Barrenjoey Consulting Engineers pty ltd
Stormwater Structural Civil
abn 13124694917 acn 124694917

FLOOD INUNDATION & RISK ASSESSMENT REPORT PROPOSED NEW RESIDENCE 12A JOHN ST AVALON

Job No 181005
March 2025
Prepared by
Lucas Molloy
MIEAust / CPEng / NER / APEC / Engineer / IntPE(Aus)

CONTENTS

INTRODUCTION

This report has been prepared in support of the proposed Development Application for a new residence at No 12A John St Avalon in respect to potential flood inundation / impacts and Northern Beaches Councils Water Management for Development Policy Section 10.0 Flood Risk Management, Pittwater 21 DCP Section B3.11 Flood Prone Land and Council RFI dated 19 March 2024, refer Appendix D.

It is proposed to construct a new residence as detailed in the architectural plans by *THW Architects*, refer Appendix A.

Barrenjoey Consulting Engineers p/l inspected the site on 30th Sept 2019 / 22nd Nov 2023.

The extent of flooding is as summarized in the "Flood Information Request" data as supplied by Northern Beaches Council, refer Appendix D.

The Flood Planning Level as defined by Northern Beaches Council is 3.41m AHD.

For the 1% AEP event the site is classified -

Flood Hazard	varies across site H1 – H5
Flood Hydraulic Category	Fringe + storage
Flood Risk Precinct	varies across site Low / Medium / High
Land Use Group	Residential – Dwelling House

Aerial Image of No 12A / 12B John St Avalon

(Northern Beaches Council web site)

Pittwater 21 Development Control Plan - 2014
B3.11 Flood Prone Land
1.2 Prescriptive Controls

A. FLOOD EFFECTS CAUSED BY DEVELOPMENT

A1	Jetty **na to this development**
A2	**na**
A3	The applicant shall include in their submission, calculations to illustrate that any fill or other structures that reduce the total flood storage are replaced by Compensatory Works. **No fill / structures proposed within flood storage areas**
A4	**na**

B. DRAINAGE INFRASTRUCTURE AND CREEK WORKS

B1	Flood mitigation works or stormwater devices that modify a major drainage system, stormwater system, natural water course, floodway or flood behaviour within or outside the development site may be permitted subject to demonstration through a Flood Management Report that they comply with the Flood Prone Land Design Standard found on Council's webpage. **No flood mitigation works are proposed.**
B2	A Section 88B notation under the Conveyancing Act 1919 may be required to be placed on the title describing the location and type of flood mitigation works with a requirement for their retention and maintenance. **No flood mitigation works are proposed.**

C. BUILDING COMPONENTS AND STRUCTURAL SOUNDNESS

C1	All buildings shall be designed and constructed as flood compatible buildings in accordance with Reducing Vulnerability of Buildings to Flood Damage: Guidance on Building in Flood Prone Areas, Hawkesbury-Nepean Floodplain Management Steering Committee (2006). **Achievable using conventional building practices, and to be conditioned within a DA approval**
C2	All structures must be designed and constructed to ensure structural integrity up to the Flood Planning Level, taking into account the forces of floodwater, wave action, flowing water with debris, buoyancy and immersion. Structural certification shall be provided confirming the above. Where shelter-in-place refuge is to be provided the structural integrity is to be to the Probable Maximum Flood level. **Achievable using conventional building and engineering practices, and to be conditioned within a DA approval.**
C3	All new electrical equipment, power points, wiring, fuel lines, sewerage systems or any other service pipes and connections must be waterproofed and/or located above the Flood Planning Level. All existing electrical equipment and power points located below the Flood Planning Level must

	have residual current devices installed that turn off all electricity supply to the property when flood waters are detected. **Achievable using conventional building practices, and to be conditioned within a DA approval**

D. STORAGE OF GOODS

D1	Hazardous or potentially polluting materials shall not be stored below the Flood Planning Level unless adequately protected from floodwaters in accordance with industry standards. **Achievable using conventional building practices, and to be conditioned within a DA approval**
D2	Goods, materials or other products which may be highly susceptible to water damage are to be located/stored above the Flood Planning Level. **Achievable using conventional building practices, and to be conditioned within a DA approval**

E. FLOOD EMERGENCY RESPONSE

E1	Development shall comply with Council's Flood Emergency Response Planning for Development in Pittwater Policy and the outcomes of any Flood Risk Emergency Assessment Report where it applies to the land. **Achievable by adhering to this report.**
E2	New development must provide an appropriately sized area to safely shelter in place above the Probable Maximum Flood level and appropriate access to this area should be available from all areas within the development. **Evacuation of the site is readily available via the flood free access driveway**
E3	**na**
E4	**na**

F. FLOOR LEVELS

F1	New floor levels within the development shall be at or above, the Flood Planning Level. A reduced Flood Planning Level may be considered only where it is permitted in this Development Control Plan. The structure must be flood proofed (wet or dry) to the Flood Planning Level. This control cannot be applied to critical or vulnerable uses. **The ground floor FFL 3.41m AHD is at the FPL level 3.41m AHD**
F2	All development structures must be designed and constructed so as not to impede the floodway or flood conveyance on the site, as well as ensuring no loss of flood storage in a 1% AEP Event. **The building is sited/elevated as not to affect the floodway or flood conveyance on the site, and this is to be conditioned within a DA approval** Where the dwelling is located over a flow path it must be elevated on suspended pier/pile footings such that the level of the underside of all floors including balconies and decks within the flood affected area are at or above, or raised to the Flood Planning Level to allow clear passage of the floodwaters under the building. The development must comply with the Flood Prone Land Design Standard. **The dwelling is not located over a flowpath**
F3	Where the lowest floor has been elevated to allow the passage of flood waters, a restriction shall be imposed on the title of the land, pursuant to S88B of the Conveyancing Act confirming that the undercroft area is not to be enclosed. **na to this development**

F4	A one- off addition or alteration below the Flood Planning Level of less than 30 square metres or an increase of less than 10% of the ground floor area (whichever is the lesser) for residential development may be considered only where: (a) it is an extension to an existing room (b) the Flood Planning Level is incompatible with the floor levels of the existing room This control will not be permitted if this provision has previously been utilised since the making of this Plan. The structure must be flood proofed to the Flood Planning Level. **na to this development**
F5	**na**
F6	Any existing floor level may be retained below the Flood Planning Level when undertaking a first floor addition provided that: (a) it is not located within a floodway; (b) there is no increase to the building footprint below the Flood Planning Level; (c) it is flood proofed to the Flood Planning Level; **na to this development**
F7	**na**
F8	The minimum floor level of any first floor additions shall be at or above the Probable Maximum Flood Level **na to this development**
F9	Foyers – consideration may be given to a minimum floor level of a foyer being set at the 5% AEP flood level, provided it can be demonstrated that it complies with the Flood Prone Land Design Standard. **na to this development**
F10	**na**
F11	**na**

G. CAR PARKING

G1	Open carpark areas and carports shall not be located within a floodway. **No open carpark areas and carports are located within a floodway**
G2	The lowest floor level of open carparks and carports (unroofed or with open sides) shall be constructed no lower than the natural ground levels. **na to this development**
G3	All enclosed car parks must be protected from inundation up to the relevant flood planning level. For example, basement carparks must be provided with a crest at the entrance, the crest of which is at the relevant Flood Planning Level. All access, ventilation and any other potential water entry points to any enclosed car parking shall be above the relevant Flood Planning Level. Council will not accept any options that rely on electrical, mechanical or manual exclusion of the floodwaters from entering the enclosed carpark **na to this development**
G4	**na**
G5	Enclosed Garages must be located at or above the 1% AEP level **The Proposed garage is located at the 1% AEP level 2.55m AHD**
G6	Carports must comply with the Flood Prone Land Design Standard **na to this development**

G7	Where a driveway is required to be raised it must be demonstrated that there is no loss to flood storage in the 1% AEP flood event and no impact on flood conveyance through the site **na to this development**
G8	Multi Dwelling Housing and Shop Top Housing residential carparking – consideration may be given to a minimum floor level for open or covered carparking being set at the 5% AEP flood level, provided it can be demonstrated that it complies with the Flood Prone Land Design Standard **na to this development**
G9	**na**
G10	**na**

H. FENCING

H1	Fencing, including pool fencing, shall be designed so as not to impede the flow of flood waters and not to increase flood affectation on surrounding land. Appropriate fencing must comply with the Flood Prone Land Design Standard in addition to other regulatory requirements of pool fencing. **Achievable using conventional building practices, to be conditioned within a DA approval**

I. POOLS

I1	Pools located within the 1% AEP flood extent are to be in-ground, with coping flush with natural ground level. Where it is not possible to have pool coping flush with natural ground level, it must be demonstrated that the development will result in no net loss of flood storage and no impact on flood conveyance on or from the site. All electrical equipment associated with the pool (including pool pumps) is to be All chemicals associated with the pool are to be stored at or above the flood planning level. **na to this development**

FLOOD RISK ASSESSMENT

A flood risk assessment was carried out for the 1% AEP and PMF event adopting the following

