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## Flood Management Report

4B Holloway Place, Curl Curl

### Issue B

Prepared for: Peninsula Homes

Prepared by: Hannah Stubley



# Flood Management Report

**Project no:** 2503106

**Issue:** B

**Date:** 03.07.2025

**Client:** Peninsula Homes

**Engineer:** Hannah Stubley

**Principal review:** Michael Wachjo

**Council:** Northern Beaches Council (Region 2)

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Issue	Engineer	Peer Review	Principal Review	Description	Date
A	H.Stubley	S.Raaff	M.Wachjo	Report for DA submission	09.02.2025
B	H.Stubley	S.Raaff	M.Wachjo	Revised to suit updated architecturals	03.07.2025

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## 1. Introduction

At the request of Peninsula Homes, Northern Beaches Consulting Engineers have undertaken a hydrologic and hydraulic investigation at 4B Holloway Place, Curl Curl to determine the effect of the proposed development on the existing floodplain.

For the undertaking of this report, Northern Beaches Consulting Engineers (NBCE) has analysed the general drainage patterns of the catchment and has considered the effects of mainstream flooding and overland flow flooding as determined in the Council Supplied Flood information with respect to the proposed development. This report has been prepared in accordance with:

- *Australian Rainfall and Runoff Guidelines 2019*
- *Northern Beaches Council (Warringah Area)*
- *Warringah Local Environmental Plan 2013 (LEP)*
- *Warringah Development Control Plan (DCP) – Section E11 Flood Prone Land*
- *NSW Government Floodplain Management Manual (2005)*
- *Council supplied flood information*

### 1.1 Aim

This study explores the impact of overland flow flooding envisaged to occur at the subject site up to the 1% AEP storm event. The development under consideration is located at 4B Holloway Place, Curl Curl. This area is predicted to experience overland flow flooding when the capacity of Council's drainage infrastructure is exceeded during heavy rainfall events. The anticipated flood behaviour within the contributing catchment for the 1% Annual Exceedance Probability (AEP) and Probable Maximum Flood (PMF) has been assessed in relation to the proposed development at the subject site.

### 1.2 Description of Development

The proposed development at the residential property at 4B Holloway Place, Curl Curl consists of a subdivision and new dual residence, pool and landscaping works (refer Appendix C).

### 1.3 Site Conditions

The property is approximately 1029m<sup>2</sup> and located within the Northern Beaches Council (Warringah Area) LGA. The subject site is relatively flat with a high point generally located in the middle of the site .



## 1.4 Flood Behaviour

The development lies in the Greendale Creek catchment area. Flooding within the area occurs when intense local rainfall generates runoff exceeding the capacity of council's drainage infrastructure, producing overland flow flooding. Runoff from a low point on Manuela Place is expected to exceed the capacity of the kerb and gutter and flow in a north easterly trajectory through the subject site.

## 2. Flood Analysis

### 2.1 Site Flooding Extent

The site flooding extent has been determined using Council's available flood information. All relevant flood information is shown below:

Flood Planning Level (FPL) (Max):	<b>5.39 m AHD<sup>i</sup></b>
Predicted 1% AEP flood level (Max):	5.09 m AHD
Predicted 1% AEP flood depth (Max):	0.23 m (Flood ID Point 3) <sup>ii</sup>
1% AEP Maximum Velocity (Max):	0.36 m/s (Flood ID Point 1) <sup>ii</sup>
Probable Maximum Flood (PMF) level (Max):	5.53 m AHD
Probable Maximum Flood (PMF) depth (Max):	1.08 m
Probable Maximum Flood (PMF) velocity:	1.05 m/s
Flood Risk Precinct:	Low – Medium
1% AEP Hydraulic Category	Flood Fringe – Flood Storage
Flood Life Hazard Category:	H1-H3
Mapping of relevant extents:	Refer Appendix B
Proposed Ground Floor Level:	FFL 5.53m AHD (refer Appendix C)
Proposed First Floor Level:	FFL 8.48m AHD (refer Appendix C)

<sup>i</sup> The maximum  $V \cdot D$  provided within council's flood information report (Flood ID Point 2) is  $0.0646 \text{ m}^2/\text{s}$  ( $0.19 \text{ m} \cdot 0.34 \text{ m/s}$ ). Therefore, a 300mm freeboard has been applied to the development above the predicted maximum 1% AEP flood level of 5.09m AHD which results in an adopted Flood Planning Level (FPL) of 5.39m AHD.

<sup>ii</sup> The maximum 1% AEP flood depth and velocities provided on the flood information report provided by council on the 27<sup>th</sup> of March 2025 (Refer Appendix B) appear to be an inaccuracy left over from the corrected (obsolete) flood information report from council dated 14<sup>th</sup> of February (Refer Appendix D). Therefore, the maximum 1% AEP flood depth 0.23 m (Flood ID Point 3) and velocity 0.36 m/s (Flood ID Point 1) from the flood information report provided by council on the 27<sup>th</sup> of March 2025 has been used to determine the maximum  $V \cdot D$  of the subject site.

## 3. Assessment of Impacts

### 3.1 Development Matrix

The subject site is classified under the residential category in figure 2 below.

		Medium Flood Risk Precinct				
		Vulnerable & Critical Use	Residential Use	Business & Industrial Use	Recreational & Environmental Use	Subdivision & Civil Works
<b>A</b>	<b>Flood effects caused by Development</b>	A1 A2	A1 A2	A1 A2	A1 A2	A1 A2
<b>B</b>	<b>Building Components &amp; Structural</b>	B1 B2 B3	B1 B2 B3	B1 B2 B3	B1 B2 B3	
<b>C</b>	<b>Floor Levels</b>	C2 C3	C1 C3 C4 C6	C1 C3 C4 C6 C7	C3	C5
<b>D</b>	<b>Car Parking</b>	D1 D2 D3 D4 D7	D1 D2 D3 D4 D5 D6	D1 D2 D3 D4 D5 D6	D1 D2 D3 D4 D5 D6	D1
<b>E</b>	<b>Emergency Response</b>	E1 E2	E1	E1	E1	E3
<b>F</b>	<b>Fencing</b>	F1	F1	F1	F1	F1
<b>G</b>	<b>Storage of Goods</b>	G1	G1	G1	G1	
<b>H</b>	<b>Pools</b>	H1	H1	H1	H1	H1

Figure 1 - Development Matrix. Source: Northern Beaches Council Website Information

Table 1 - Assessment of Impacts Table

		Compliance	
	Not Applicable	Yes	No
A Flood effects caused by the development		x*	
B Building Components & Structural		x*	
C Floor Levels		x*	
D Carparking		x*	
E Flood Emergency Response		x*	
F Fencing		x*	
G Storage of Goods		x*	
H Pools		x*	

\*Note – Compliance achievable should the recommendations outline in this report be adopted

## 4. Assessment and Recommendations

### 4.1 Flood Planning Level

The proposed ground floor level FFL 5.39m AHD is located at the Flood Planning Level (FPL) RL 5.39m AHD.

### 4.2 Flood Storage

The existing and proposed building footprint is generally located outside the extent of the 1% AEP flood storage area. A minor increase in on site flood storage is anticipated as a result of the development due to the removal of the existing garage within the flood storage area. Refer Appendix A.

Flood storage calculation summary is provided below:

- Flood storage increase (Flood storage tank) =  $0.43\text{m}^2 \times 0.19\text{m}$  (Flood depth at Flood ID Point 2) =  $+0.08\text{m}^3$

### 4.3 Building Components and Structural Soundness

All buildings are to be designed and constructed in accordance with Reducing Vulnerability of Buildings to Flood Damage – Guidance on Building in Flood Prone Areas, Hawkesbury-Nepean Floodplain Management Steering Committee (2006). Below are key areas to be considered in the architectural and structural design of the development:

Structural component and key risks	Provision for protecting structural performance
Raised concrete slab	<ul style="list-style-type: none"> <li>- In areas of high silt deposition, use a deeper slab rebate to hold more slit without it bridging the wall cavity.</li> </ul>
Slab on ground	<ul style="list-style-type: none"> <li>- In areas of high slit deposition, use a deeper slab rebate to hold more slit without it bridging the wall cavity.</li> </ul>
Suspended timber floor	<ul style="list-style-type: none"> <li>- Ventilation needed to ensure drying and to prevent decay of timber components.</li> <li>- Allow for some loss of load bearing capacity with manufactured/engineered timber beams.</li> <li>- Select plywood flooring with waterproof glue bond.</li> <li>- Avoid particleboard flooring (which weakens after immersion) and underfloor thermal and noise insulation or remove it post-flood to assist drying.</li> <li>- To reduce the risk of ponding in subfloor areas after flooding has occurred, the sub-floor area is to be filled and levelled to ensure that it is highest at the centre and drains to the edges.</li> <li>- Provide a minimum 450mm clearance required between underside of timber structure and ground as per BCA.</li> <li>- Timber used in sub-floor structural members and in flooring should be minimum H3 (Avoid using LVL's)</li> </ul>

Any new structures are to be constructed of fit for purpose building materials in accordance with “Reducing vulnerability of buildings to flood damage”. We recommend to use solid materials, such as block and solid masonry to construct development below the FPL. New structures are to be designed and constructed to ensure structural integrity up to the FPL (5.39m AHD), taking into account the forces of floodwater, wave action, flowing water with debris and buoyancy and immersion.

#### 4.4 Electrical Requirements

The switchboard and main circuit unit must be fitted above the FPL (5.39m AHD). All new electrical equipment, power points, wiring, fuel lines, sewerage systems or any other service pipes and connections must be waterproofed and/or located above the FPL (5.39m AHD) and conduits must be laid such that they are free draining.

#### 4.5 Fences

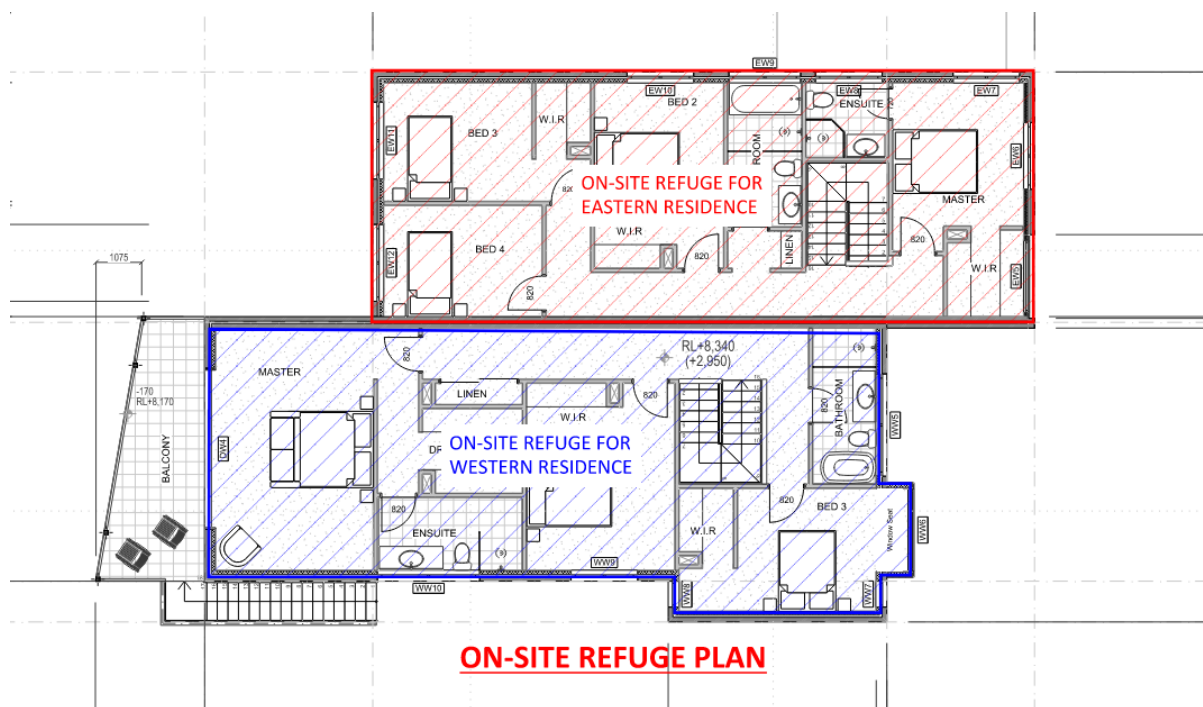
Any proposed fencing along the boundaries, alternative to pool type fencing, located within the 1% AEP flood extent are to be certified and/or designed by a civil engineer to withstand hydrostatic forces up to and including the 1% AEP storm event. Openings are to be provided, excluding the property frontage, to ensure the 1% AEP floodwater is able to flow through the property unimpeded. At least 50% of the fence must be of an open design from the natural ground level up to the 1% AEP flood level (RL 5.09m AHD). Openings are to be a minimum 75mm x 75mm.

#### 4.6 Carparking

The eastern residence carport and car space is located outside the extent of the 1% AEP Flood. The western residence car spaces are located within the 1% AEP Flood extent. However, the maximum flood depth within the carparking location is less than 300mm (1% AEP flood depth of 0.23m at Flood ID point 3). Therefore, vehicle barriers/restraints are not required.

## 4.7 Emergency Flood Response

The proposed first floor level of both dwellings (FFL 8.34m AHD) are recommended to provide an on-site refuge at the PMF level RL 5.53m AHD. The on-site refuge must have appropriate access installed to enable access points from all areas within the development. The proposed on-site refuge is to be structurally adequate up to the PMF (5.53m AHD). Refer to below for the proposed on-site refuge location.



The on-site refuge must provide:

- Sufficient clean water for all occupants
- Portable radio with spare batteries
- Torch with spare batteries
- First aid Kit

If flooding is experienced:

- Evacuate to the designated on-site refuge location and shelter in place.
- Evacuate if ordered by Emergency Services Personnel regardless of availability of on-site refuge.

### Important Contact Information

NSW SES: 132 500

Life-threatening Emergencies: 000

Northern Beaches Council: 1300 434 434

## 5. Conclusion

In accordance with accepted engineering practice, NBCE have undertaken a flood study at the above-mentioned site. No anticipated increased flooding is envisaged to occur at the subject site due to the proposed development should the recommendations of this report be carried out. The flood information provided by Northern Beaches Council has been used for this assessment. The recommendations of this report should be adopted for the development to meet the requirements of *Northern Beaches Development Control Plan (DCP)*. Please contact the author if further clarification is required.

