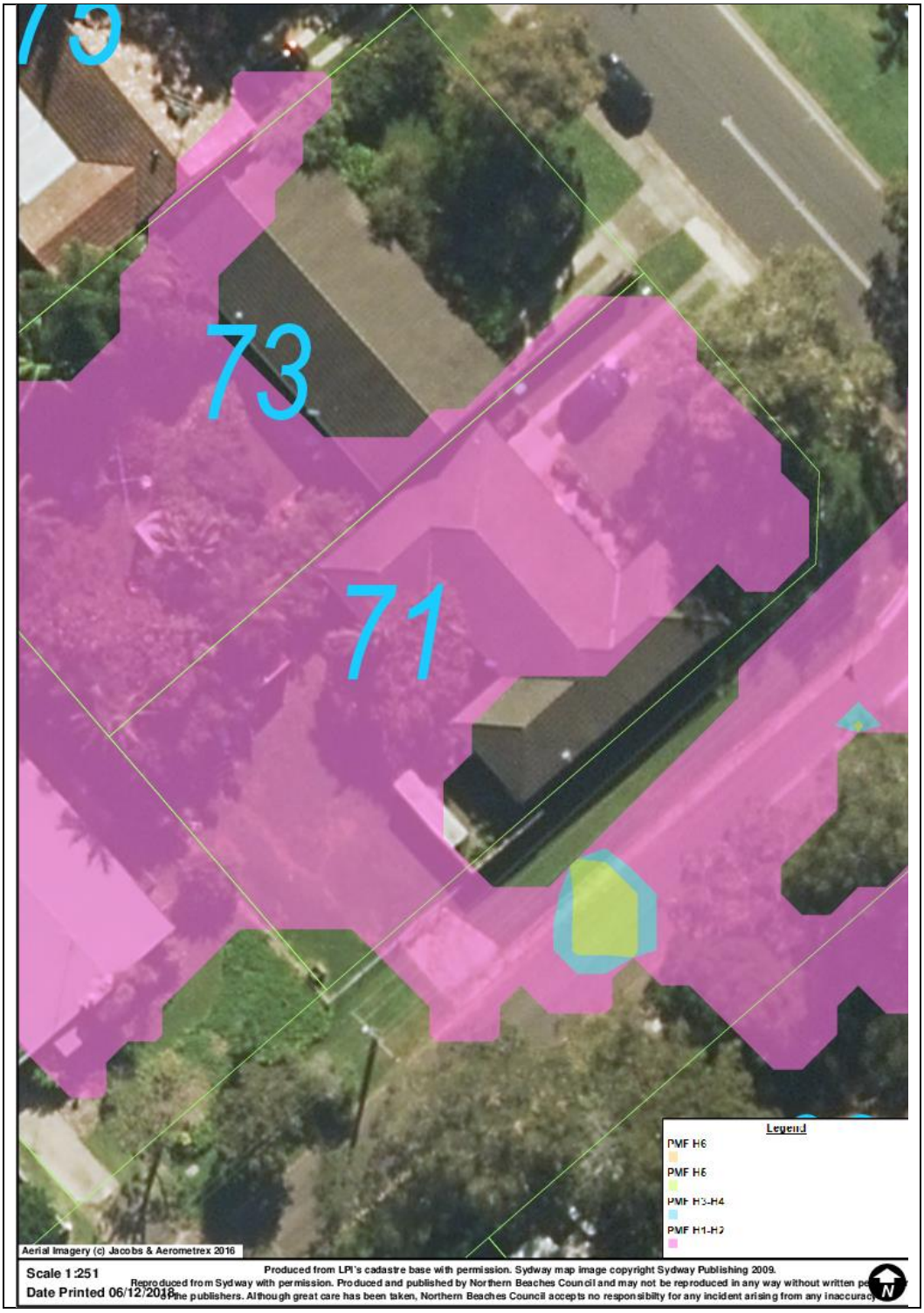
[1]The flood information does not take into account any local overland flow issues nor private stormwater drainage systems.
[2]Overland flow/mainstream water levels may vary across a sloping site, resulting in variable minimum floor/ flood planning levels across the site.

[3]Intensification of development in the former Pittwater LGA requires the consideration of climate change impacts which may result in higher minimum floor levels than those indicated on this flood advice.
[4]Vulnerable/critical developments require higher minimum floor levels using the higher of the PMF or Flood Planning Level

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.