- Likehood of the hazard occurring
  - Almost Certain 1:10
  - Likely 1:100
  - Possible 1:1000
  - Unlikely 1:10000
  - Rare 1:100000
- Consequence of the hazard to persons and property
  - Insignificant no injury / $ 0 - low
  - Minor first aid injury / $ low - medium
  - Moderate medical treatment required / $ medium – high
  - Major serious injuries / $ major
  - Catastrophic death / $ major ++

	Insignificant	Minor	Moderate	Major	Catastrophic
Almost Certain					
Likely (1%)					
Possible					
Unlikely (PMF)					
Rare					

Legend

Low - acceptable
Moderate – tolerable
Sever – unacceptable

1 Risk to persons 'shelter in place' provisions as per the *Flood Risk Management Report* specified / ensured, therefore risk assessment -
1% event – minor injuries possible therefore moderate / tolerable risk assessment
PMF event – minor injuries possible therefore low / acceptable risk assessment
2 Risk to structures adequate structural capacity to resist the flood forces (water and debris) as per the *Flood Risk Management Report* specified / ensured, therefore risk assessment -
1% event – insignificant therefore low /acceptable risk assessment
PMF event – minor damage to structures therefore low / risk assessment
2 Risk to vehicles vehicles protected from flood exposure, therefore risk assessment -
1% event – insignificant therefore low /acceptable risk assessment
PMF event – moderate damage therefore low / acceptable risk assessment
3 Risk to services protection of services from flood exposure as per the *Flood Risk Management Report* specified / ensured, therefore risk assessment -
1% event – insignificant therefore low /acceptable risk assessment
PMF event – minor damage therefore low / acceptable risk assessment

SUMMARY

Assessment of Impacts Compliance Table

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

The proposed works if carried out in accordance with recommendations within this *Flood Inundation & Risk Assessment Report* by Barrenjoey Consulting dated March 2025 will satisfy the intent of Northern Beaches Councils Water Management for Development Policy Section 10.0 Flood Risk Management and the Pittwater 21 DCP Section B3.11 Flood Prone Land. Noting the following measures are to be implemented into the works –

- **All occupants are to be informed of the sites flooding potential / impact and available warning services (ie : Councils *Floodwatch*, SES services etc).**
- **All occupants are to be informed of the sites flooding potential / impact and the residences 'shelter in place' capacity.**
- **All structures must be designed and constructed to ensure structural integrity up to the Flood Planning Level**
- **All occupants are to be informed of the sites flooding potential and requirements for goods / valuables storage etc.**

It is to be noted that, due to the many complex factors that can affect a site, the subjective nature of a risk analysis, and the imprecise nature of the science of flood analysis, the risk of persons being injured, to life and property cannot be completely removed. The recommendations within this Report do not remove the risk associated with the predicted flooding event, though lower those risks to an acceptable level reasonably anticipated by the community in everyday life.

Regards
BARRENJOEY CONSULTING ENGINEERS pty ltd

Per
Lucas Molloy (Director)
BE CPEng NER

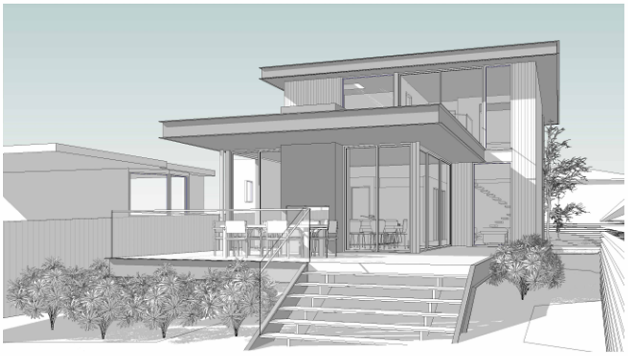
Appendix A

Architectural plans
THW Architects

12A JOHN STREET
AVALON, NSW, 2107

SHEET LIST:

00 - COVER PAGE	20 - SECTIONS
01 - SITE PLAN	21 - SECTIONS
02 - GROUND FLOOR PLAN	100 - SITE ANALYSIS
03 - FIRST FLOOR PLAN	101 - ANALYSIS SECTIONS
10 - ELEVATIONS	102 - SHADOW PLANS
11 - ELEVATIONS	103 - SHADOW 3D'S
12 - ELEVATIONS	104 - COLOUR & FINISHES
13 - ELEVATIONS	105 - 3D'S
14 - ELEVATIONS	106 - BASIX & NATHERS



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WA12	1200	1200	2100
WA13	1200	1200	2100
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WA17	0	2800	3300
WA18	0	2800	800
WA19	0	2800	1250
WA20	1200	1200	2000
WA21	0	2500	900
WA22	0	2500	900

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SURVEY	PLANNER	LANDSCAPE	PROJECT
BEE & LETHBRIDGE PTY LTD SUITE 2, 14 STARKEY ST, FORESTVILLE, NSW, 2087 P. 9975 3535 E. SURVEY@BEELTH.COM.AU W. BEELTH.COM.AU	VAUGHAN MILLIGAN DEVELOPMENT CONSULTING VAUGHAN MILLIGAN 8/1 KALINYA ST, NEWPORT, NSW, 2106 9999 4922	A TOTAL CONCEPT 60 WEST ST, NORTH SYDNEY, NSW, 2060 DESIGN@ATOTALCONCEPT.COM.AU 9957 5122	PROPOSED DWELLING 12A JOHN ST, AVALON, NSW, 2107
STORMWATER / FLOOD	**BASIX / NATHERS**	**BIODIVERSITY / COASTAL**	**CLIENT**
BARRENJOEY CONSULTING ENGINEERS 34 GEORGE ST, AVALON, NSW, 2107 LUCAS@CSYNGPOND.COM 0418 620 330	SUSTAINABLE THERMAL SOLUTIONS 138 COWLES RD, MOSMAN, NSW, 2088 ENQUIRIES@SUSTAINABLETHERMALSOLUTIONS.COM.AU 0403 313 721	ECOLOGICAL CONSULTANTS AUSTRALIA ECOLOGICALCA@OUTLOOK.COM 9918 4466	TIM DONOVAN TD@DONVANCITYFREEHOLDS.COM.AU

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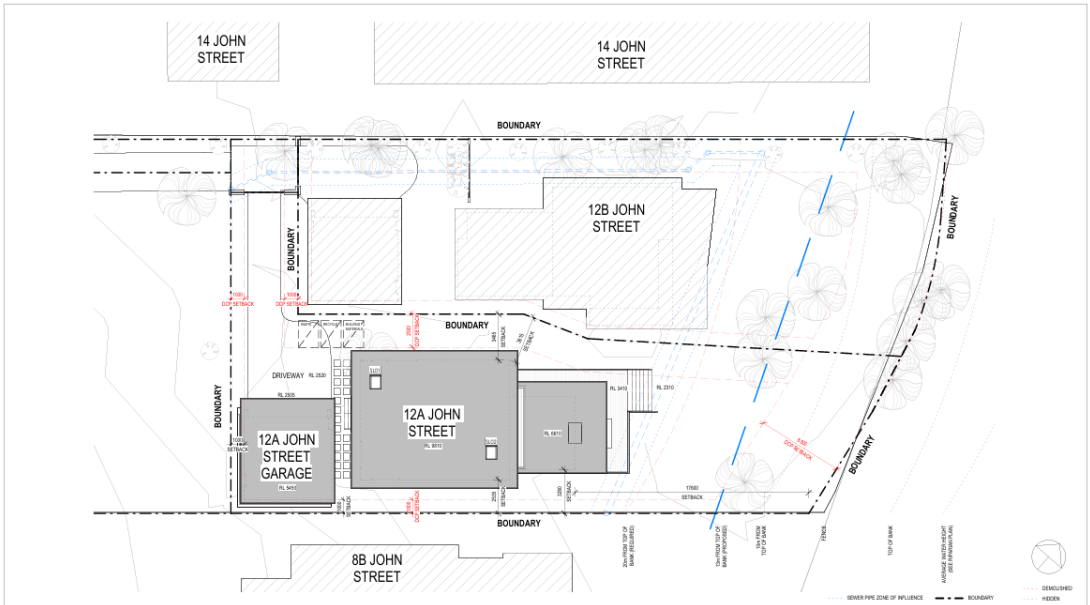