### NORTHERN BEACHES CONSULTING ENGINEERS P/L

Author:



**Hannah Stubley**

Engineer 3 | B.Eng (Hons.) Civil, B.Sc. Environmental

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Reviewed By:



**Michael Wachjo**

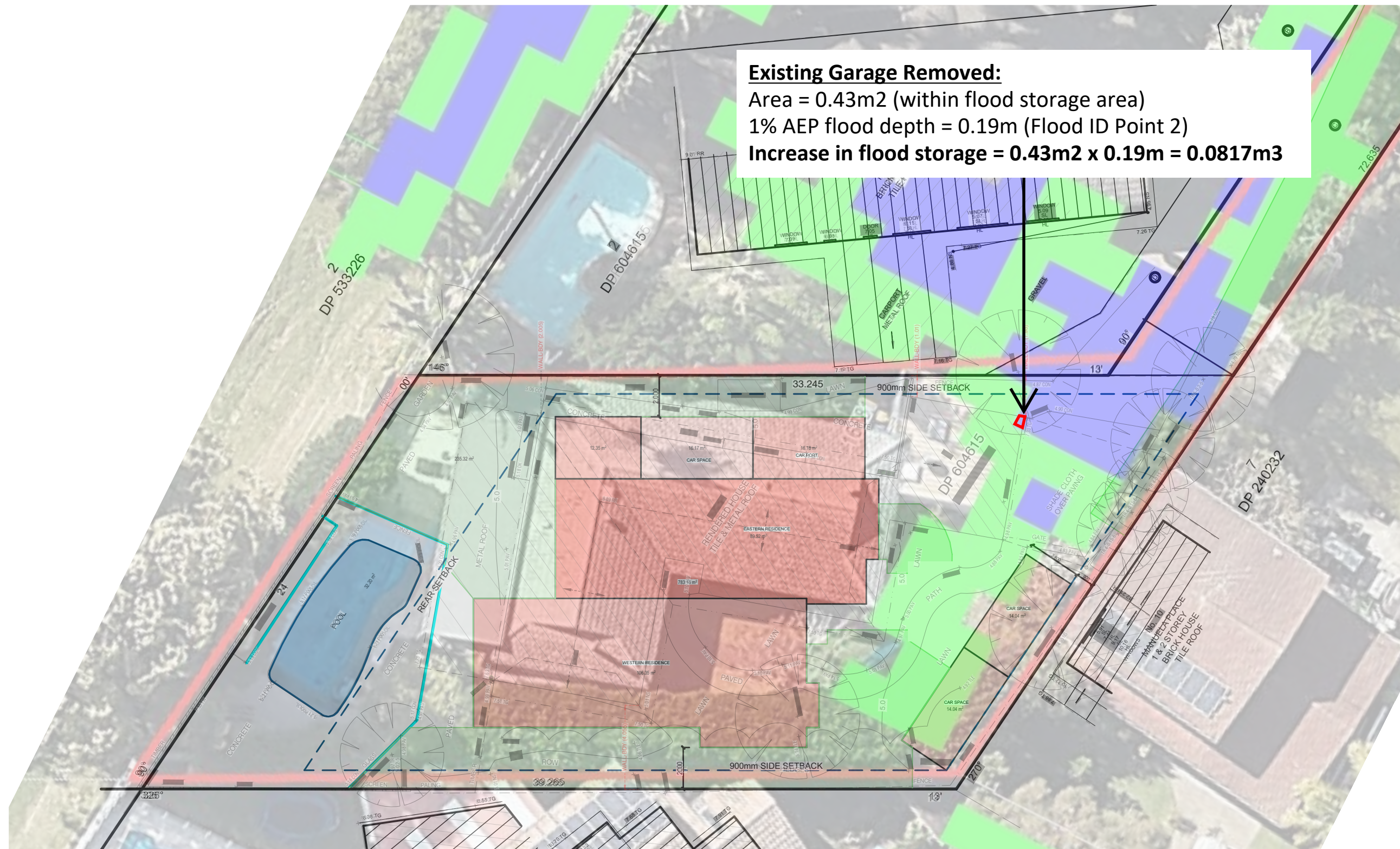
Director | B.E.(Civil), MIEAust.



## APPENDIX A

### Flood Storage Calculations





## FLOOD STORAGE CALCULATIONS

## APPENDIX B

Council Flood Information (Current) dated 27<sup>th</sup> March 2025



# COMPREHENSIVE FLOOD INFORMATION REPORT

**Property:** 4B Holloway Place CURL CURL NSW 2096

**Lot DP:** Part Lot 1 DP 604615

**Issue Date:** 27/03/2025

**Flood Study Reference:** Greendale Creek Flood Study 2023, WMA

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

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

Maximum Flood Planning Level (FPL) <sup>2, 3, 4</sup>: 5.59 m AHD

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

1% AEP Maximum Water Level <sup>2, 3</sup>: 5.09 m AHD

1% AEP Maximum Depth from natural ground level<sup>3</sup>: 0.34 m

1% AEP Maximum Velocity: 0.51 m/s

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

1% AEP Hydraulic Categorisation: Flood Storage / Flood Fringe

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

PMF Maximum Water Level (PMF) <sup>4</sup>: 5.53 m AHD

PMF Maximum Depth from natural ground level: 1.08 m

PMF Maximum Velocity: 1.05 m/s

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

1% AEP Maximum Water Level with Climate change <sup>3</sup>: 5.22 m AHD

1% AEP Maximum Depth with Climate Change<sup>3</sup>: 0.36 m

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

H3 – H1

- (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

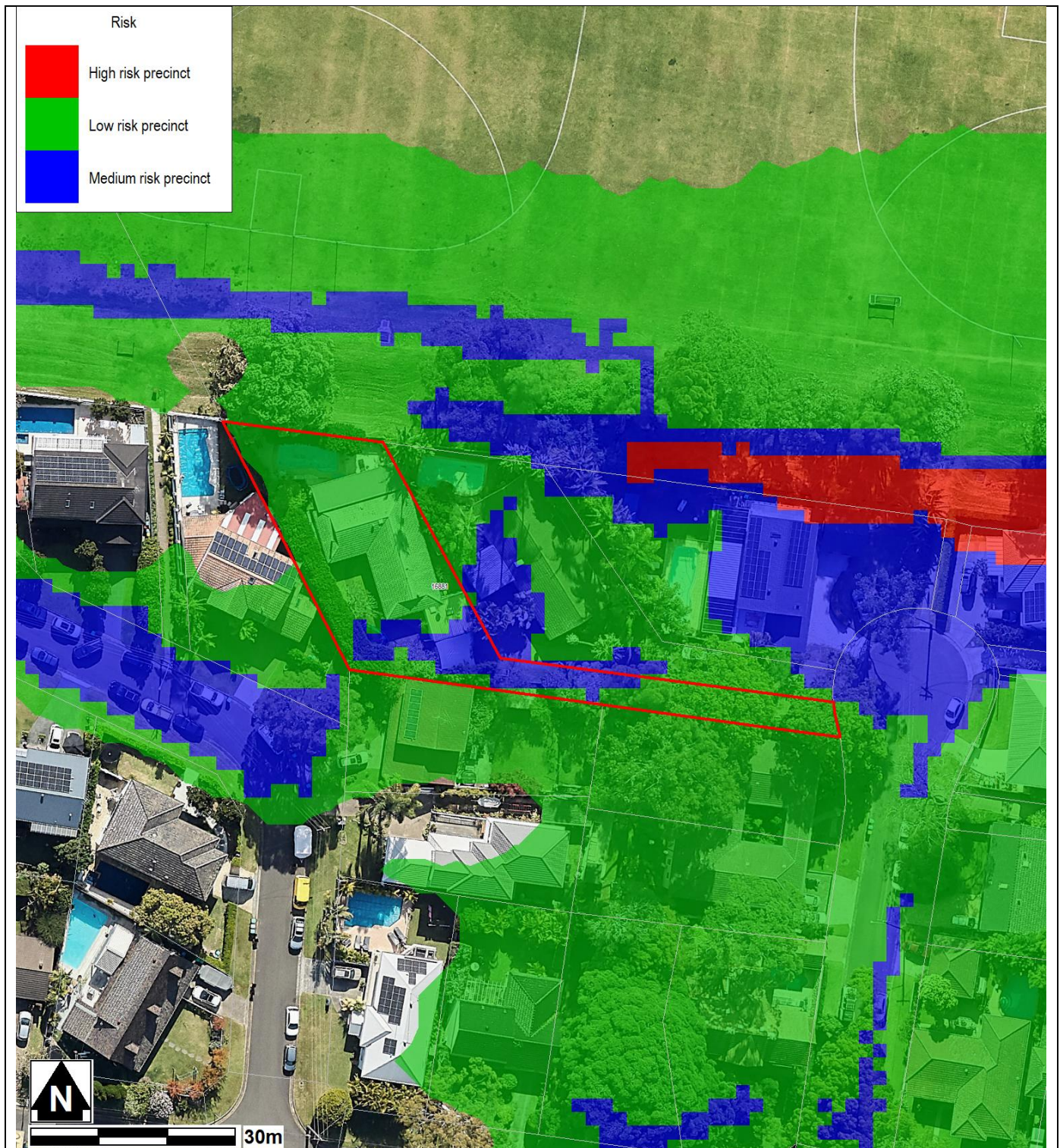
## Notes

### **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: Greendale Creek Flood Study 2023, WMA) 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: Greendale Creek Flood Study 2023, WMA) 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	5.09	0.15	0.36	5.59	5.52	0.58	0.86
2	5.00	0.16	5.04	0.19	0.34	5.54	5.52	0.67	0.74
3	5.00	0.19	5.04	0.23	0.23	5.54	5.52	0.70	0.40

## 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	5.11	0.17
2	5.06	0.21
3	5.06	0.25

WL – Water Level

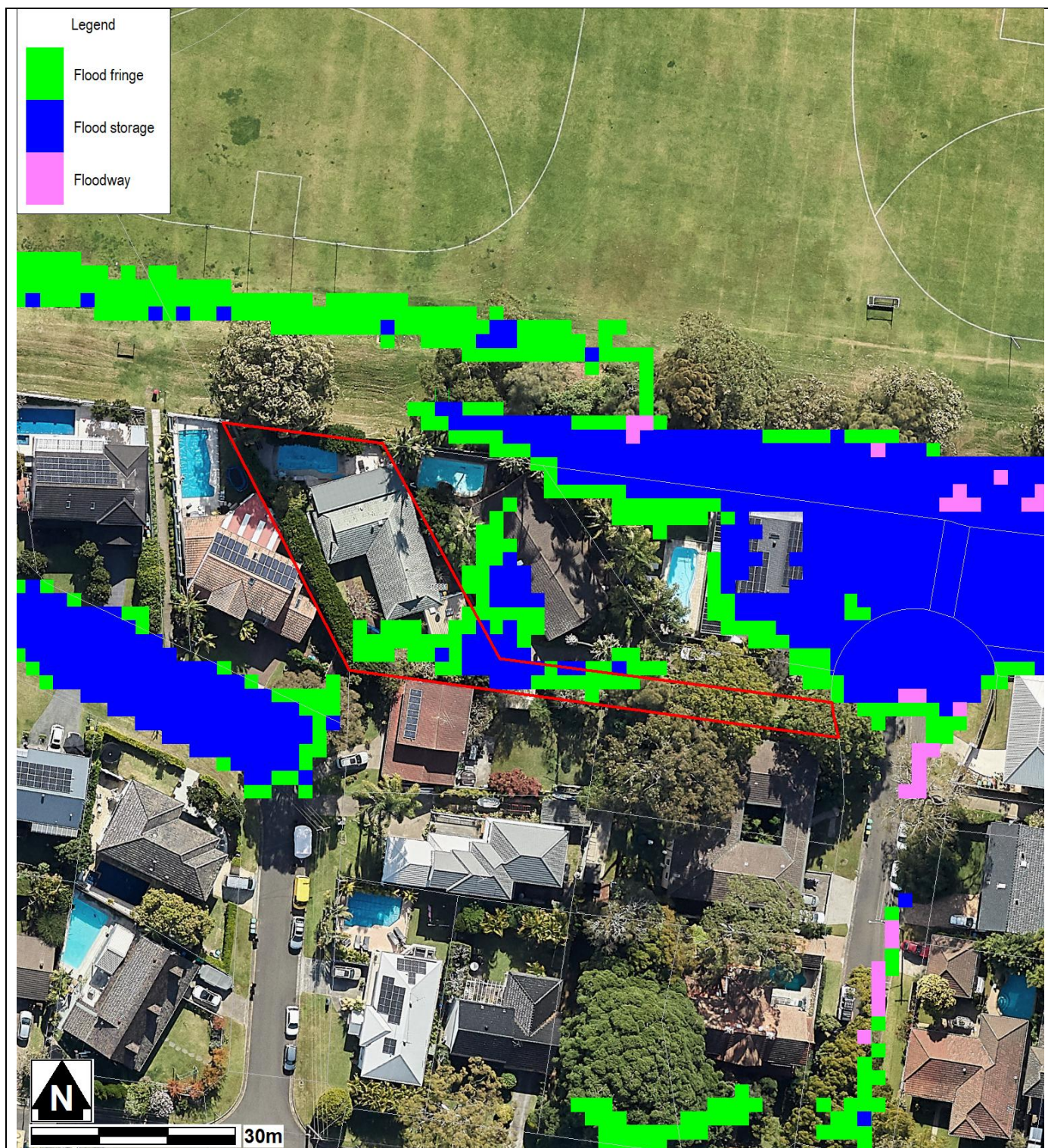
PMF – Probable Maximum Flood

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

### Notes:

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

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

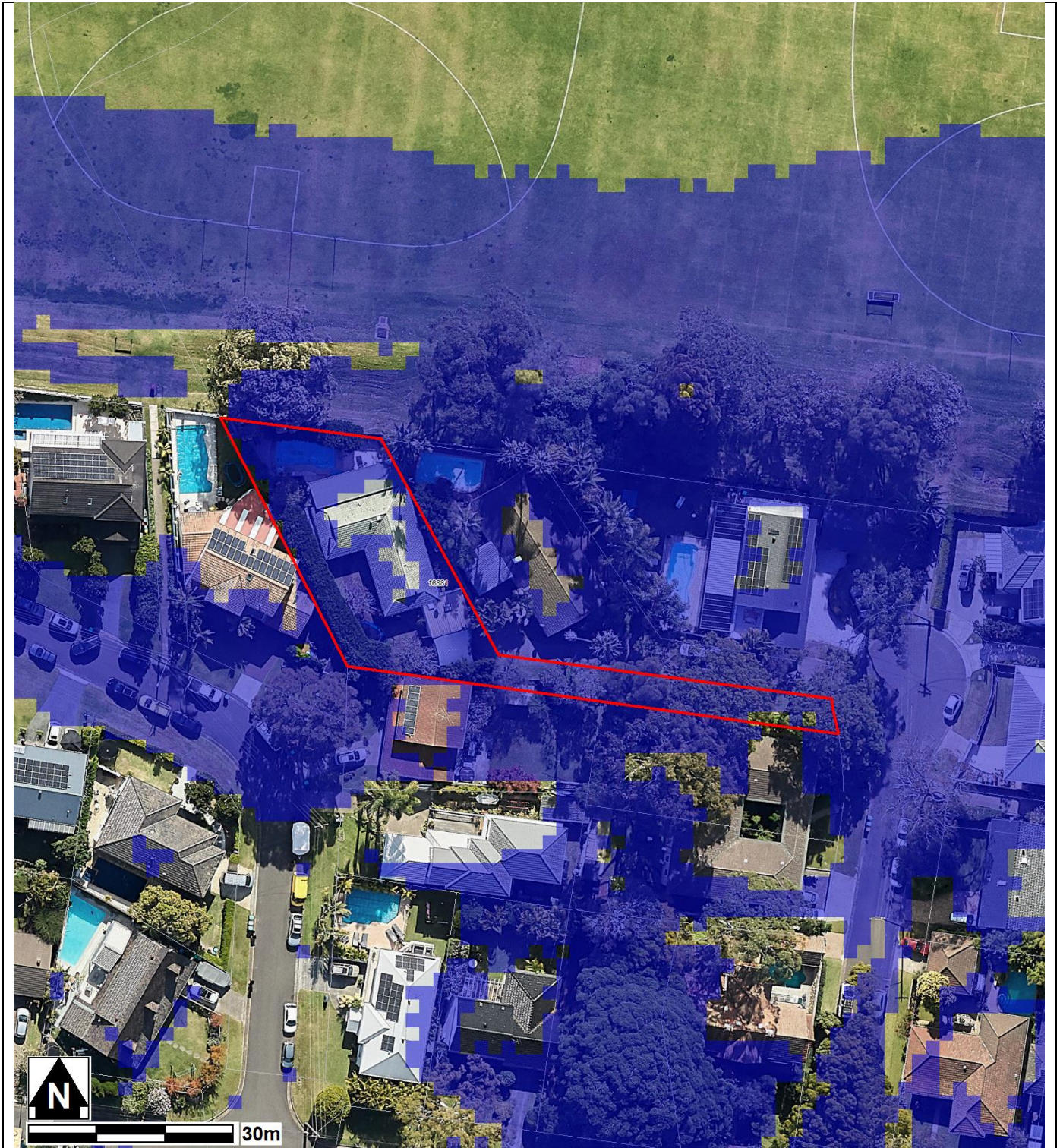


## Notes:

- Extent represents the 1% Annual Exceedance Probability (AEP) flood event
- Extent does not include climate change
- Cadastre Lines (Source: NSW Government Land and Property Information), flood levels/extents (Source: Greendale Creek Flood Study 2023, WMA) and aerial photography (Source: NearMap 2014) are indicative only