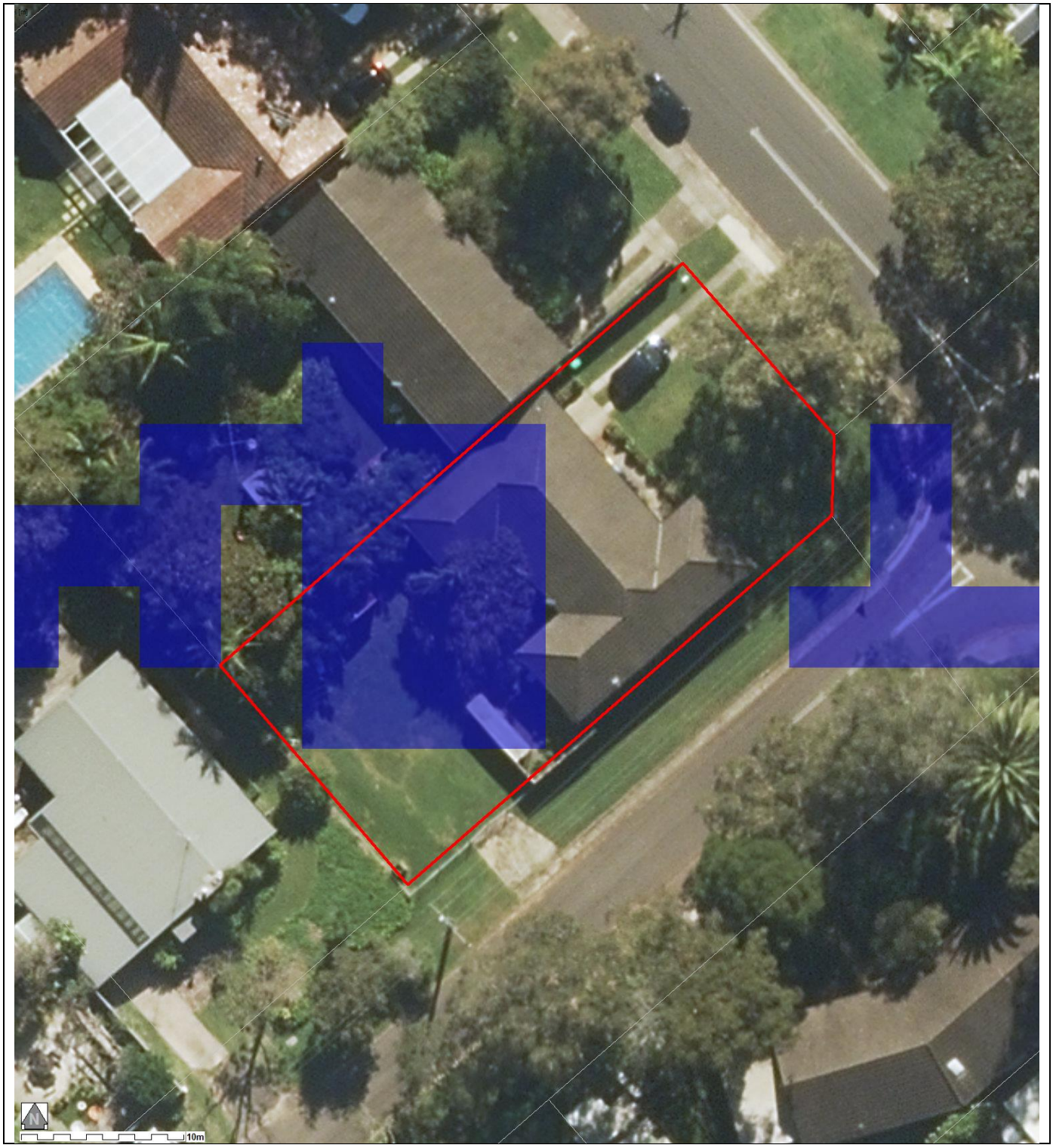
FLOOD MAP A: FLOOD LIFE HAZARD CATEGORY



Notes:

- Refer to 'Flood Emergency Response Planning for Development in Pittwater Policy' for additional information on the Flood Life Hazard Categories and Pittwater 21 DCP Control B3.25.
- Cadastre Lines (Source: NSW Government Land and Property Information), flood levels/extents (Source: Avalon to Palm Beach Floodplain Risk Management Study and Plan, Manly Hydraulics Laboratory, 2017) and aerial photography (Source Near Map 2014) are indicative only.