1 SITE PLAN
A01 1 : 200

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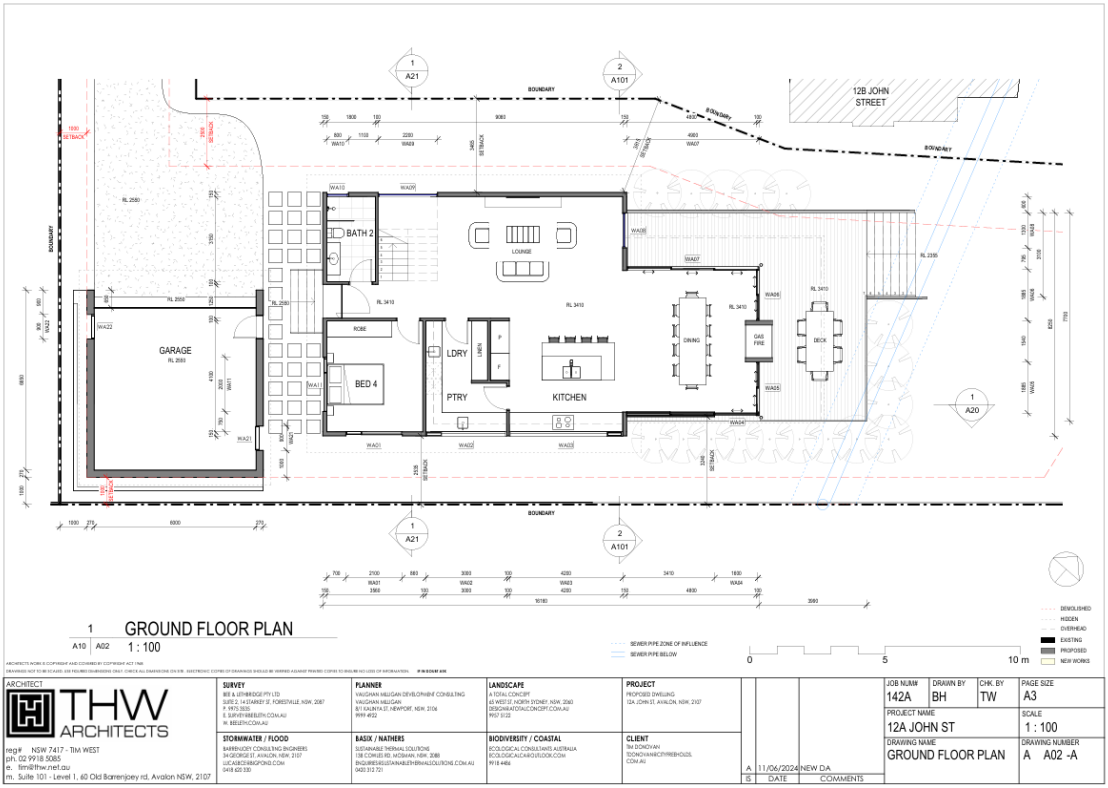
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BOUNDARY
BATH 2
LOUNGE
GARAGE
BED 4
LDRY
PTRY
KITCHEN
DINING
GAS FIRE
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ROBE
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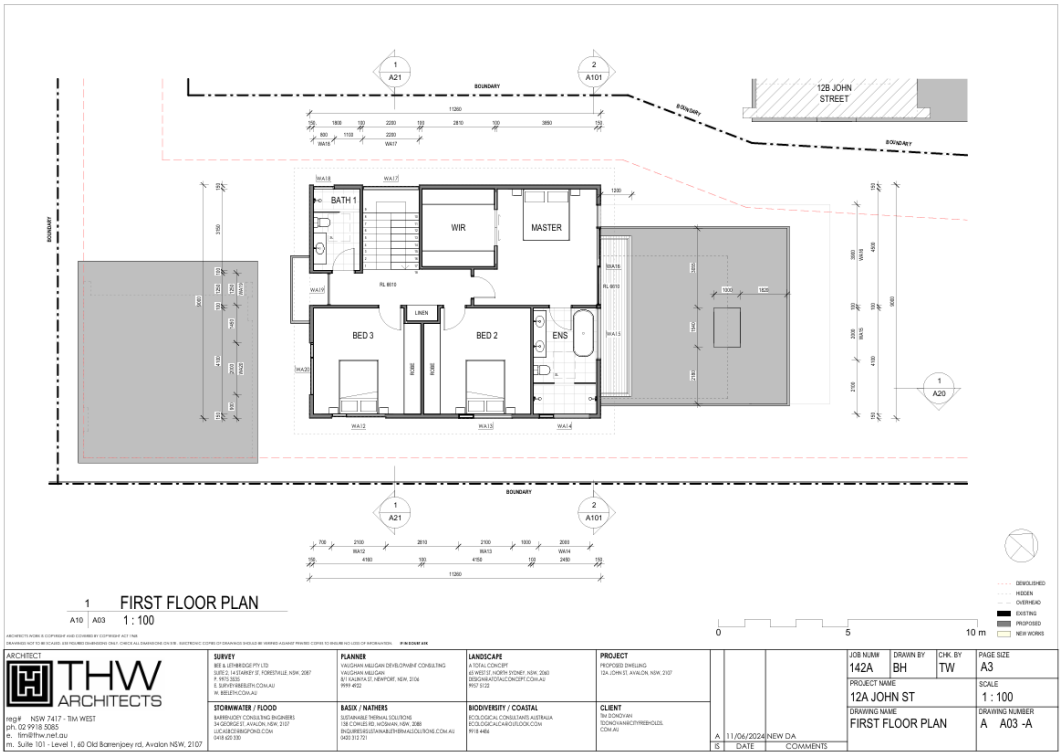
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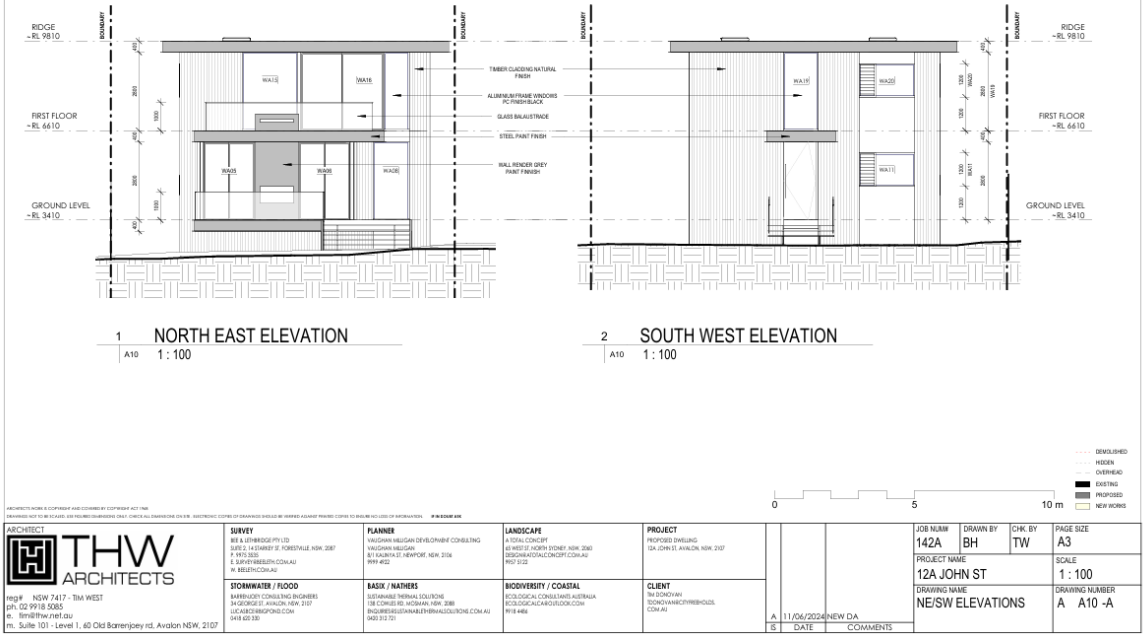

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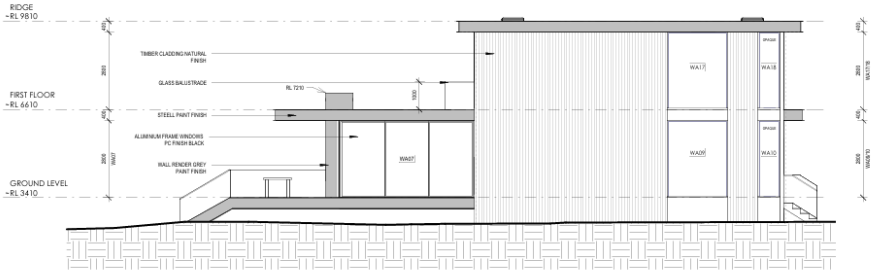

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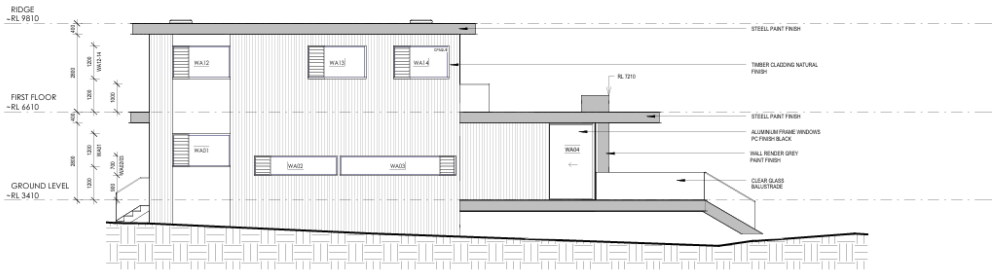

1 SOUTH EAST ELEVATION
A12 1 : 100

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LANDSCAPE
A TOTAL CONCEPT
65 WEST ST, NORTH SYDNEY, NSW, 2060
DESIGN@ATOTALCONCEPT.COM.AU
9957 5122

PROJECT
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12A JOHN ST, AVALON, NSW, 2107