## MAP D: PMF EXTENT MAP

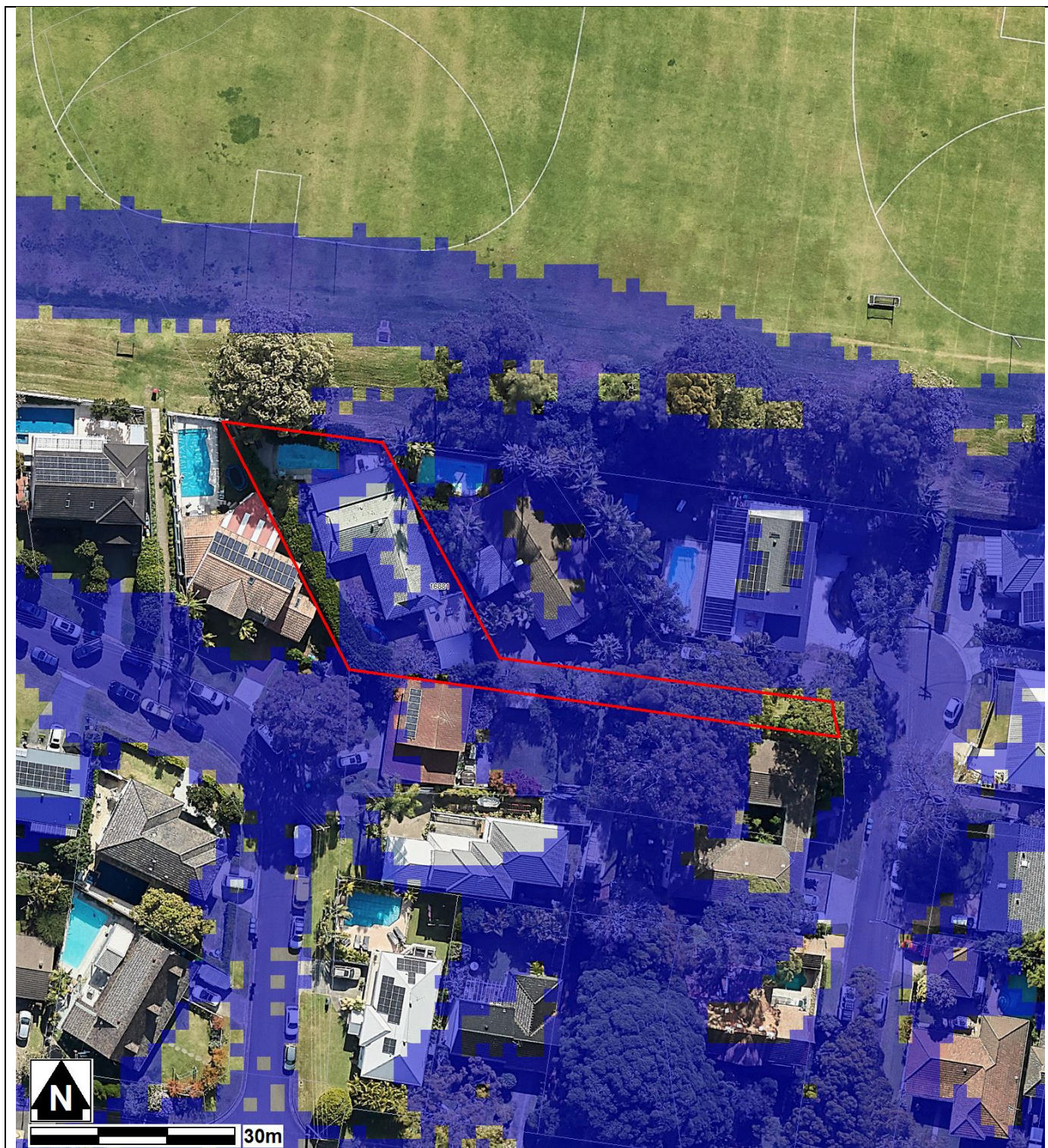


### Notes:

- 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: Greendale Creek Flood Study 2023, WMA) and aerial photography (Source: NearMap 2014) are indicative only



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

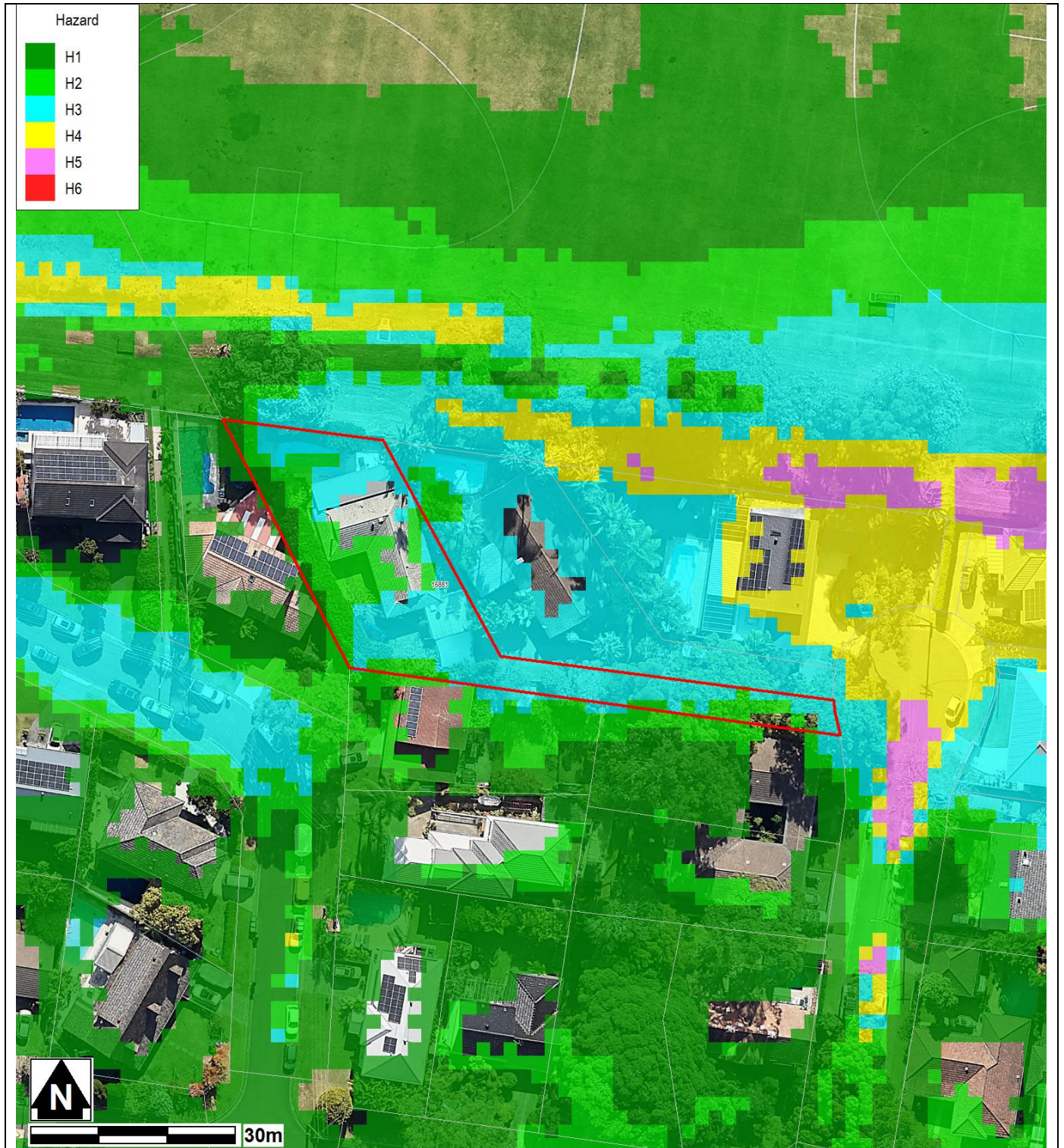


### Notes:

- Extent represents the 1% annual Exceedance Probability (AEP) flood event including 30% rainfall intensity and 0.9m Sea Level Rise climate change scenario
- Flood events exceeding the 1% AEP can occur on this site.
- Cadastre Lines (Source: NSW Government Land and Property Information), flood levels/extents (Source: Greendale Creek Flood Study 2023, WMA) 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: Greendale Creek Flood Study 2023, WMA) and aerial photography (Source Near Map 2014) are indicative only.

# Preparation of a Flood Management Report

## Introduction

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

## Planning Requirements for Flood Prone Land

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

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

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

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

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

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

## When is a Flood Management Report required?

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

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

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

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

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

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

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

### Preparation of a Flood Management Report

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

1. Description of development

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

2. Flood analysis

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

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

3. Assessment of impacts

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

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

- Demonstration of how the development complies with any relevant flood planning requirements

from the DCP, LEP, Water Management for Development Policy, and if it is in the Warriewood Valley Urban Land Release Area, with the Warriewood Valley Water Management Specification (2001)

- For any non-compliance, a justification for why the development should still be considered.
- Calculations of available flood storage if compensatory flood storage is proposed
- Plan of the proposed development site showing the predicted 1% AEP and PMF flood extents, as well as any high hazard or floodway affectation
- Development recommendations and construction methodologies
- Qualifications of author - Council requires that the Flood Management Report be prepared by a suitably qualified Engineer with experience in flood design / management who has, or is eligible for, membership to the Institution of Engineers Australia
- Any flood advice provided by Council
- Any other details which may be relevant

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

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

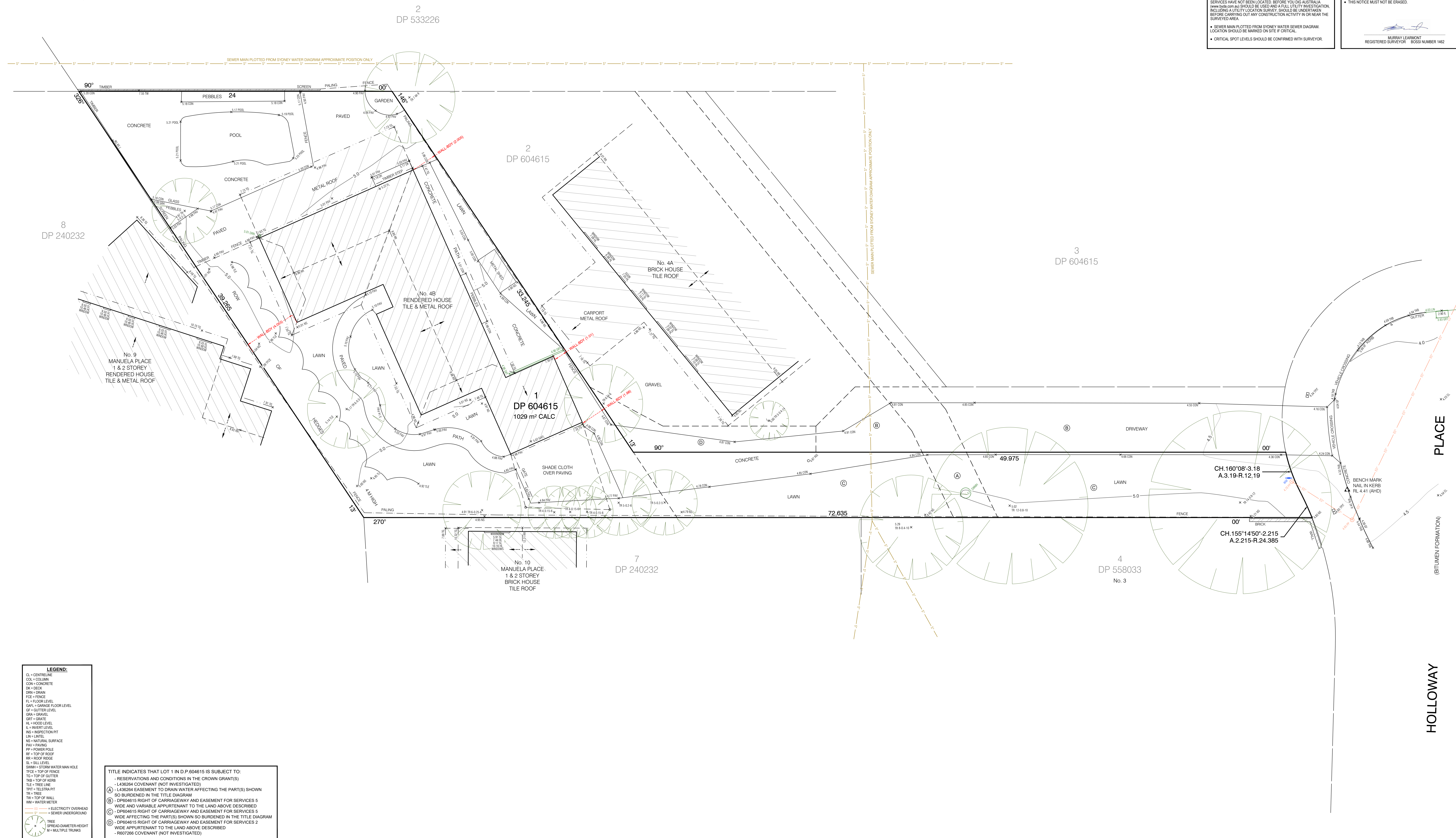
Council's Flood Team may be contacted on 1300 434 434 or at [floodplain@northernbeaches.nsw.gov.au](mailto:floodplain@northernbeaches.nsw.gov.au) .



## APPENDIX C

### Proposed Development Plans & Survey





- BOUNDARY IDENTIFICATION HAS BEEN UNDERTAKEN.
- WALL TO BOUNDARY DIMENSIONS SHOWN HEREON MUST NOT BE USED FOR CONSTRUCTION.
- WHERE THE LAND IS TO BE UNDERTAKEN ON OR ADJACENT TO PROPERTY BOUNDARIES THE BOUNDARIES OF THE LAND MUST BE IDENTIFIED AND SET OUT.