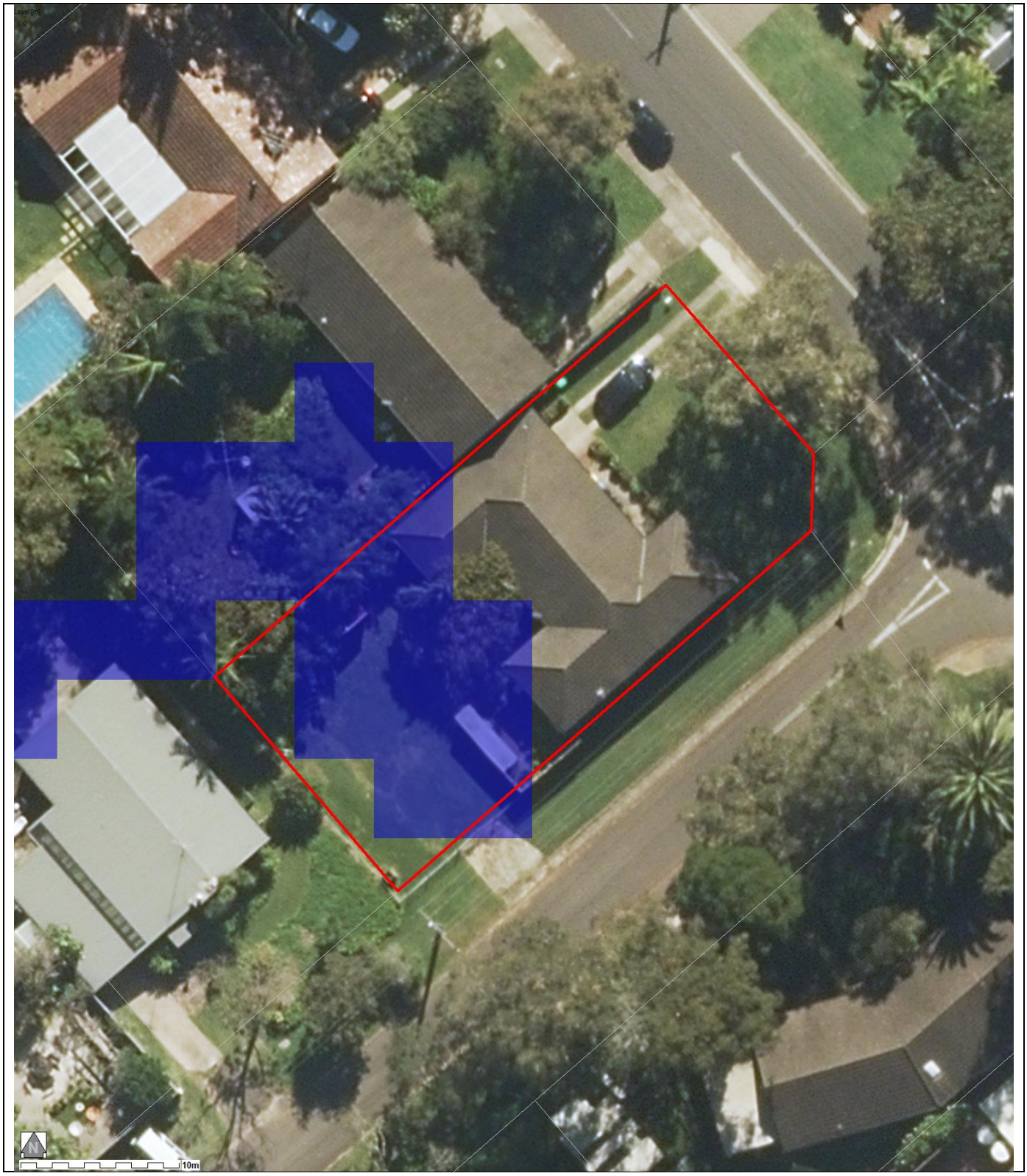
FLOOD MAP B: FLOODING - 1% AEP EXTENT



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: Avalon to Palm Beach Floodplain Risk Management Study and Plan, Manly Hydraulics Laboratory, 2017) and aerial photography (Source Near Map 2014) are indicative only.