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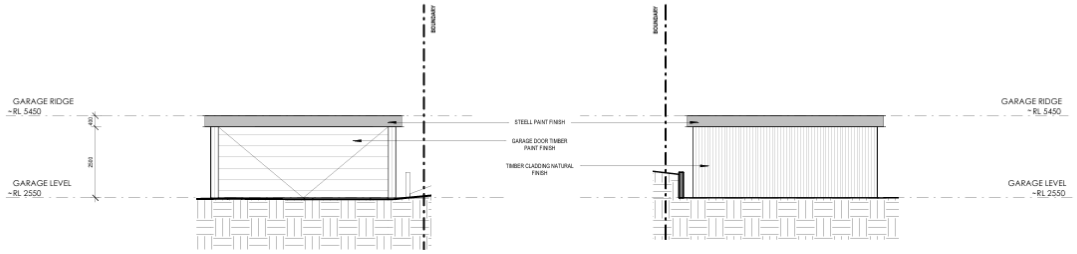

1 GARAGE NW ELEVATION
A13 1 : 100

2 GARAGE SE ELEVATION
A13 1 : 100

DEMOLISHED
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EXISTING
PROPOSED
NEW WORKS

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LANDSCAPE
A TOTAL CONCEPT
65 WEST ST, NORTH SYDNEY, NSW, 2060
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9957 5122

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PROPOSED DWELLING
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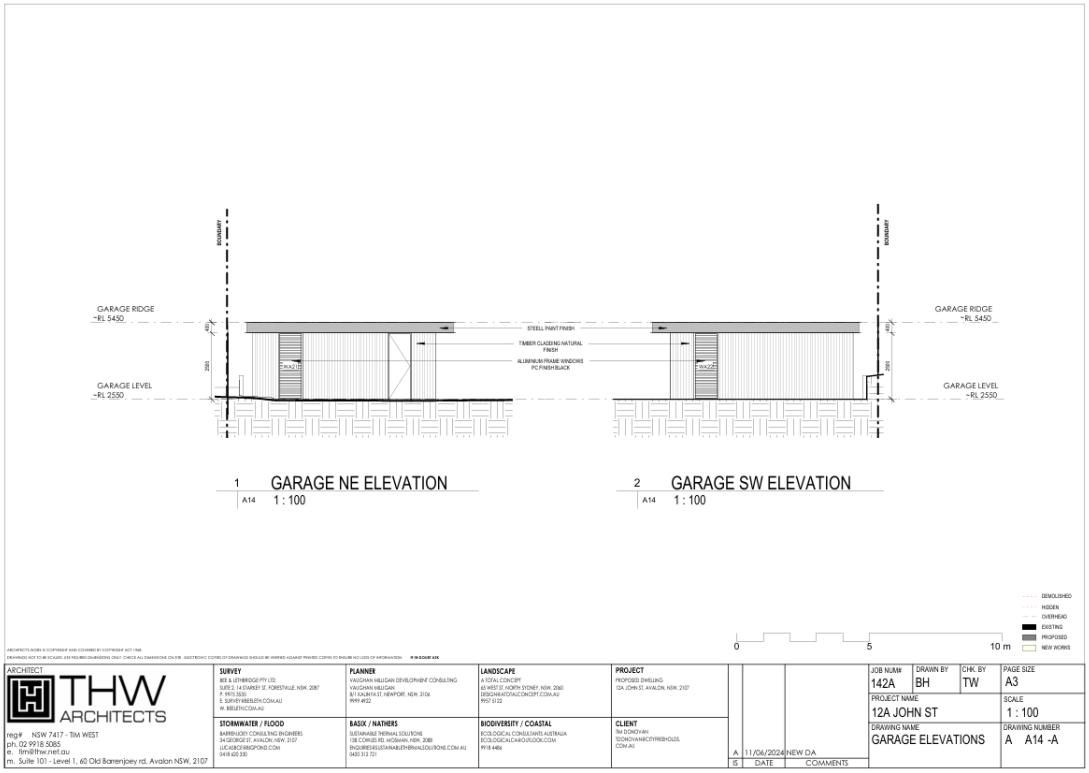
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2 GARAGE SW ELEVATION
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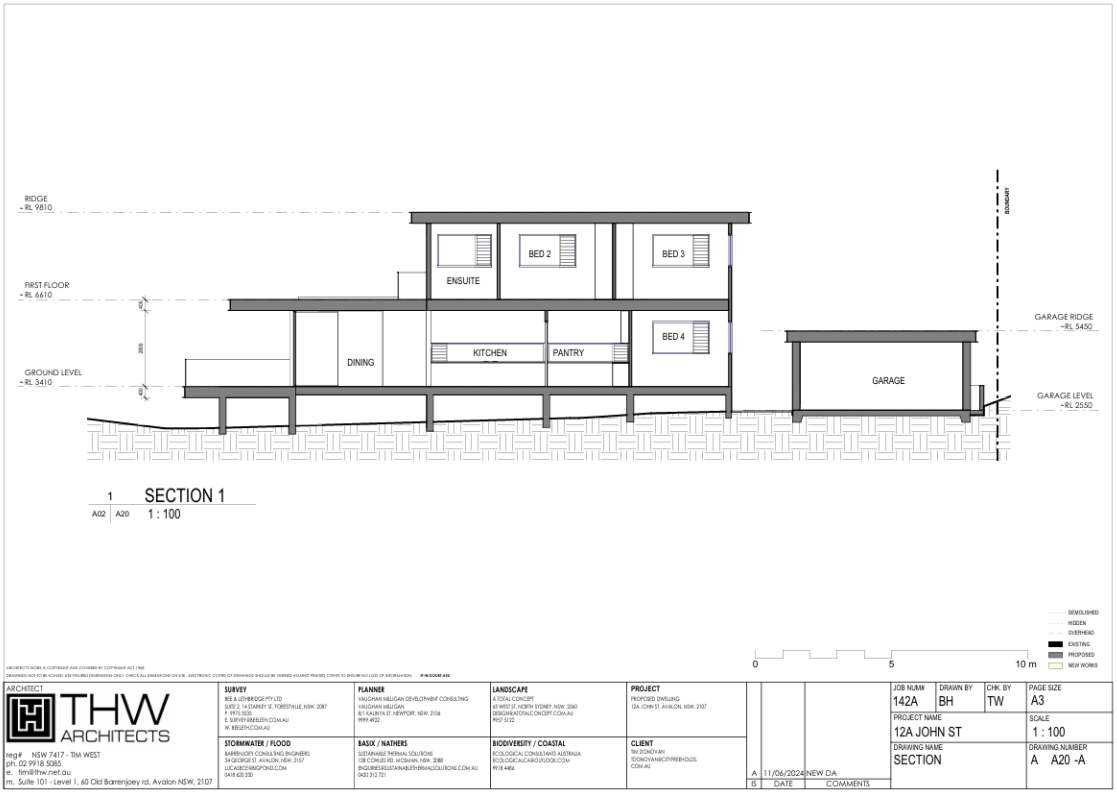
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FIRST FLOOR
~RL 6610
GROUND LEVEL
~RL 3410
BED 2
BED 3
BED 4
ENSUITE
KITCHEN
PANTRY
DINING
GARAGE
GARAGE RIDGE
~RL 5450
GARAGE LEVEL
~RL 2550
BOUNDARY
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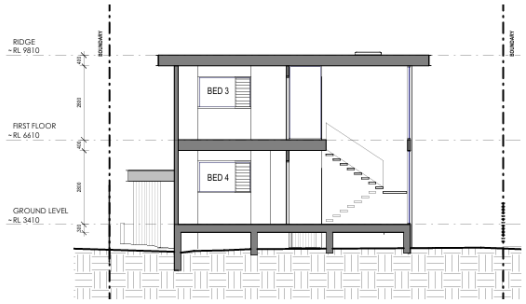

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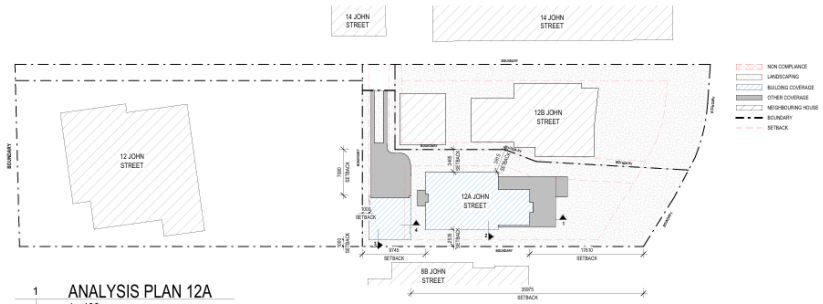
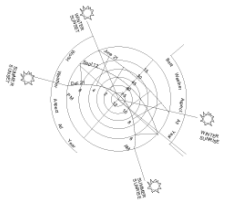


1 ANALYSIS PLAN 12A
A10 | A100 1 : 400

SITE ANALYSIS

SITE AREA	700m²
ZONE	E4
MAX COVERAGE	40% = 280m²
BUILDING FOOTPRINT	178.8m²
HARD PAVING / DECK / STAIRS	99.5m²
PRO COVERAGE	278.3m² = 39.5%
REQ LANDSCAPE	60% = 420m²
PRO LANDSCAPE	423.7m² = 60.5%
MAX HEIGHT	8.5m
PRO HEIGHT	7.7m
REQ FRONT SETBACK	6.50m
PRO FRONT SETBACK HOUSE	9.7 m
PRO FRONT SETBACK GARAGE	1.00m
REQ REAR SETBACK	6.50m
PRO REAR SETBACK HOUSE	17.6m
PRO REAR SETBACK GARAGE	35.9m
REQ SIDE SETBACK	1.0m / 2.5m
PRO SIDE SETBACK HOUSE	2.5m / 3.4m
PRO SIDE SETBACK GARAGE	1.0m / 7.2m