**THIS SURVEY IS FOR THE PURPOSES OF THE SUBJECT LAND ONLY. THIS PLAN MUST NOT BE USED FOR ANY OTHER MATTER, PURPOSE OR CONSTRUCTION.**

- TREES ARE SIZE ESTIMATES ONLY.
- THIS PLAN HAS BEEN PREPARED FOR THE EXCLUSIVE USE OF SHAWN WALSH.
- RELATIONSHIP OF IMPROVEMENTS TO BOUNDARIES IS DIAGRAMMATIC. WHERE THERE ARE ERRORS ARE CRITICAL, THEY SHOULD BE CONFIRMED BY FURTHER SURVEY.
- EXCEPT WHERE SHOWN BY DIMENSION LOCATION OF DETAIL WITH DIMENSIONS IS NOT TO BE USED FOR CONSTRUCTION.
- ONLY VISIBLE SERVICES HAVE BEEN LOCATED. UNDERGROUND SERVICES HAVE NOT BEEN LOCATED. BEFORE YOU DIG (AUSTRALIA'S DUTY TO EXAMINE) YOU MUST OBTAIN ALL UTILITY INVESTIGATION INCLUDING A UTILITY LOCATING SURVEY. SHOULD BE UNDERTAKEN PRIOR TO ANY CONSTRUCTION ACTIVITY IN OR NEAR THE SURVEYED AREA.
- SEWER MAIN PLOTTED FROM SONEY WATER SEWER DIAGRAM.
- CRITICAL SPOT LEVELS SHOULD BE CONFIRMED WITH SURVEYOR

\* CONTOURS SHOULD REFLECT THE TOPOGRAPHY. THEY DO NOT REPRESENT THE EXACT LEVEL. ANY PARTICULAR POINT ON A SPOT LEVEL SHOULD BE USED FOR CALCULATIONS OF QUANTITIES WITH CAUTION.

\* SPOT INTERVAL: 0.5 mtrs. SPOT LEVELS SHOULD BE ADAPTED TO THE TOPOGRAPHY.

\* POSITION OF RESE LINE ARE DIAGRAMATIC ONLY (NOT TO SCALE).

\* THE INFORMATION IS ONLY TO BE USED AT A SCALE ACCURACY OF 1:100.


\* DO NOT SCALE OFF THIS PLAN. FIGURED DIMENSIONS TO BE TAKEN TO THE DIMENSIONS OF THE RESEARCHER'S COPY.

\* COPYRIGHT © CMS SURVEYS 2004

\* NO PART OF THIS SURVEY MAY BE REPRODUCED, STORED IN A RETRIEVAL SYSTEM OR TRANSMITTED IN ANY FORM, WITHOUT THE WRITTEN PERMISSION OF THE COPYRIGHT OWNER EXCEPT AS PERMITTED BY THE COPYRIGHT ACT 1968.

\* ANY PERMITTED DOWNLOADING, ELECTRONIC DISPLAY, PRINT, COPY OR REPRODUCTION OF THIS SURVEY SHOULD CONTAIN NO ALTERATION OR ADDITION TO THE ORIGINAL SURVEY.

\* THIS NOTICE MUST NOT BE ERASED.

  
MURRAY LEAMONT



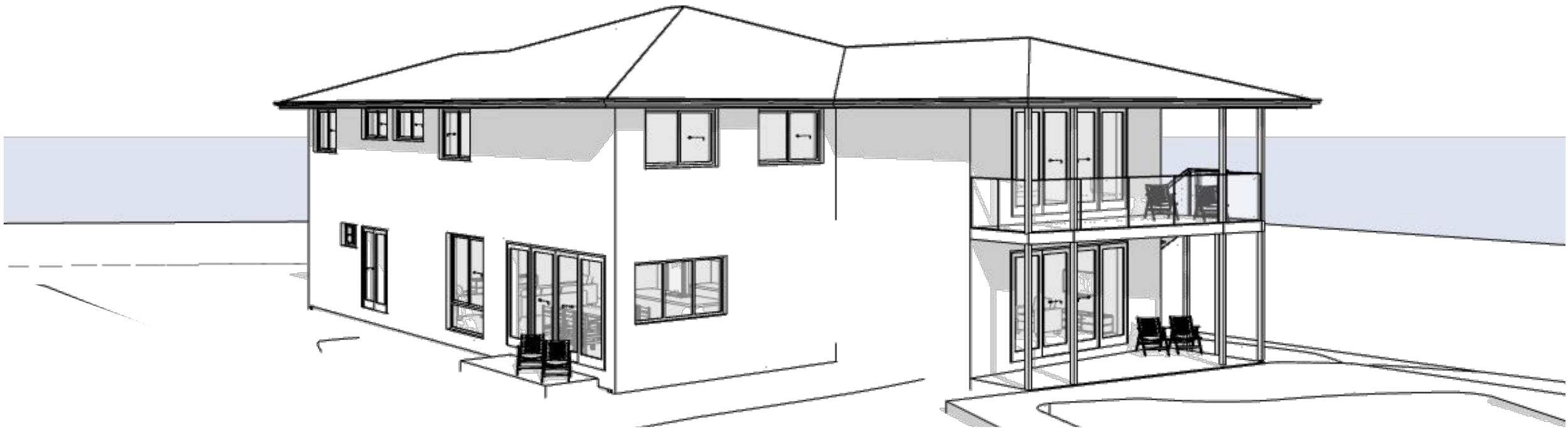
PROPOSED RESIDENCES

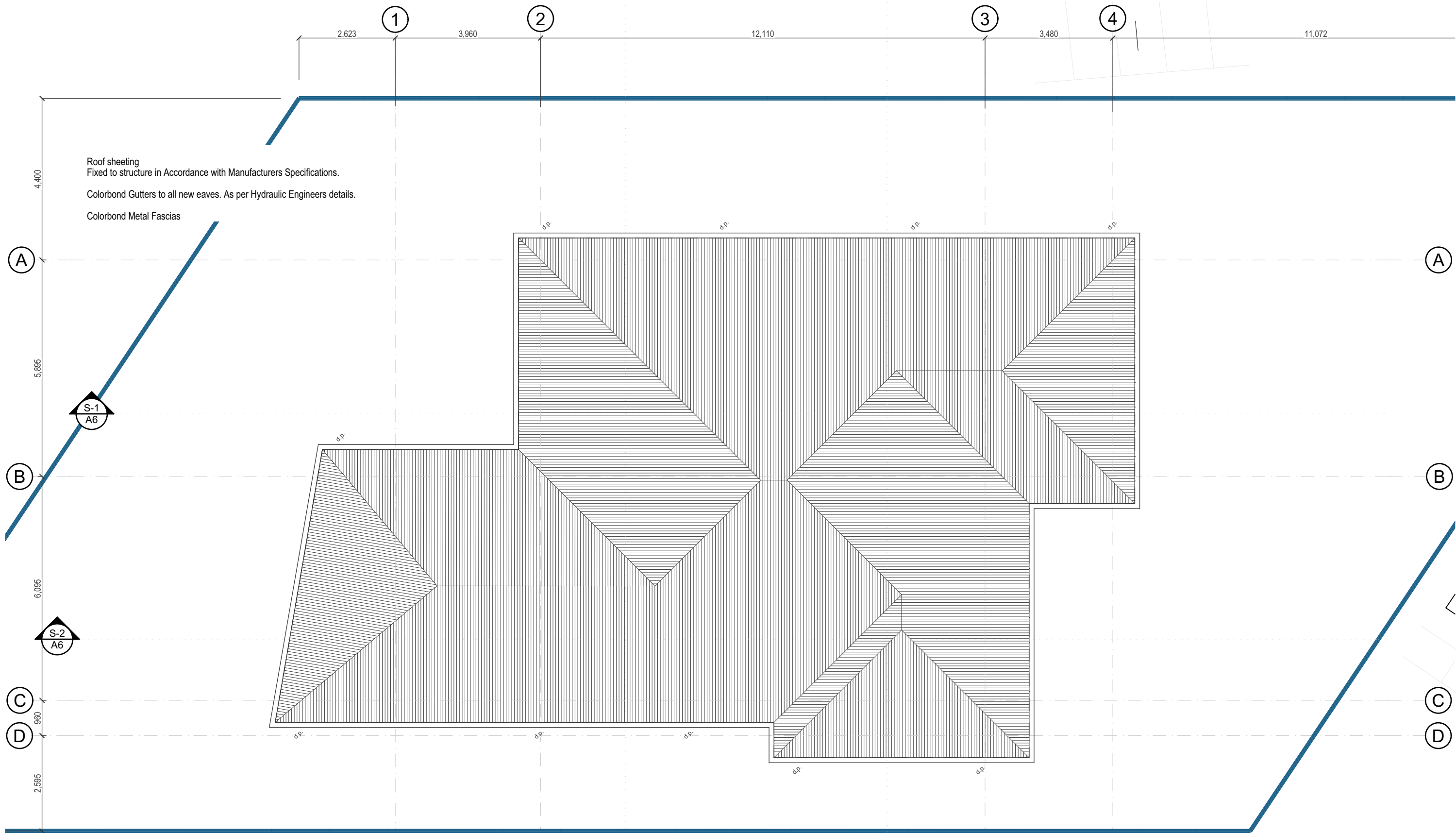
MICHELLE + SHAUN WALSH

4B HOLLOWAY PLACE CURL CURL NSW 2096



DRAWING No.	DESCRIPTION
	COVER PAGE
	PERSPECTIVES
A1	ROOF PLAN
A2	FIRST FLOOR PLAN
A3	GROUND FLOOR PLAN
A4	ELEVATION SHEET 1
A5	ELEVATION SHEET 2
A6	SECTIONS SHEET 1
A7	SECTIONS SHEET 2
A8	DRIVEWAY LONG SECTION
D1	DEMOLITION PLAN
N1	WINDOW   DOOR   COLOUR SCHEDULES
N2	BASIX COMMITMENTS SHEET 1
N3	BASIX COMMITMENTS SHEET 2
S1	SITE ANALYSIS
S2	SITE PLAN and CALCULATIONS
S3	SITE and WASTE MANAGEMENT
S4	SHADOW DIAGRAM - 9AM JUNE 21 - WINTER SOLSTICE
S5	SHADOW DIAGRAM - 12PM JUNE 21 - WINTER SOLSTICE
S6	SHADOW DIAGRAM - 3PM JUNE 21 - WINTER SOLSTICE









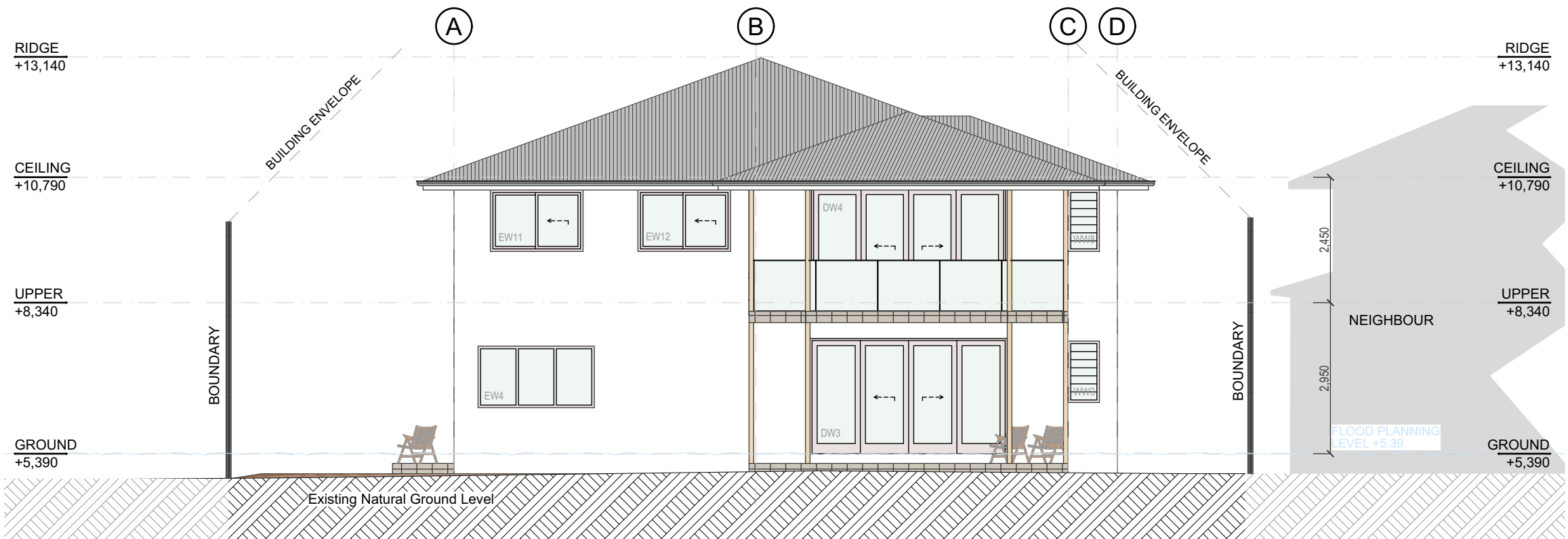




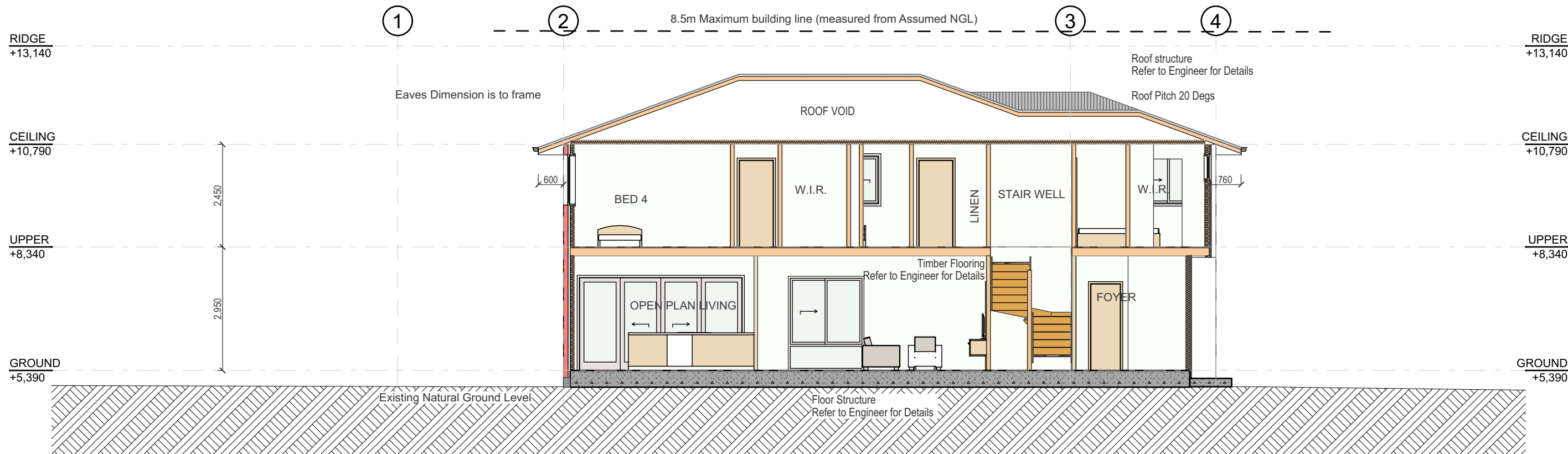
SOUTHERN ELEVATION

GENERAL WINDOW AND DOOR NOTE:  
All windows to be Powder Coated Aluminium with fly screens.  
Front door to be Solid Core Timber Feature door.  
All other external doors to be Powder Coated Aluminium.