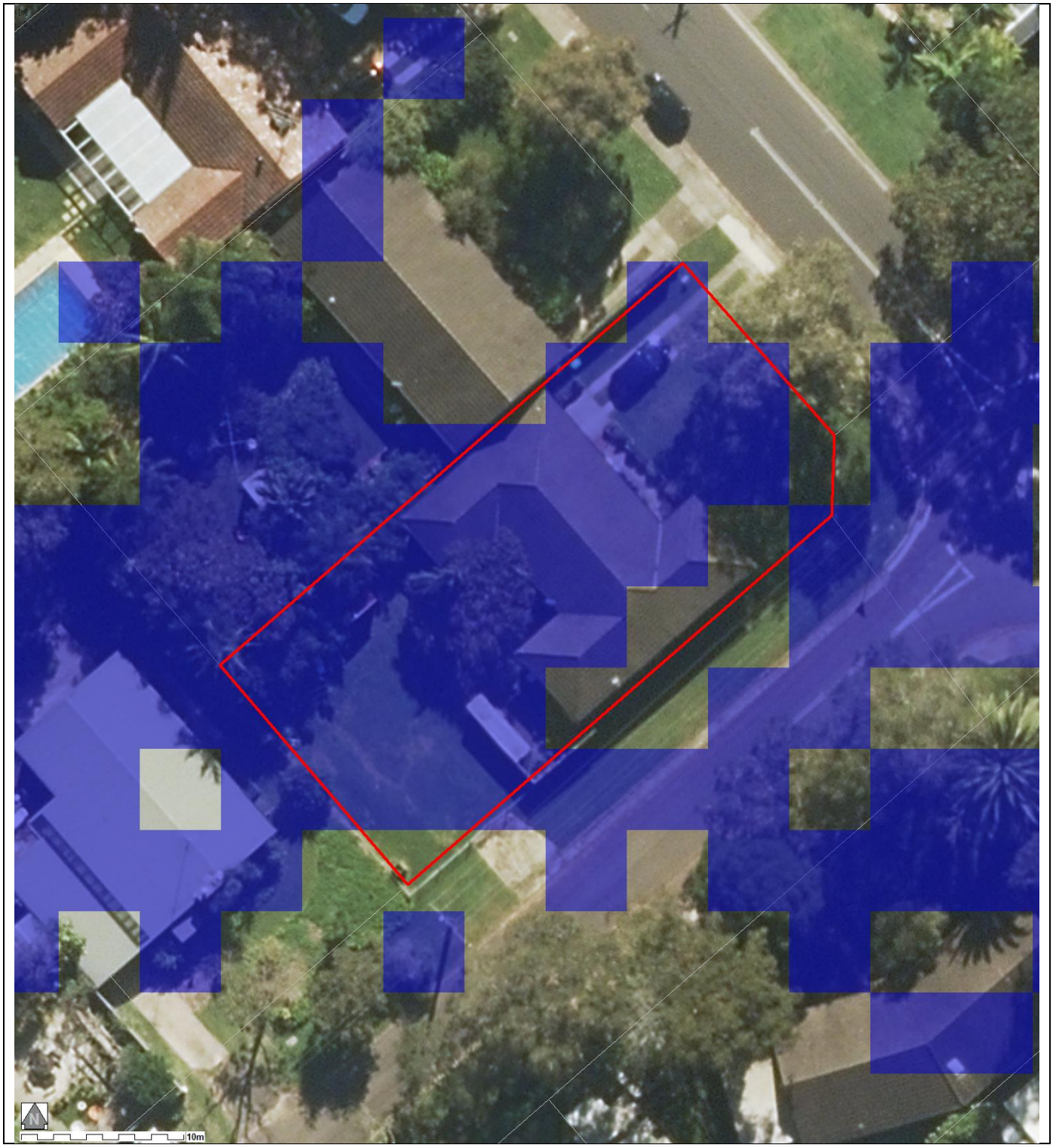
FLOOD MAP C: FLOOD PLANNING AREA EXTENT



Notes:

- Extent represents the 1% annual Exceedance Probability (AEP) flood event + freeboard.
- 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, Manly Hydraulics Laboratory, 2017) and aerial photography (Source Near Map 2014) are indicative only.

FLOOD MAP D: 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: Avalon to Palm Beach Floodplain Risk Management Study and Plan, Manly Hydraulics Laboratory, 2017) and aerial photography (Source Near Map 2014) are indicative only.