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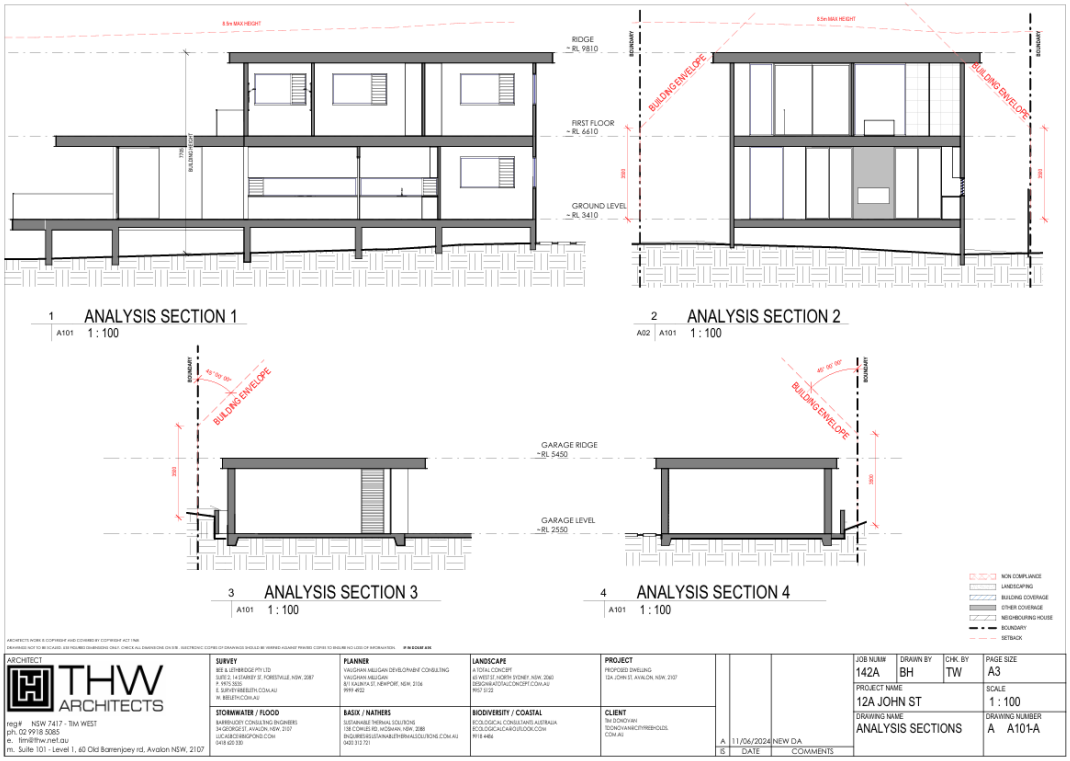

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A101 1 : 100

2 ANALYSIS SECTION 2
A02 A101 1 : 100

3 ANALYSIS SECTION 3
A101 1 : 100

4 ANALYSIS SECTION 4
A101 1 : 100

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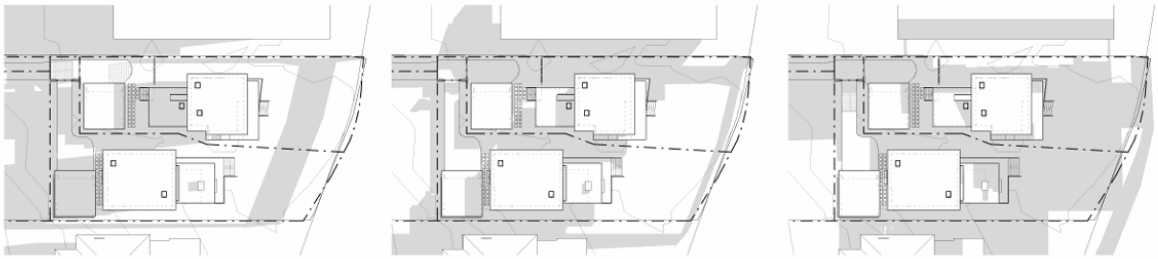