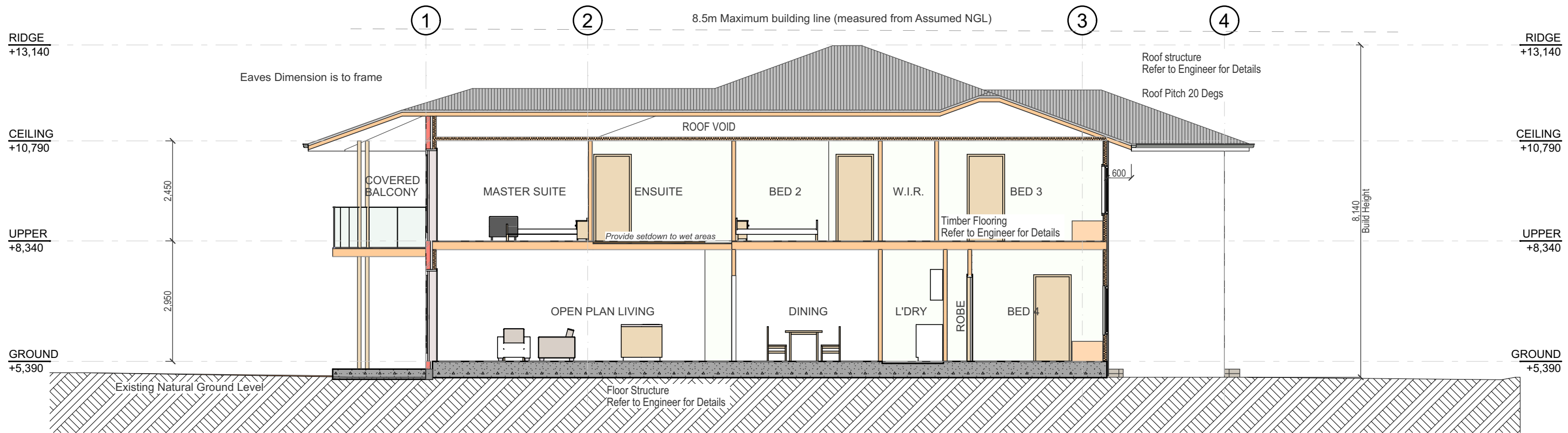
EXTERNAL CLADDINGS:  
Walls : A combination of Newtech Wood Castellations Cladding and rendered Hebel.  
Roof : Colorbond Custom Orb roof Sheeting