FLOOD MAP E – 1% AEP FLOOD HAZARD EXTENT MAP

Notes:

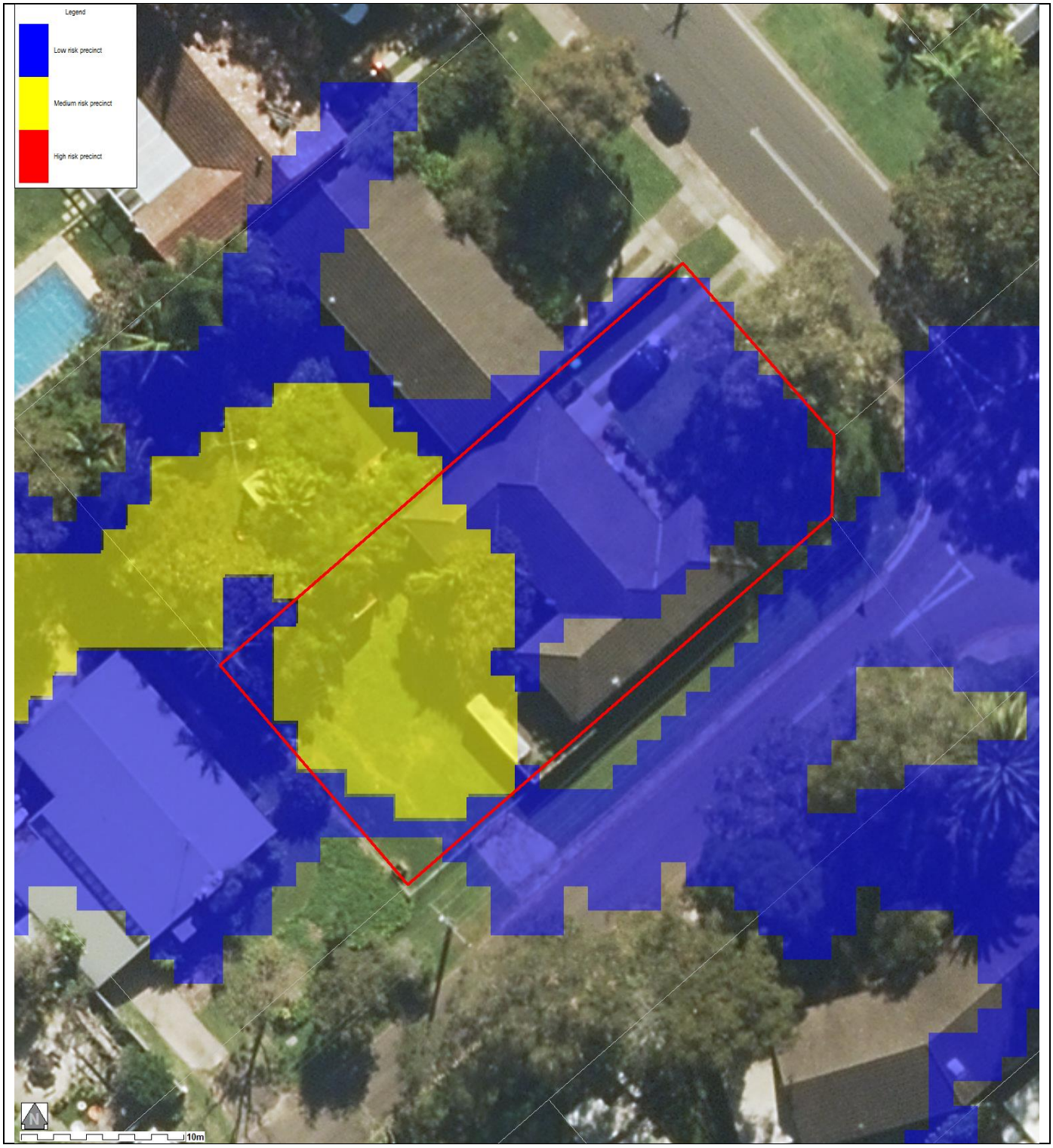
- Extent represents the 1% annual Exceedance Probability (AEP) flood event.
- Extent does not include climate change.
- Cadastre Lines (Source: NSW Government Land and Property Information), flood levels/extents (Source: Avalon to Palm Beach Floodplain Risk Management Study and Plan, Manly Hydraulics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

FLOOD MAP F – 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, Manly Hydraulics Laboratory, 2017) and aerial photography (Source: NearMap 2014) are indicative only.

FLOOD MAP G – 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 and or H6 Life Hazard Classification).