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A102 1 : 500

2 SHADOWS PLAN JUNE 21ST 12AM
A102 1 : 500

3 SHADOWS PLAN JUNE 21ST 3PM
A102 1 : 500

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SHADOW PLANS			A A102-A

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A103

2 SHADOWS 3D JUNE 21ST 12AM
A103

3 SHADOWS 3D JUNE 21ST 3PM
A103

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WALL RENDER: GREY

WALL CALDDING:
TIMBER NATURAL FINISH

ALUMINIUM FRAME WINDOWS:
BLACK PC FINISH

STEEL EDGES: BLACK PAINT FINISH

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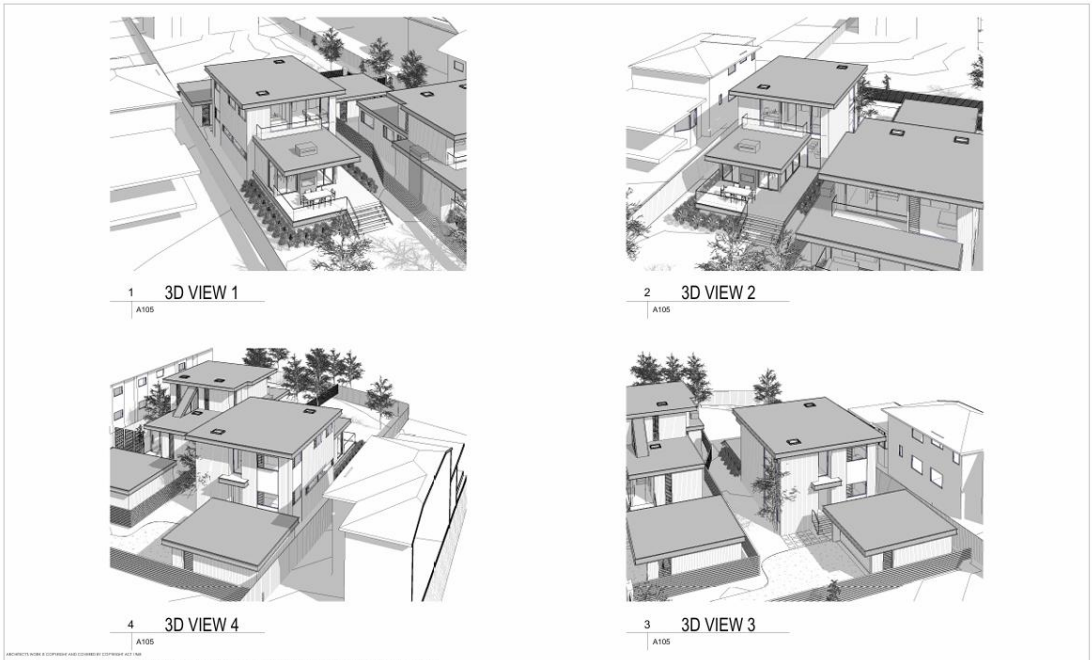
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2 3D VIEW 2
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4 3D VIEW 4
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3 3D VIEW 3
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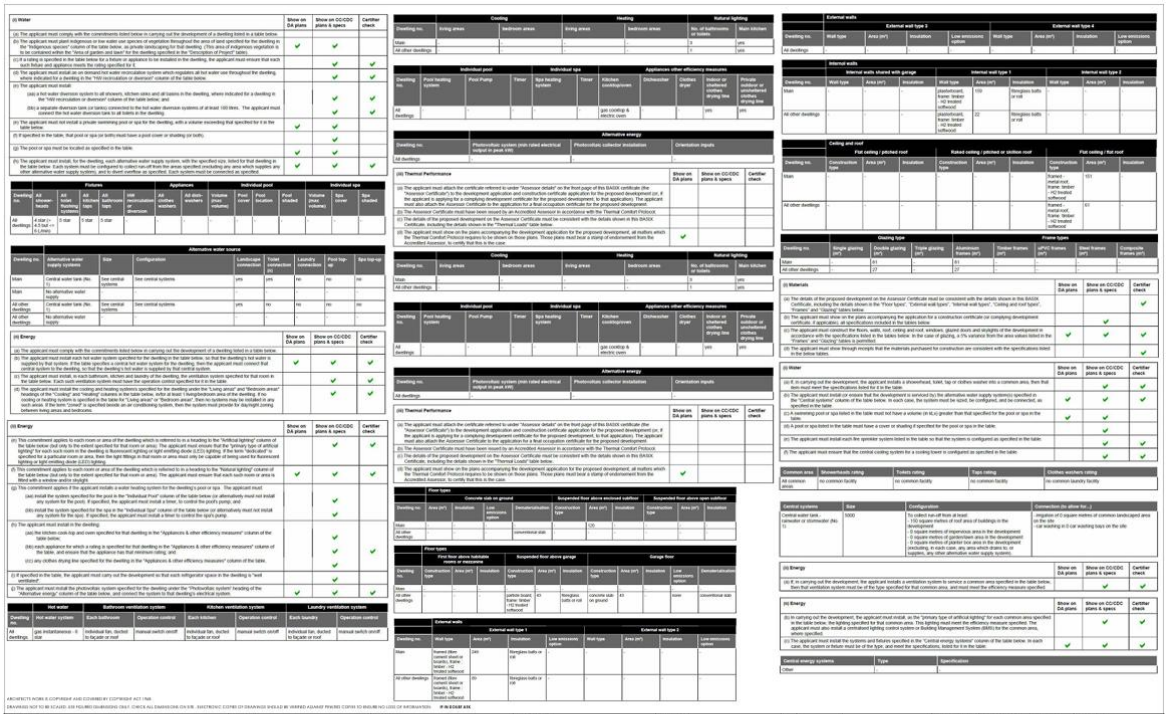
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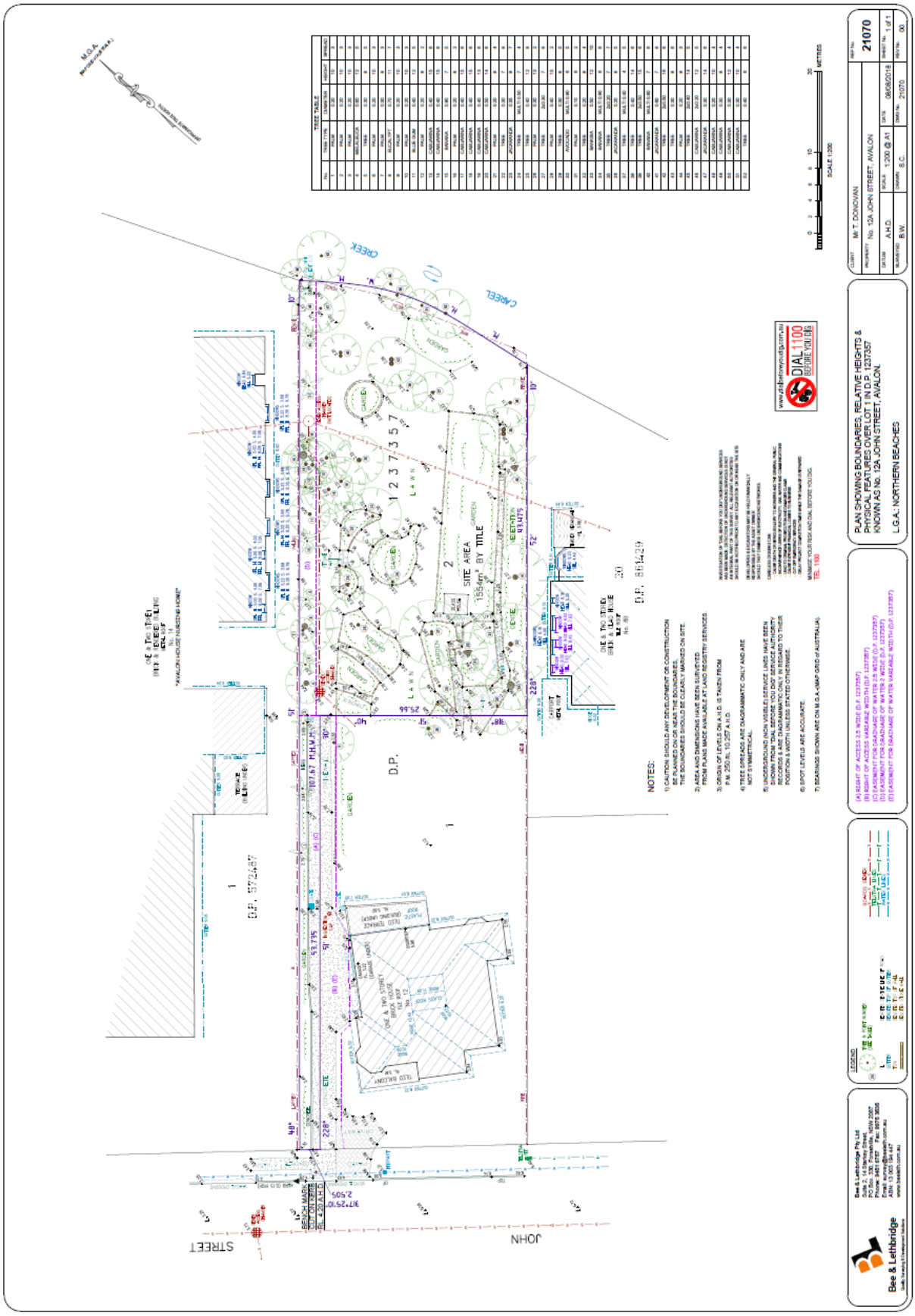
Appendix B

Site Survey
Bee & Lethbridge


PLAN SHOWING BOUNDARIES, RELATIVE HEIGHTS & PHYSICAL FEATURES OVER LOT 1 D.P. 1237357
KNOWN AS No. 12A JOHN STREET, AVALON.
L.G.A.: NORTHERN BEACHES
M.T. DONOVAN
No. 12A JOHN STREET, AVALON
21070
1:200 @ A1
26/04/2018
A.H.D.
B.W.
S.C.
SITE AREA 1554m²
BY TITLE
D.P. 1237357
D.P. 8614429
NOTES:
STREET
JOHN
CREEK
DIAL 1100 BEFORE YOU DIG
Bee & Lethbridge

Appendix C

Flood Information Request – Basic
Northern Beaches Council

northern beaches council

FLOOD INFORMATION REPORT (COMPREHENSIVE)

Property: 12A John Street AVALON BEACH NSW 2107
Lot DP: Lot 2 DP 1237357
Issue Date: 29/11/2023
Flood Study Reference: Avalon to Palm Beach Floodplain Risk Management Study and Plan 2017, Manly Hydraulics Laboratory

Flood Information[1]:

Map A - Flood Risk Precincts
Maximum Flood Planning Level (FPL)[2, 3, 4]: 3.05 m AHD

Map B - 1% AEP Flood & Key points
1% AEP Maximum Water Level[2, 3]: 2.55 m AHD
1% AEP Maximum Depth from natural ground level[3]: 1.84 m
1% AEP Maximum Velocity: 1.48 m/s

Map C - 1% AEP Hydraulic Categorisation
1% AEP Hydraulic Categorisation: Floodway at rear

Map D - Probable Maximum Flood
PMF Maximum Water Level (PMF)[4]: 3.57 m AHD
PMF Maximum Depth from natural ground level: 2.85 m
PMF Maximum Velocity: 3.60 m/s

Map E - Flooding with Climate Change
1% AEP Maximum Water Level with Climate change[3]: 2.91 m AHD
1% AEP Maximum Depth with Climate Change[3]: 2.17 m

Map F - Flood Life Hazard Category in PMF

Map G - Indicative Ground Surface Spot Heights

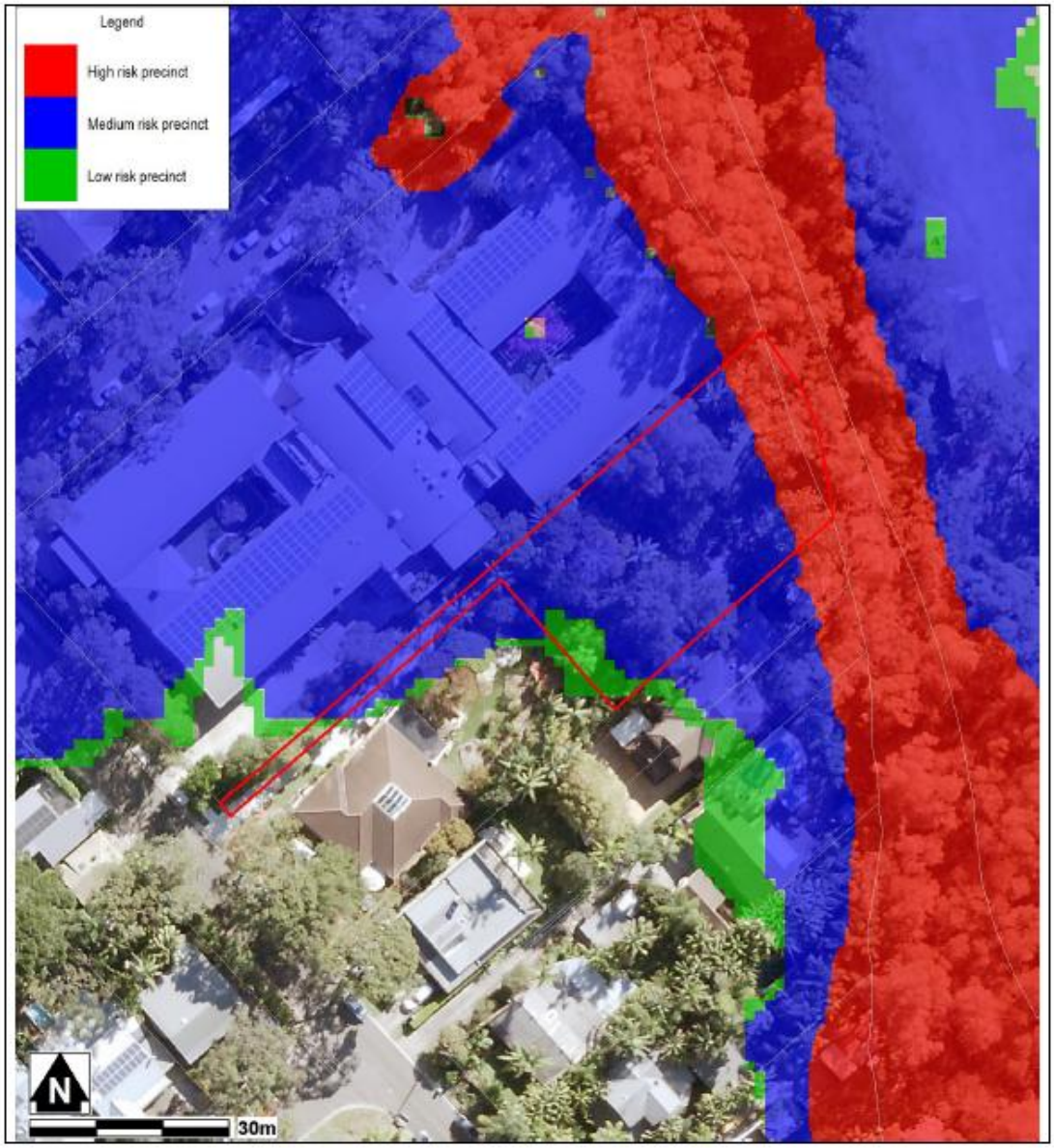
(1) The provided flood information does not account for any local overland flow issues nor private stormwater drainage systems.
(2) Overland flow/mainstream water levels may vary across a sloping site, resulting in variable minimum floor/ flood planning levels across the site. The maximum Flood Planning 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.