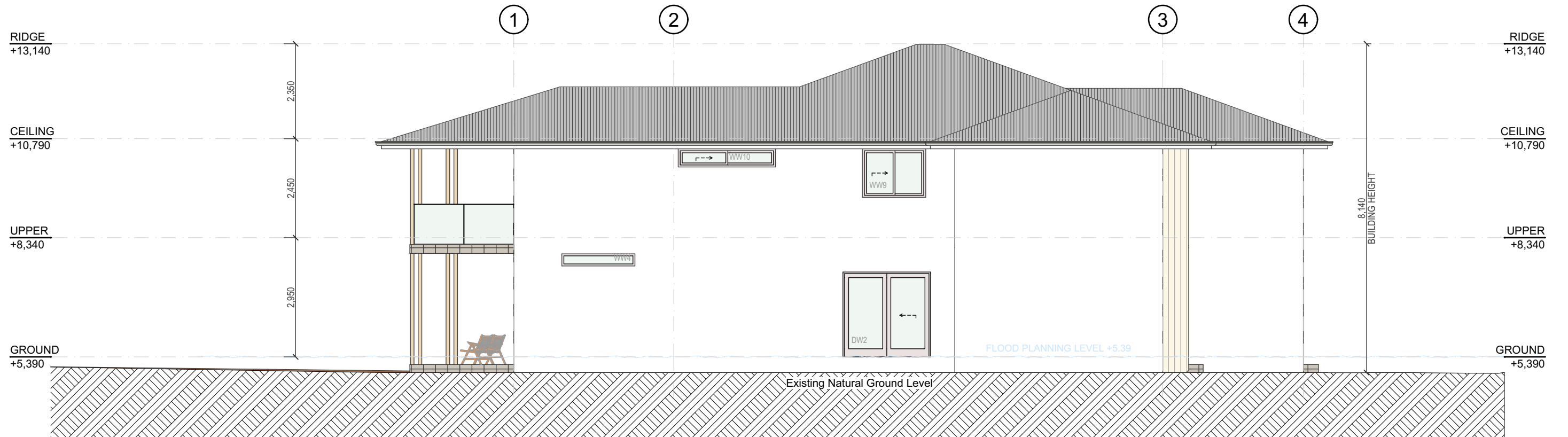
NORTHERN ELEVATION



S-1 LONG SECTION NORTH



S-2 LONG SECTION SOUTH

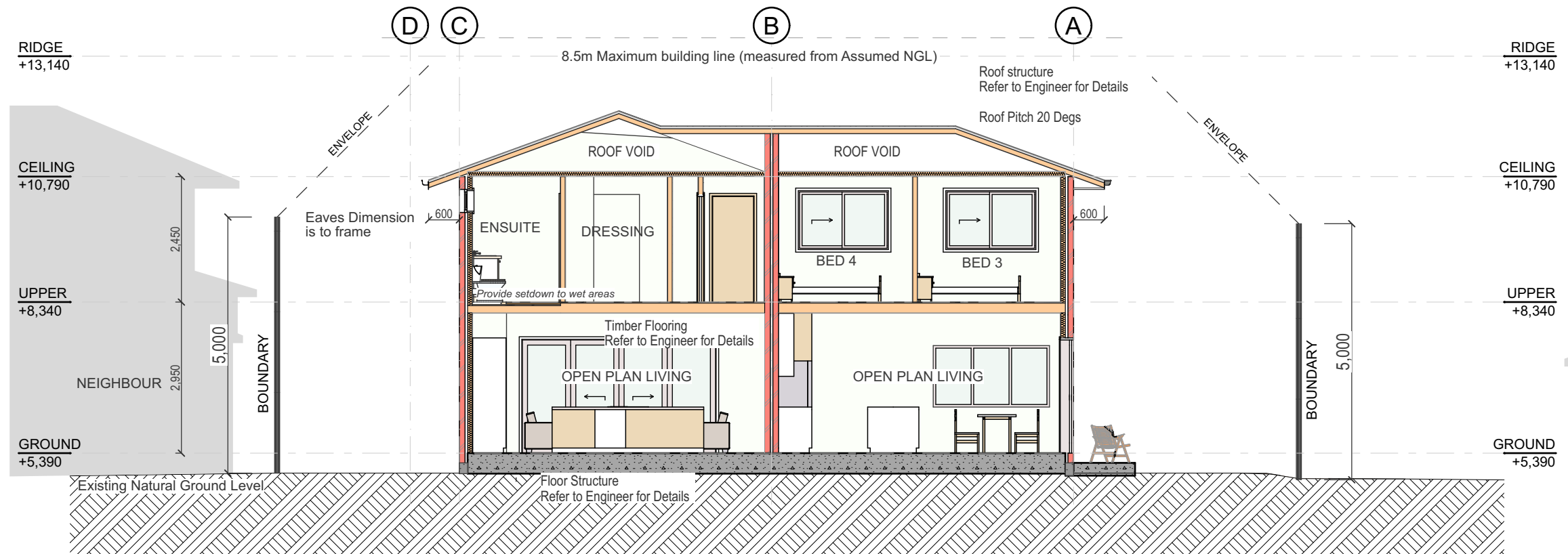


WESTERN ELEVATION

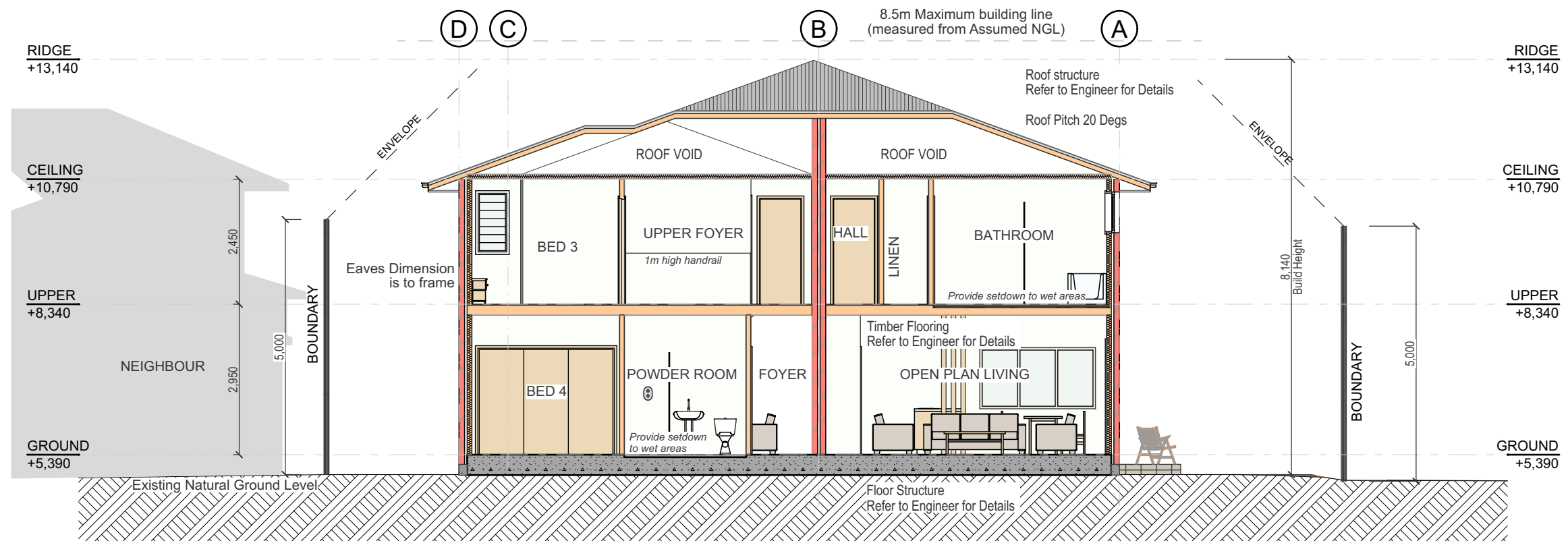


EASTERN ELEVATION



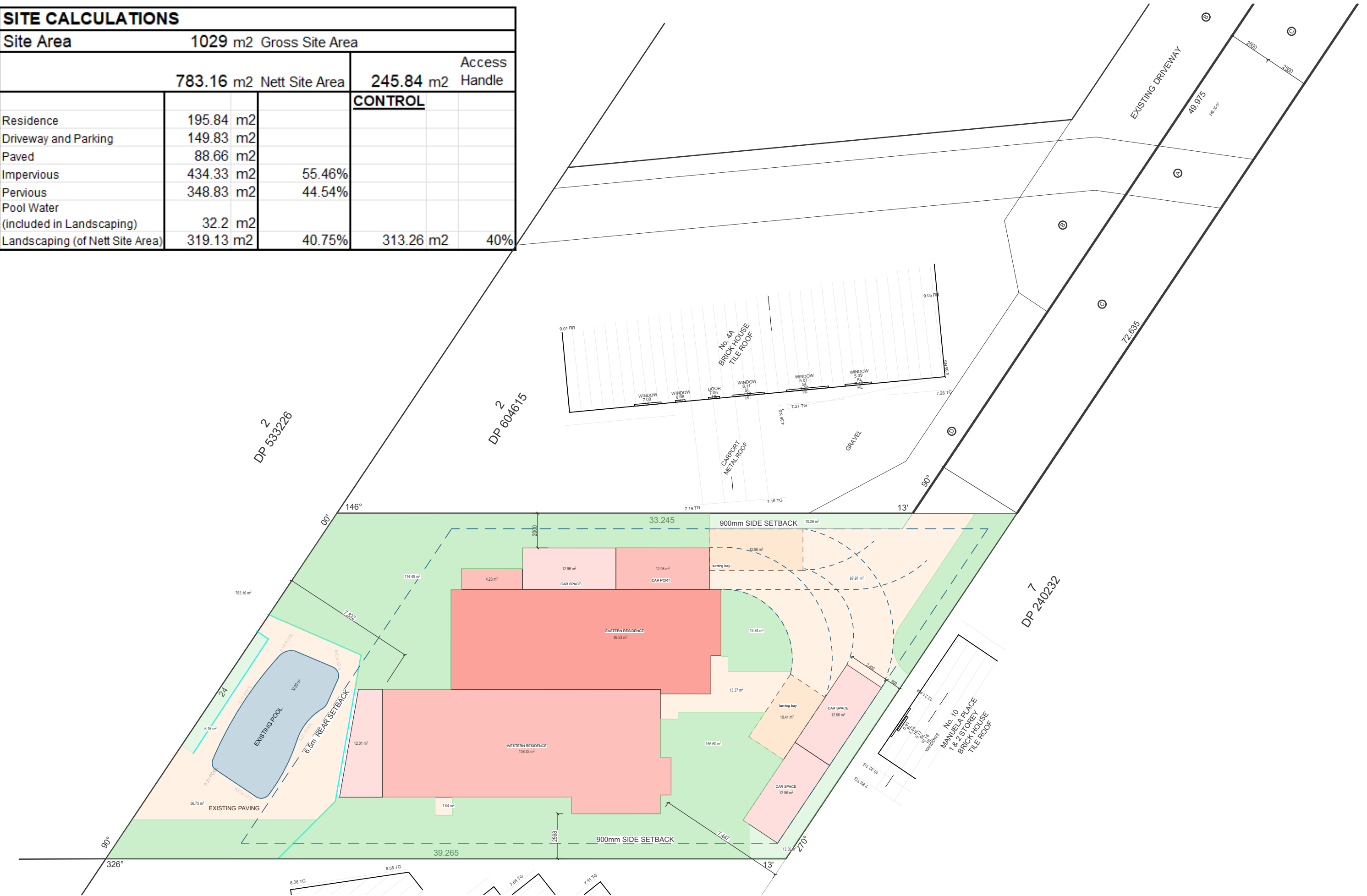


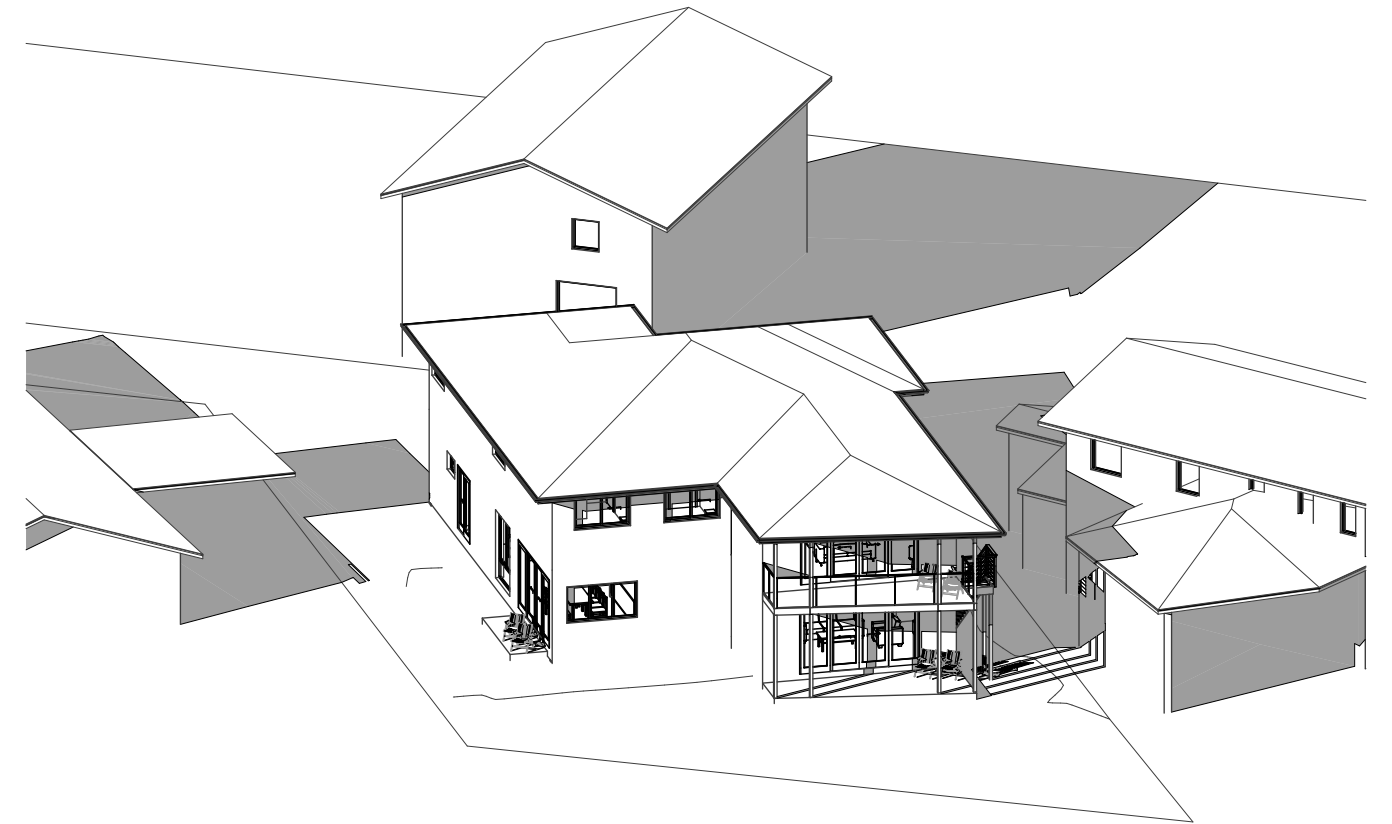
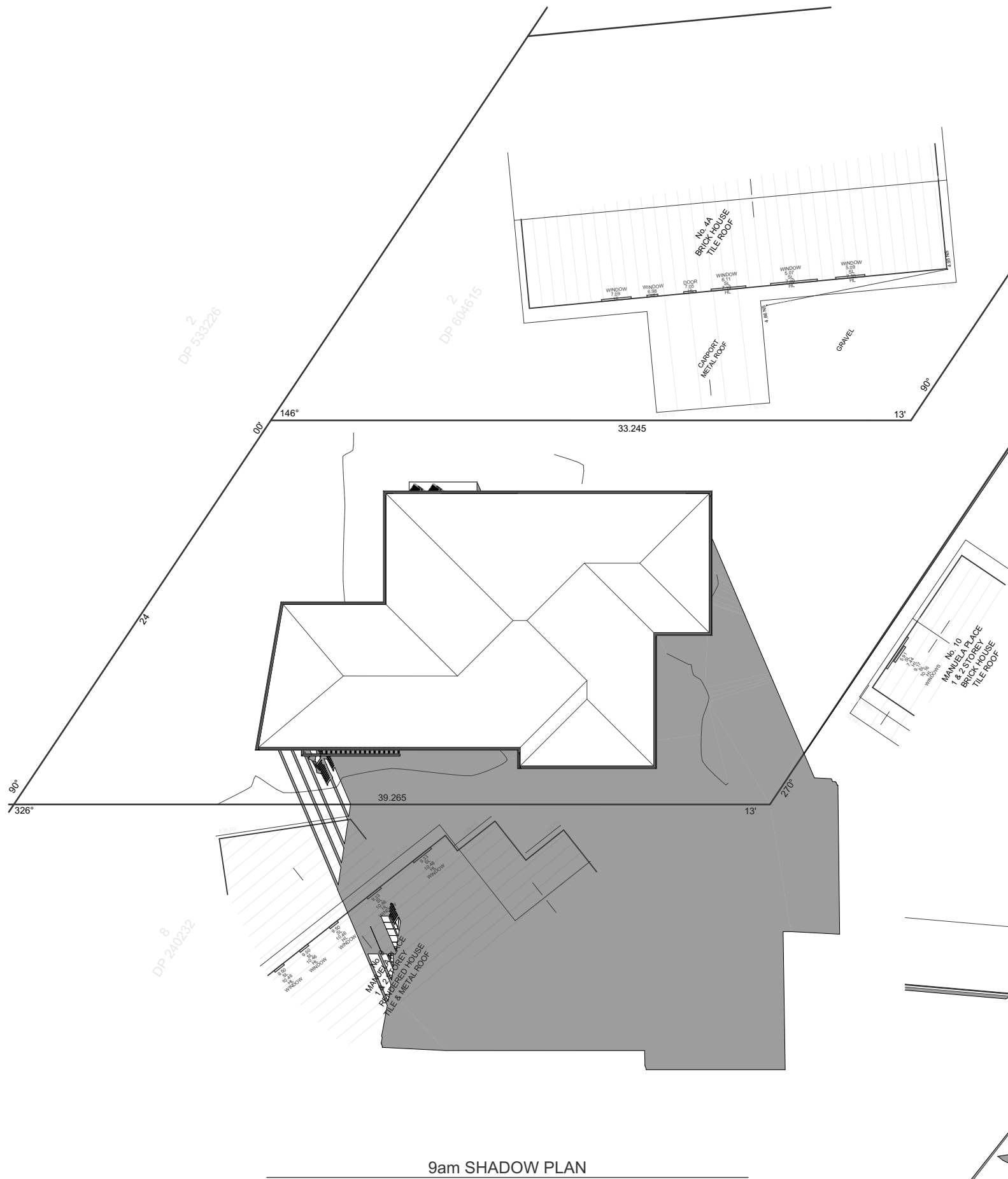
S-3 CROSS SECTION WEST



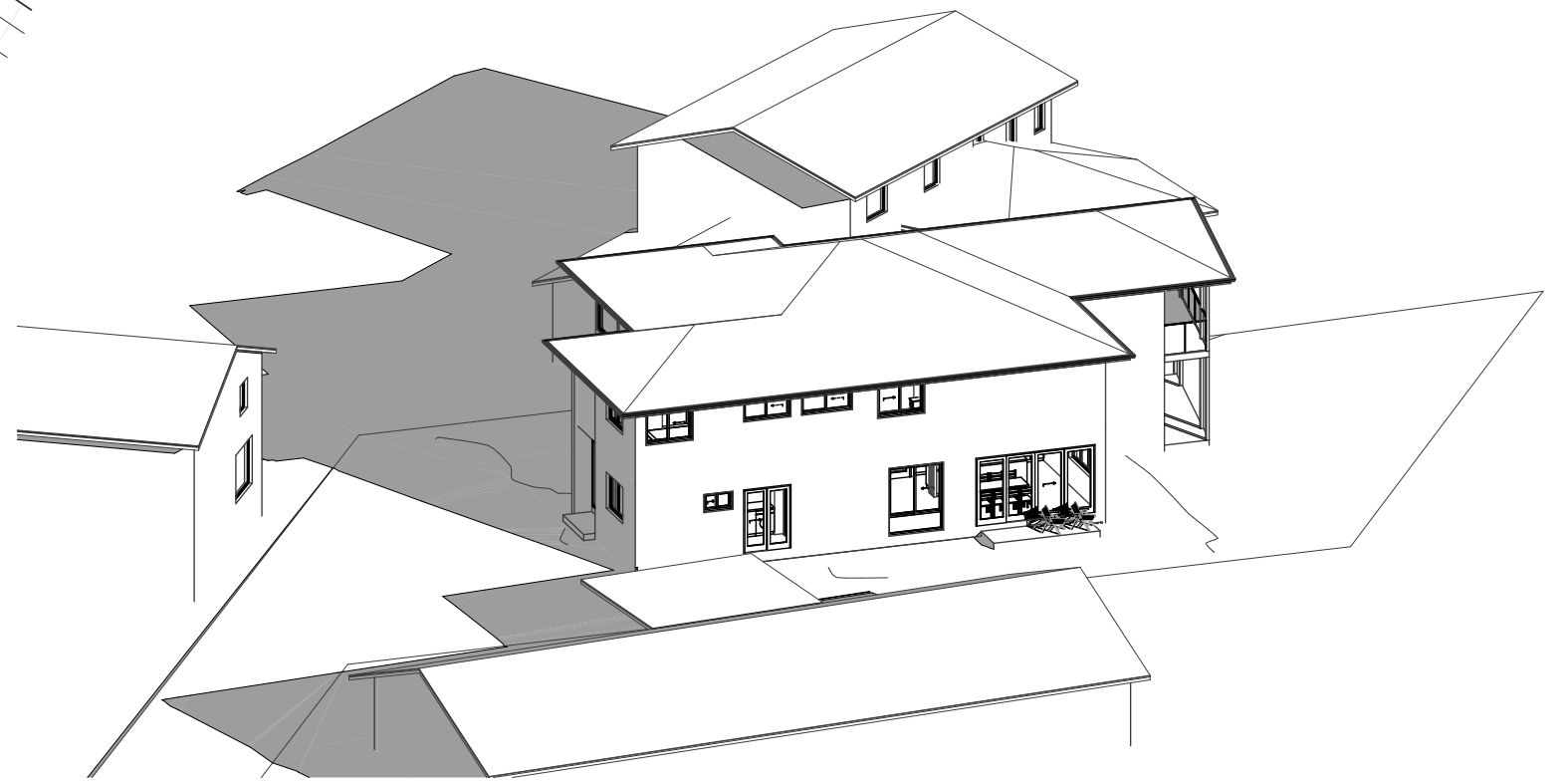
S-4 CROSS SECTION EAST

SITE CALCULATIONS					
Site Area		1029 m2 Gross Site Area			
		783.16 m2	Nett Site Area	245.84 m2	Access Handle
		CONTROL			
Residence	195.84 m2				
Driveway and Parking	149.83 m2				
Paved	88.66 m2				
Impervious	434.33 m2	55.46%			
Pervious	348.83 m2	44.54%			
Pool Water (included in Landscaping)	32.2 m2				
Landscaping (of Nett Site Area)	319.13 m2	40.75%	313.26 m2	40%	

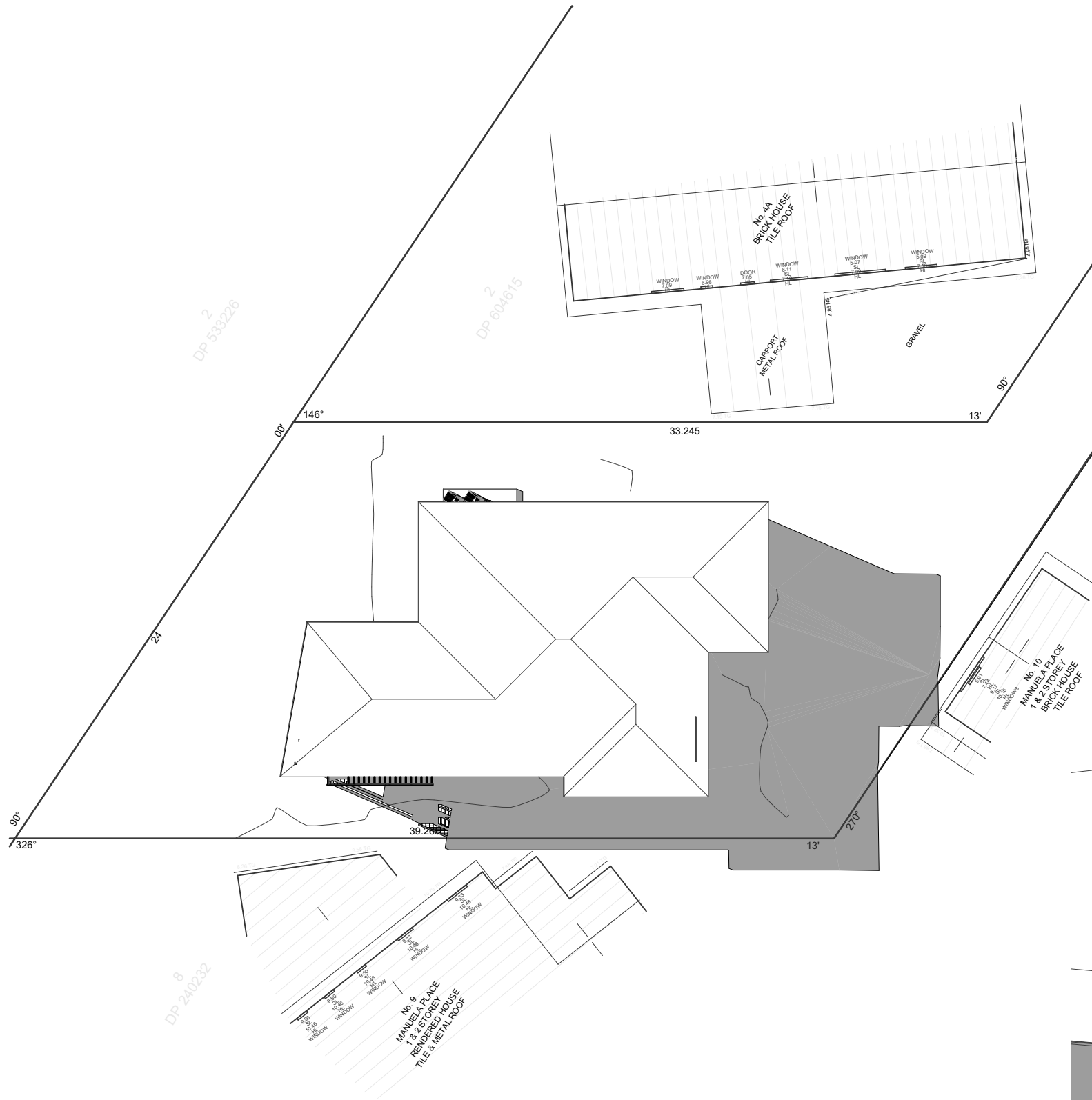




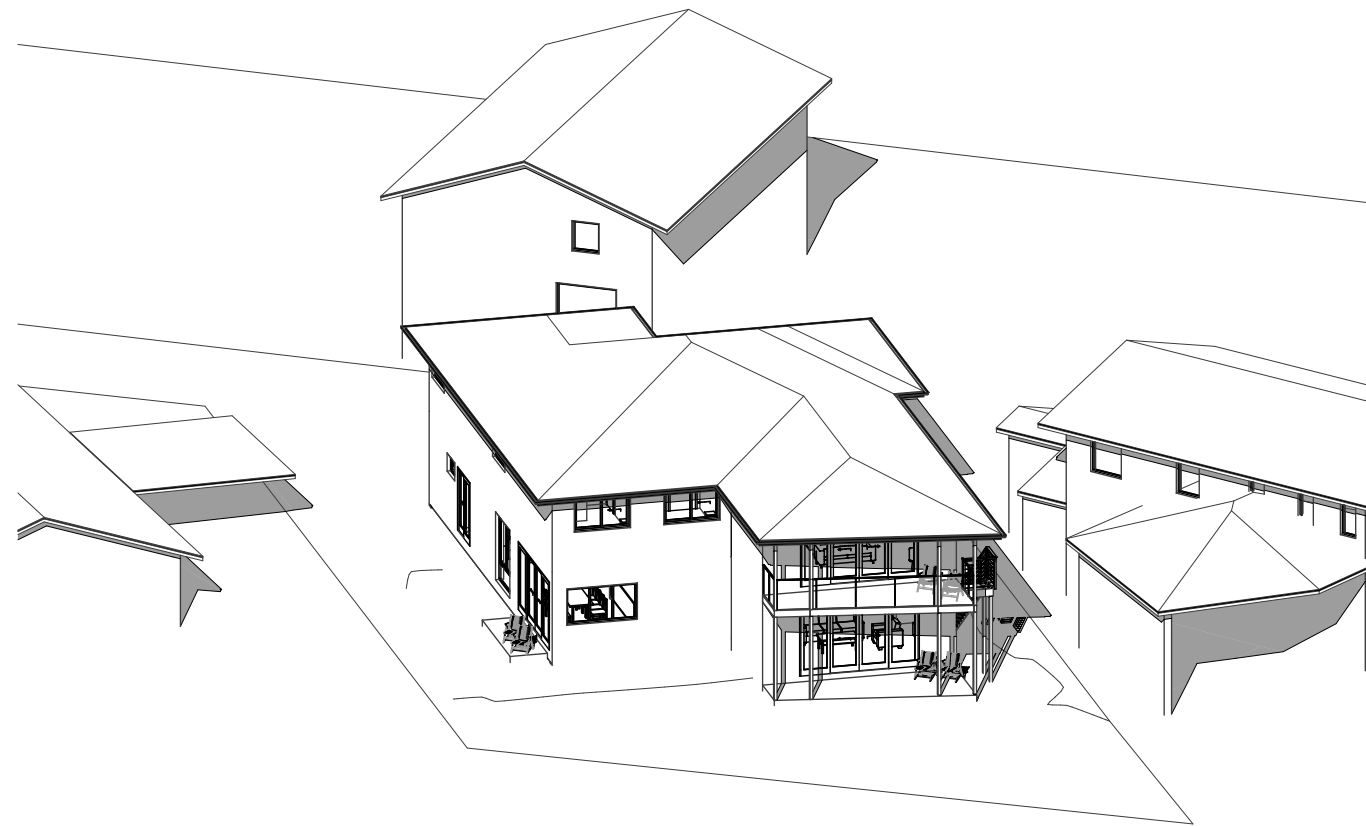
9am NORTH EAST PERSPECTIVE



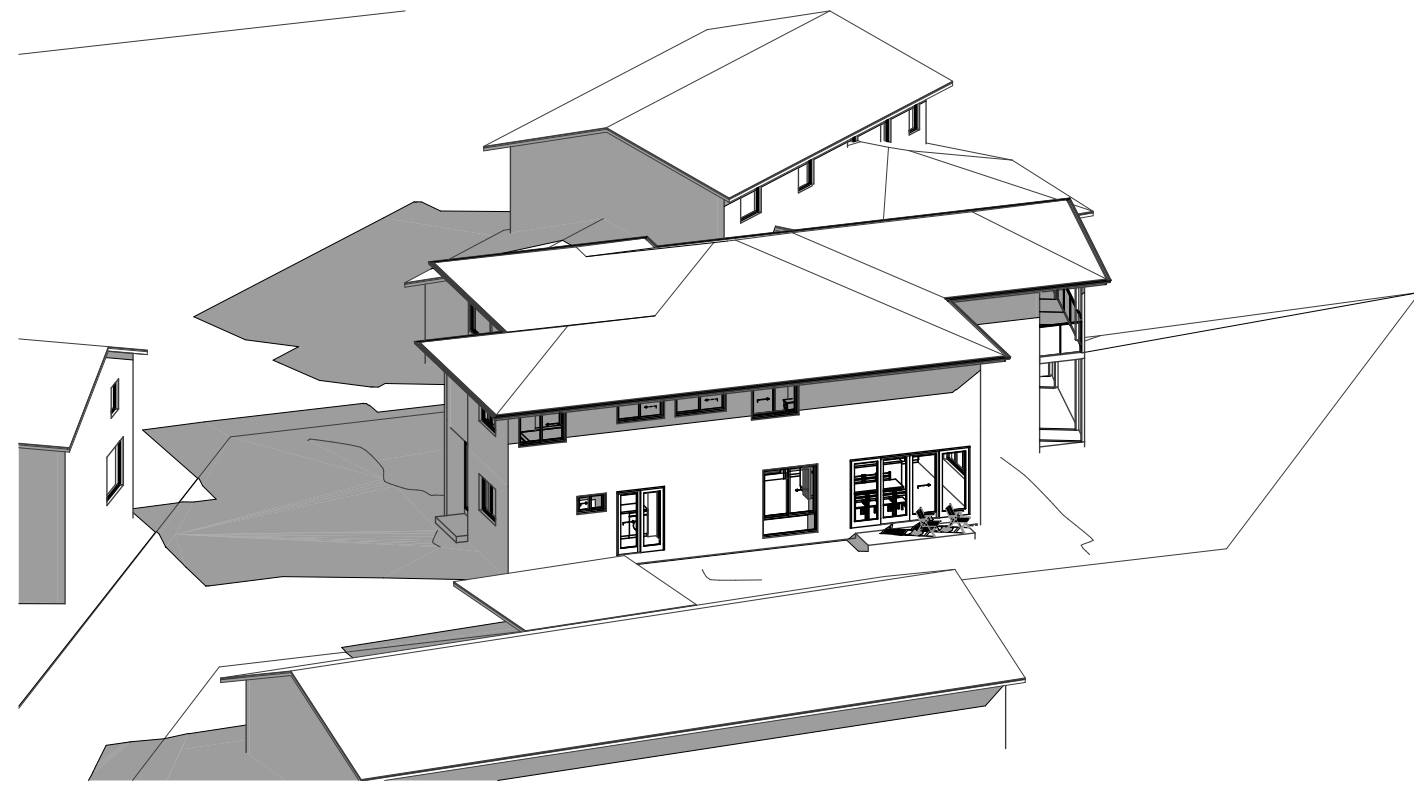
9am EAST PERSPECTIVE



12pm SHADOW PLAN

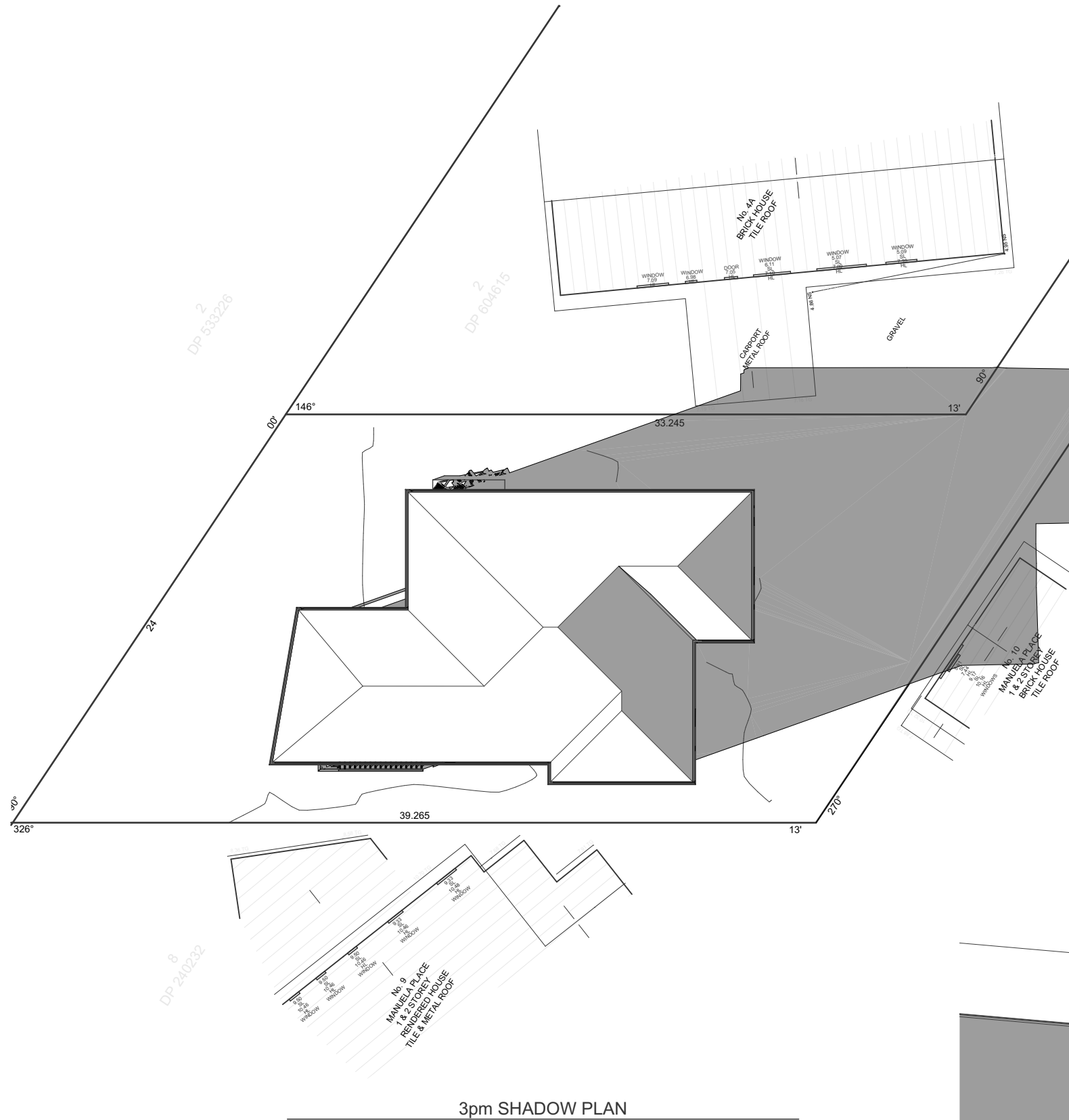


12pm NORTH EAST PERSPECTIVE

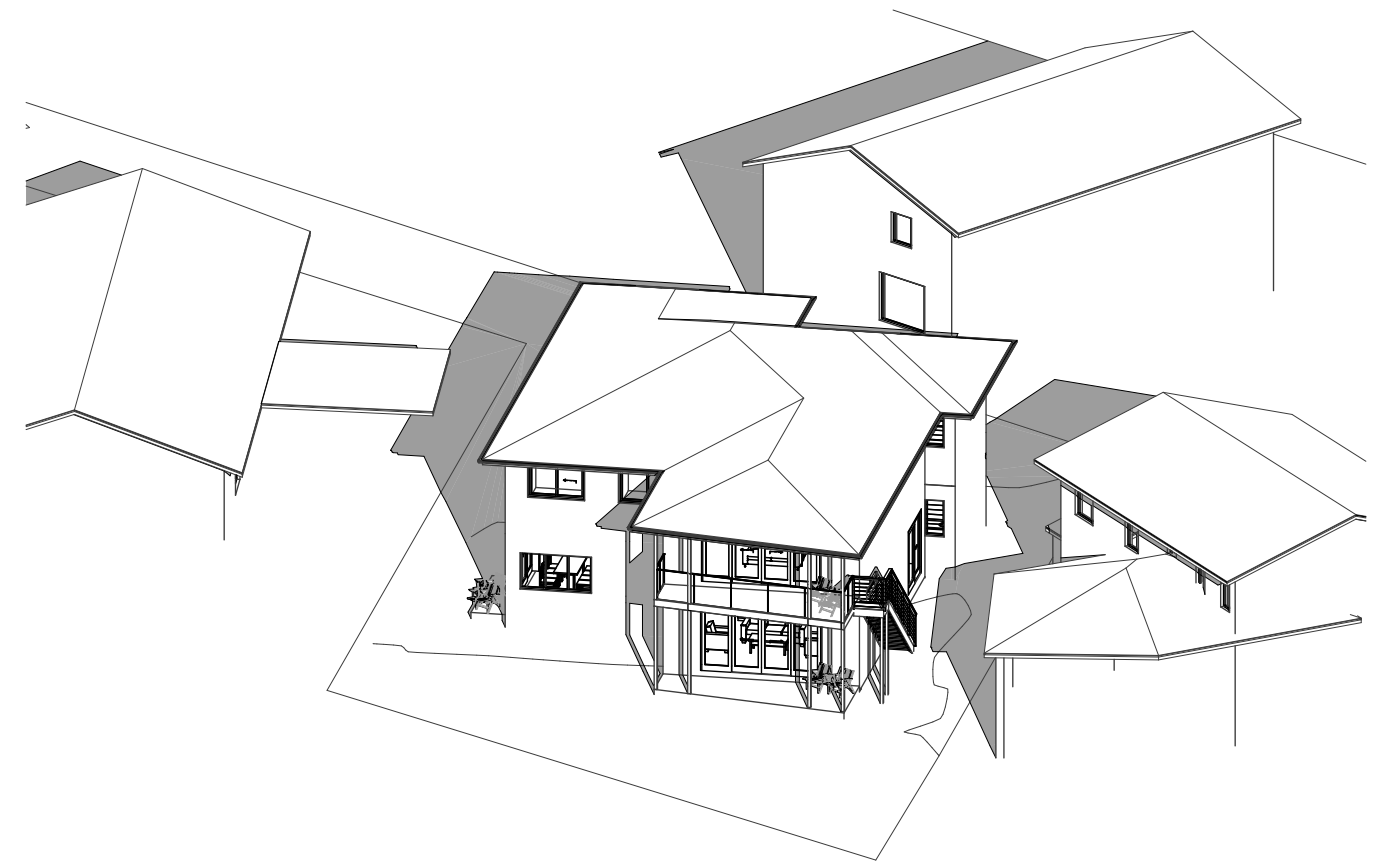


12pm EAST PERSPECTIVE

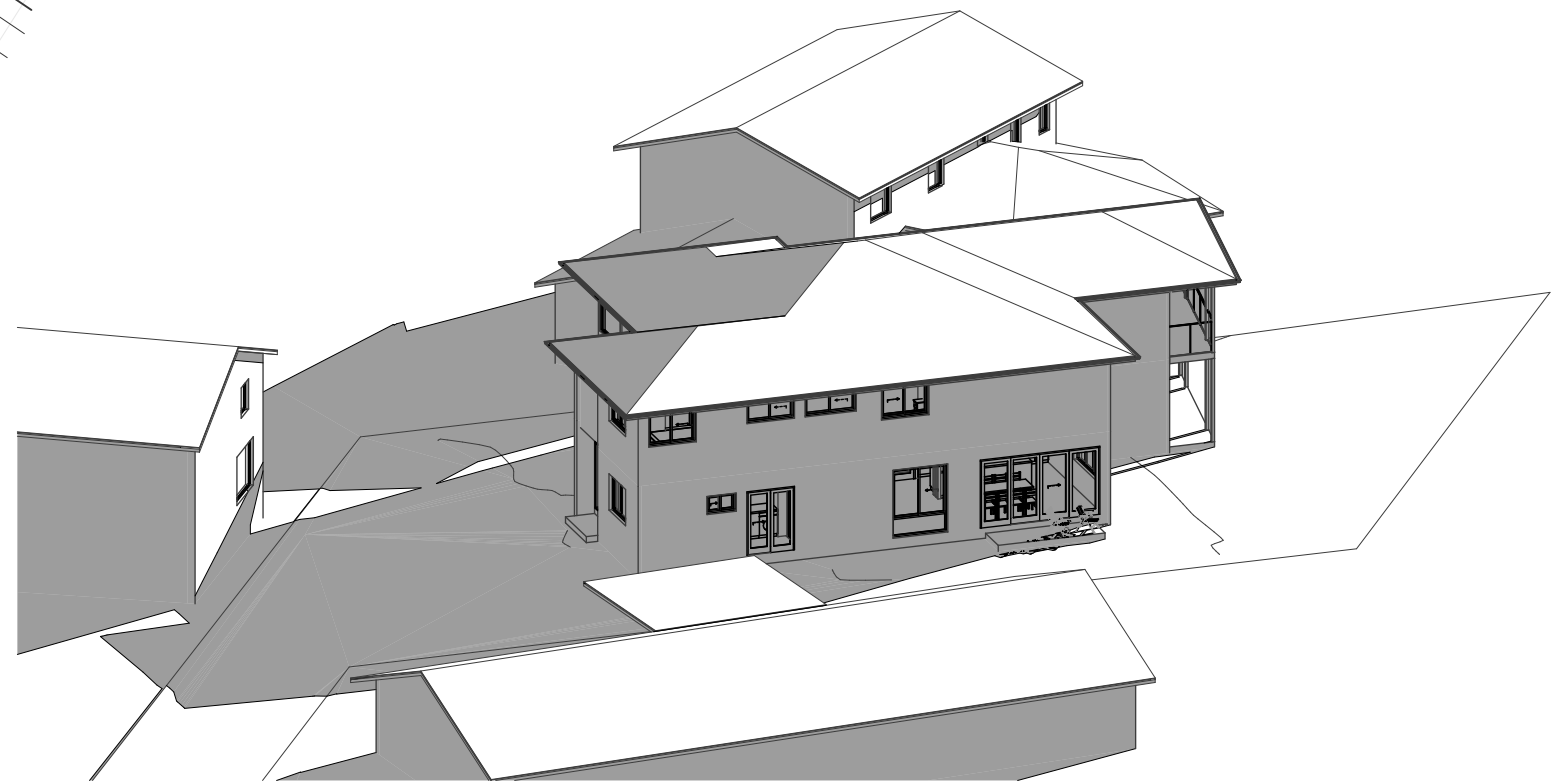




3pm SHADOW PLAN



3pm NORTH PERSPECTIVE



3pm EAST PERSPECTIVE

The commitments set out below regulate how the proposed development is to be carried out. It is a condition of any development consent granted, or complying development certificate issued, for the proposed development, that BASIX commitments be complied with.

(a) Dwellings	All dwellings	-	-	-	-	-	electric cooktop & electric oven	-	-	yes	yes
---------------	---------------	---	---	---	---	---	----------------------------------	---	---	-----	-----

[illegible]

(ii) Energy	Show on DA plans	Show on CC/CDC plans & specs	Certifier check
(a) The applicant must comply with the commitments listed below in carrying out the development of a dwelling listed in a table below.			
(b) The applicant must install each hot water system specified for the dwelling in the table below, so that the dwelling's hot water is supplied by that system. If the table specifies a central hot water system for the dwelling, then the applicant must connect that central system to the dwelling, so that the dwelling's hot water is supplied by that central system.	✓	✓	✓
(c) The applicant must install, in each bathroom, kitchen and laundry of the dwelling, the ventilation system specified for that room in the table below. Each such ventilation system must have the operation control specified for it in the table.		✓	✓
(d) The applicant must install the cooling and heating system/s specified for the dwelling under the "Living areas" and "Bedroom areas" headings of the "Cooling" and "Heating" columns in the table below, in/for at least 1 living/bedroom area of the dwelling. If no cooling or heating system is specified in the table for "Living areas" or "Bedroom areas", then no systems may be installed in any such areas. If the term "zoned" is specified beside an air conditioning system, then the system must provide for day/night zoning between living areas and bedrooms.			
(e) This commitment applies to each room or area of the dwelling which is referred to in a heading to the "Artificial lighting" column of the table below (but only to the extent specified for that room or area). The applicant must ensure that the "primary type of artificial lighting" for each such room in the dwelling is fluorescent lighting or light emitting diode (LED) lighting. If the term "dedicated" is specified for a particular room or area, then the light fittings in that room or area must only be capable of being used for fluorescent lighting or light emitting diode (LED) lighting.		✓	✓
(f) This commitment applies to each room or area of the dwelling which is referred to in a heading to the "Natural lighting" column of the table below (but only to the extent specified for that room or area). The applicant must ensure that each such room or area is fitted with a window and/or skylight.	✓	✓	✓

	Hot water	Bathroom ventilation system		Kitchen ventilation system		Laundry ventilation system	
Dwelling no.	Hot water system	Each bathroom	Operation control	Each kitchen	Operation control	Each laundry	Operation control
All dwellings	gas instantaneous - 6 star	individual fan, ducted to façade or roof	manual on / timer off	individual fan, ducted to façade or roof	manual on / timer off	natural ventilation only, or no laundry	-

Cooling			Heating		Natural lighting	
Dwelling no.	living areas	bedroom areas	living areas	bedroom areas	No. of bathrooms or toilets	Main kitchen
East	1-phase airconditioning - non ducted / 2.5 star (average zone)	1-phase airconditioning - non ducted / 2.5 star (average zone)	1-phase airconditioning - non ducted / 2.5 star (average zone)	1-phase airconditioning - non ducted / 2.5 star (average zone)	3	no
All other dwellings	1-phase airconditioning - non ducted / 2.5 star (average zone)	1-phase airconditioning - non ducted / 2.5 star (average zone)	1-phase airconditioning - non ducted / 2.5 star (average zone)	1-phase airconditioning - non ducted / 2.5 star (average zone)	2	no

	Alternative energy		
Dwelling no.	Photovoltaic system (min rated electrical output in peak kW)	Photovoltaic collector installation	Orientation inputs
All dwellings	-	-	-

(iii) Thermal Performance and Materials	Show on DA plans	Show on C/C/CDC plans & specs	Certifier check
(a) Install insulation with an R-value of not less than 1.0 around the vertical edges of the perimeter of the slab; or (b) On a suspended floor, install insulation with an R-value of not less than 1.0 underneath the slab and around the vertical edges of the perimeter of the slab.			
(h) The applicant must construct the floors and walls of the development in accordance with the specifications listed in the table below.	✓	✓	✓
(i) The applicant must show on The plans accompanying The development application for The proposed development, The locations of ceiling fans set out in The Assessor Certificate.	✓		
(j) The applicant must show on the plans accompanying the application for a construction certificate (or complying development certificate, if applicable), the locations of ceiling fans set out in the Assessor Certificate.		✓	

	Construction of floors and walls				
Dwelling no.	Concrete slab on ground (m²)	Suspended floor with open subfloor (m²)	Suspended floor with enclosed subfloor (m²)	Suspended floor above garage (m²)	Primarily rammed earth or mudbrick walls
East	80.6	0.5	-	-	no
All other dwellings	92.8	-	-	-	no

	Floor types									
	Concrete slab on ground				Suspended floor above enclosed subfloor			Suspended floor above open subfloor		
Dwelling no.	Area (m <sup>2</sup> )	Insulation	Low emissions option	Dematerialisation	Construction type	Area (m <sup>2</sup> )	Insulation	Construction type	Area (m <sup>2</sup> )	Insulation
East	80.6	-	-	conventional slab	-	-	-	treated softwood, frame: timber - H2 treated softwood	0.5	fibreglass batts or roll
All other dwellings	92.8	-	-	conventional slab	-	-	-	-	-	-

	Floor types										
	First floor above habitable rooms or mezzanine			Suspended floor above garage			Garage floor				
Dwelling no.	Construction type	Area (m²)	Insulation	Construction type	Area (m²)	Insulation	Construction type	Area (m²)	Insulation	Low emissions option	Dematerialisation
East	treated softwood, frame: timber - H2 treated softwood	74.00	-	-	-	-	-	0.00	-	-	conventional slab
All other dwellings	treated softwood, frame: timber - H2 treated softwood	85.9	-	-	-	-	-	0.00	-	-	conventional slab

	External walls							
	External wall type 1				External wall type 2			