MAP A: FLOOD RISK PRECINCTS



Notes:

- **Low Flood Risk precinct** means all flood prone land not identified within the High or Medium flood risk precincts.
- **Medium Flood Risk precinct** means all flood prone land that is (a) within the 1% AEP Flood Planning Area; and (b) is not within the high flood risk precinct.
- **High Flood Risk precinct** means all flood prone land (a) within the 1% AEP Flood Planning Area; and (b) is either subject to a high hydraulic hazard, within the floodway or subject to significant evacuation difficulties (H5 or H6 Life Hazard Classification).
- The **Flood Planning Area** extent is equivalent to the Medium Flood Risk Precinct extent and includes the High Flood Risk Precinct within it. The mapped extent represents the 1% annual Exceedance Probability (AEP) flood event + freeboard.
- None of these mapped extents include climate change.
- Cadastre Lines (Source: NSW Government Land and Property Information), flood levels/extents (Source: Avalon to Palm Beach Floodplain Risk Management Study and Plan 2017, Manly Hydraulics Laboratory) and aerial photography (Source: NearMap 2014) are indicative only.

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

Notes:

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

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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	2.28	1.00	2.51	1.23	1.06	3.01	3.55	2.27	2.94
2	N/A	N/A	2.54	0.18	0.09	3.04	3.56	1.18	1.10
3	N/A	N/A	N/A	N/A	N/A	N/A	3.50	0.24	0.23
4	2.23	0.83	2.45	1.00	0.87	2.95	3.47	2.01	2.72
5	N/A	N/A	N/A	N/A	N/A	3.03	3.47	0.83	1.27
6	2.19	0.85	2.40	1.06	0.96	2.90	3.38	2.05	2.67
7	N/A	N/A	2.39	0.20	0.03	2.89	3.37	1.18	0.73
8	N/A	N/A	N/A	N/A	N/A	2.89	3.33	0.96	0.48

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

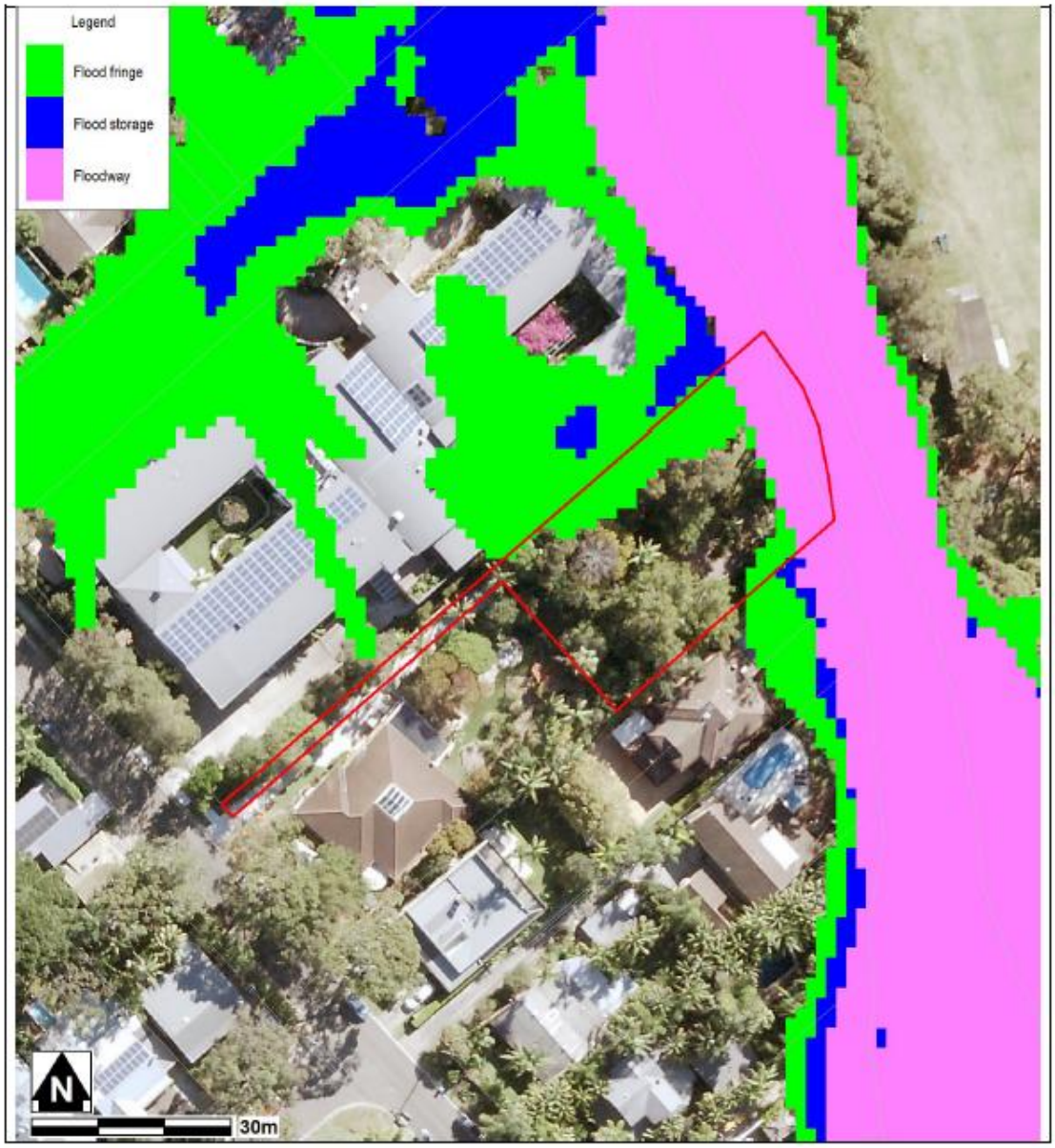
ID	CC 1% AEP Max WL (m AHD)	CC1 % AEP Max Depth (m)
1	2.84	1.55
2	2.86	0.48
3	N/A	N/A
4	2.78	1.32
5	2.81	0.17
6	2.73	1.39
7	2.72	0.53
8	2.71	0.34

WL – Water Level
PMF – Probable Maximum Flood
N/A - No Peak Water Level/Depth/Velocity Available.

Notes:

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

MAP C: 1% AEP FLOOD HYDRAULIC CATEGORY EXTENT MAP



Notes:

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

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MAP D: PMF EXTENT MAP

Notes:

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

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

Notes:

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

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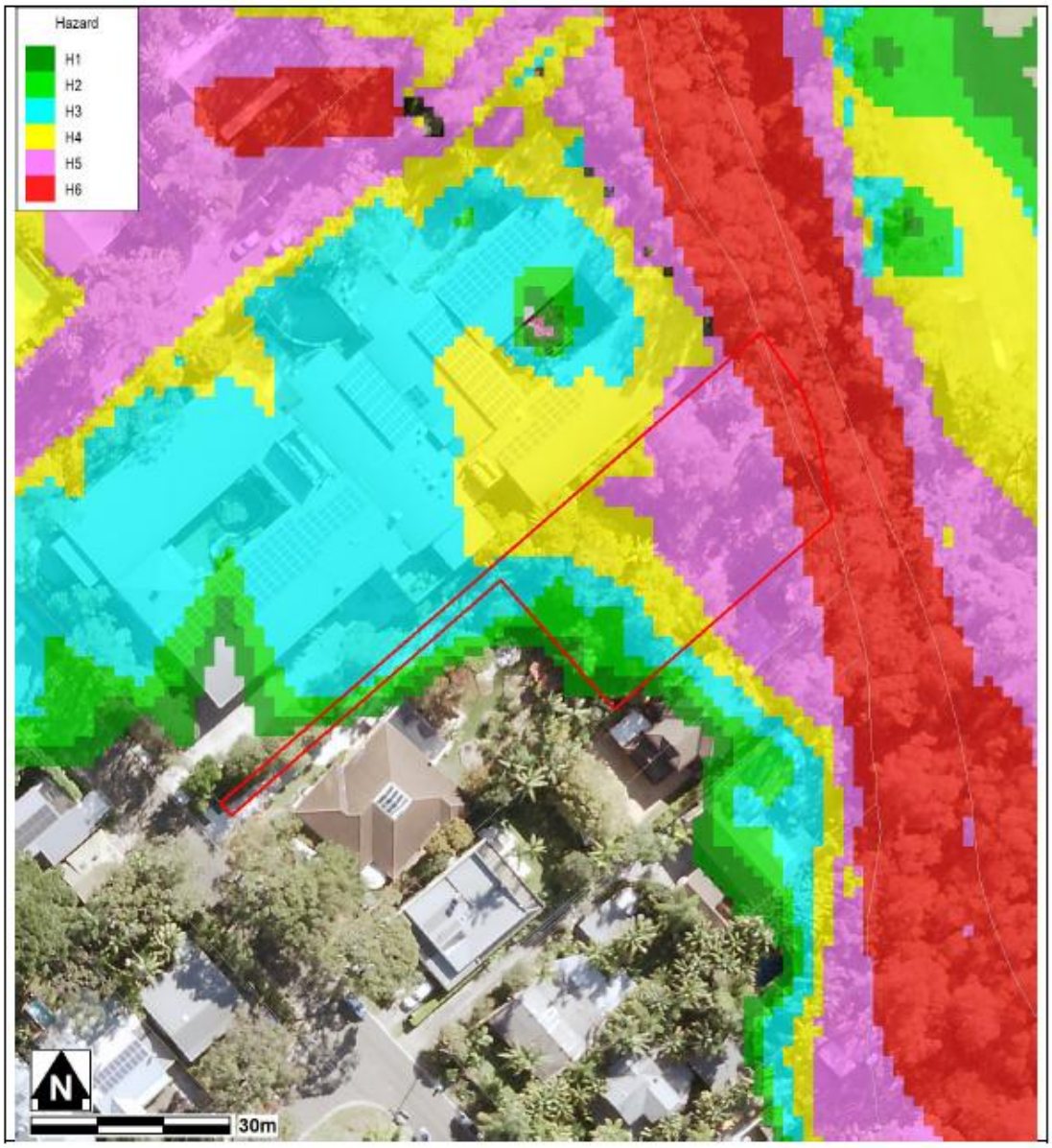
MAP F: FLOOD LIFE HAZARD CATEGORY IN PMF



Notes:

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

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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 ± 0.2m vertically and ± 0.15m 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.

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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 DCP (2013) – 5.4.3 Flood Prone Land
Warringah LEP (2011) – 5.21 Flood Planning Warringah LEP (2000) – 47 Flood Affected Land *	Warringah DCP (2011) – E11 Flood Prone Land
Pittwater LEP (2014) – 5.21 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 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 .

Appendix D

Northern Beaches Council RFI
(in part)

northern beaches council

19 March 2024

13010110011202121001223130113311233 13

Timothy H West
1/33 Avalon Parade
AVALON BEACH NSW 2107

Dear Sir/Madam,

Development Application No: DA2023/1819 for Construction of a dwelling house, detached garage and a secondary dwelling (Proposed Lot 1 – 12B) at 12A John Street AVALON BEACH.

I refer to your Application which is under assessment by Council.

The assessment of your application has revealed issues, which prevent Council from supporting the proposal.

The following is a list of the issues and concerns identified in the assessment:

1. **Council's Flood Officer**

   Council's Flood Officer has provided the following comments:

   The property is located within Low and High Risk Flood Precincts. The High Risk Flood Precinct is located in the Floodway at the rear of the property. The rest of the 1% AEP Flood extent on the property is identified as Flood Fringe. The property has the following flood characteristics:

   - *Maximum 1% AEP Flood Level with Climate Change (CC): 2.91m AHD*
   - *Maximum Flood Planning Level (FPL) with Climate Change: 3.41m AHD*
   - *Maximum 1% AEP Flood Level: 2.55m AHD*
   - *1% AEP Flood Hydraulic Category: Flood Fringe and Floodway*
   - *Probable Maximum Flood (PMF) Level: 3.57m AHD*
   - *PMF Life Hazard Category: H1 - H6*

   Since the development is one half of a subdivision on the existing lot at 12A John Street, Avalon Beach, it is considered an intensification of development. As such, the necessary FPL is taken as the FPL with Climate Change. This is outlined in Section B3.12 of the Pittwater DCP. The plans do not meet this requirement.

   Additionally, the underfloor area on the plans are not designed to be 50% open up to the 1% AEP Flood Level (without Climate Change). Thus it does not comply with control C3 of Section B3.11 of the Pittwater DCP.

t 1300 434 434
e council@northernbeaches.nsw.gov.au
northernbeaches.nsw.gov.au
PO Box 82 Manly NSW 1655
ABN 57 284 295 198

Dee Why Office: 725 Pittwater Road Dee Why NSW 2099
Mona Vale Office: 1 Park Street Mona Vale NSW 2103
Manly Office: 1 Belgrave Street Manly NSW 2095

Appendix E
Curriculum Vitae 2025
Lucas Molloy

Curriculum Vitae 2025

Lucas Molloy
MIEAust / CPEng / NER / APEC / Engineer / IntPE(Aus)

Education -

- 1988 Higher School Certificate
  Pittwater High School NSW Australia
- 1995 Bachelor of Engineering (Civil)
  University of Wollongong NSW Australia

Employment -

- May 2007 to date
  Barrenjoey Consulting Engineers pty ltd
  Director / Engineer / Draftsman
- April 2003 to April 2007
  Northern Beaches Consulting Engineers pty ltd
  Director / Engineer
- Feb 1997 to April 2003
  Northern Beaches Consulting Engineers pty ltd
  Engineer
- Dec 1988 to Dec 1993
  Jack Hodgson Consulting Engineers
  Undergraduate trainee / Engineer

For last sixteen years Director / Engineer / Draftsman of the structural and civil engineering practice Barrenjoey Consulting Engineers pty ltd (est 2007). I am responsible for the structural and civil (including stormwater management) design, documentation, investigation and construction supervision of predominately residential developments.
The spectrum of projects I have consulted on, vary from a 6 square meter timber framed deck extension of a residential house (budget ~ $1,500) to 8 storey commercial development (budget of ~ $10,000,000).

During my career I have been active in the preparation and issuing of –

- 250+ stormwater management plans inc on site detention
- 50+ overflow / flood analysis using DRAINS / HECRAS / AR+R
- 25+ flood inundation & risk assessment reports

Appendix F

Northern Beaches Council
Standard Hydraulic Certification Form

NORTHERN BEACHES COUNCIL
STANDARD HYDRAULIC CERTIFICATION FORM

FORM A/A1 – To be submitted with Development Application

Development Application for

Address of site: **12A John St Avalon**

Declaration made by hydraulic engineer or professional consultant specialising in flooding/flood risk management as part of undertaking the Flood Management Report:

I, **Lucas Molloy** on behalf of **Barrenjoey Consulting Engineers p/l** on this the **22nd March 2025** certify that I am engineer or a professional consultant specialising in flooding and I am authorised by the above organisation/ company to issue this document and to certify that the organisation/ company has a current professional indemnity policy of at least $10 million.

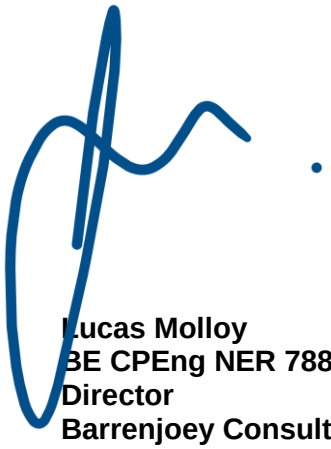
Flood Management Report Details:

Report Title: **FLOOD INUNDATION & RISK ASSESSMENT REPORT PROPOSED NEW RESIDENCE 12A JOHN ST AVALON**
Report Date: **March 2025**
Author: **Lucas Molloy**
Author's Company/Organisation: **Barrenjoey Consulting Engineers p/l**

I: **Lucas Molloy**

Please tick all that are applicable (more than one box can be ticked)
- have obtained and included flood information from Council (must be less than 12 months old, **na**)
X have followed Council's Guidelines for Preparing a Flood Management Report
na have requested a variation to one or more of the flood related development controls. Details are provided in the *Flood Management Report*.

Signature



Name **Lucas Molloy**
BE CPEng NER 788184
Director
Barrenjoey Consulting Engineers p/l

End