Dwelling no.	Wall type	Area (m²)	Insulation	Low emissions option	Wall type	Area (m²)	Insulation	Low emissions option
East	AAC veneer, frame : timber - H2 treated softwood	128.9	fibreglass batts or roll	none	framed (fibre cement sheet or boards), frame : timber - H2 treated softwood	10.6	fibreglass batts or roll	none
All other dwellings	AAC veneer, frame : timber - H2 treated softwood	143.2	fibreglass batts or roll	none	framed (fibre cement sheet or boards), frame : timber - H2 treated softwood	18.9	fibreglass batts or roll	none

	Internal walls								
	Internal walls shared with garage			Internal wall type 1			Internal wall type 2		
Dwelling no.	Wall type	Area (m²)	Insulation	Wall type	Area (m²)	Insulation	Wall type	Area (m²)	Insulation
East	-	-	-	plasterboard, frame: timber - H2 treated softwood	100.3	-	plasterboard, frame: timber - H2 treated softwood	45.9	fibreglass batts or roll
All other dwellings	-	-	-	plasterboard, frame: timber - H2 treated softwood	129.9	-	plasterboard, frame: timber - H2 treated softwood	31.3	fibreglass batts or roll

	Ceiling and roof								
	Flat ceiling / pitched roof			Raked ceiling / pitched or skillion roof			Flat ceiling / flat roof		
Dwelling no.	Construction type	Area (m²)	Insulation	Construction type	Area (m²)	Insulation	Construction type	Area (m²)	Insulation
East	framed - metal roof,	85.00	Ceiling.fibreglass batts or	-	-	Ceiling_Roof.	-	-	Ceiling_Roof.
	Ceiling and roof								
	Flat ceiling / pitched roof			Raked ceiling / pitched or skillion roof			Flat ceiling / flat roof		
Dwelling no.	Construction type	Area (m²)	Insulation	Construction type	Area (m²)	Insulation	Construction type	Area (m²)	Insulation
	frame: timber - H2 treated softwood		roll,Roof. foil backed blanket						
All other dwellings	framed - metal roof, frame: timber - H2 treated softwood	100.00	Ceiling.fibreglass batts or roll,Roof. foil backed blanket	-	-	Ceiling_Roof.	-	-	Ceiling_Roof.

	Glazing type			Frame types				
Dwelling no.	Single glazing (m²)	Double glazing (m²)	Triple glazing (m²)	Aluminium frames (m²)	Timber frames (m²)	uPVC frames (m²)	Steel frames (m²)	Composite frames (m²)
East	36.2	-	-	36.2	-	-	-	-
All other dwellings	35.5	-	-	35.5	-	-	-	-

(a) Dwellings

(i) Water	Show on DA plans	Show on CC/CDC plans & specs	Certifier check
(a) The applicant must comply with the commitments listed below in carrying out the development of a dwelling listed in a table below.			
(b) The applicant must plant indigenous or low water use species of vegetation throughout the area of land specified for the dwelling in the "Indigenous species" column of the table below, as private landscaping for that dwelling. (This area of indigenous vegetation is to be contained within the "Area of garden and lawn" for the dwelling specified in the "Description of Project" table).	✓	✓	
(c) If a rating is specified in the table below for a fixture or appliance to be installed in the dwelling, the applicant must ensure that each such fixture and appliance meets the rating specified for it.		✓	✓
(d) The applicant must install an on demand hot water recirculation system which regulates all hot water use throughout the dwelling, where indicated for a dwelling in the "HW recirculation or diversion" column of the table below.		✓	✓
(e) The applicant must install:			
(aa) a hot water diversion system to all showers, kitchen sinks and all basins in the dwelling, where indicated for a dwelling in the "HW recirculation or diversion" column of the table below; and		✓	✓
(bb) a separate diversion tank (or tanks) connected to the hot water diversion systems of at least 100 litres. The applicant must connect the hot water diversion tank to all toilets in the dwelling.		✓	✓
(f) The applicant must not install a private swimming pool or spa for the dwelling, with a volume exceeding that specified for it in the table below.	✓	✓	
(g) If specified in the table, that pool or spa (or both) must have a pool cover or shading (or both).		✓	
(h) The pool or spa must be located as specified in the table.		✓	
(i) The applicant must install, for the dwelling, each alternative water supply system, with the specified size, listed for that dwelling in the table below. Each system must be configured to collect run-off from the areas specified (excluding any area which supplies any other alternative water supply system), and to divert overflow as specified. Each system must be connected as specified.	✓	✓	✓

(II) Energy	Show on DA plans	Show on CC/CDC plans & specs	Certifier check
(a) The applicant must comply with the commitments listed below in carrying out the development of a dwelling listed in a table below.			
(b) The applicant must install each hot water system specified for the dwelling in the table below, so that the dwelling's hot water is supplied by that system. If the table specifies a central hot water system for the dwelling, then the applicant must connect that central system to the dwelling, so that the dwelling's hot water is supplied by that central system.	✓	✓	✓
(c) The applicant must install, in each bathroom, kitchen and laundry of the dwelling, the ventilation system specified for that room in the table below. Each such ventilation system must have the operation control specified for it in the table.		✓	✓



(ii) Energy	Show on DA plans	Show on CC/CDC plans & specs	Certifier check
(d) The applicant must install the cooling and heating system/s specified for the dwelling under the "Living areas" and "Bedroom areas" headings of the "Cooling" and "Heating" columns in the table below, in/for at least 1 living/bedroom area of the dwelling. If no cooling or heating system is specified in the table for "Living areas" or "Bedroom areas", then no systems may be installed in any such areas. If the term "zoned" is specified beside an air conditioning system, then the system must provide for day/night zoning between living areas and bedrooms.		✓	✓
(e) This commitment applies to each room or area of the dwelling which is referred to in a heading to the "Artificial lighting" column of the table below (but only to the extent specified for that room or area). The applicant must ensure that the "primary type of artificial lighting" for each such room in the dwelling is fluorescent lighting or light emitting diode (LED) lighting. If the term "dedicated" is specified for a particular room or area, then the light fittings in that room or area must only be capable of being used for fluorescent lighting or light emitting diode (LED) lighting.		✓	✓
(f) This commitment applies to each room or area of the dwelling which is referred to in a heading to the "Natural lighting" column of the table below (but only to the extent specified for that room or area). The applicant must ensure that each such room or area is fitted with a window and/or skylight.	✓	✓	✓
(g) This commitment applies if the applicant installs a water heating system for the dwelling's pool or spa. The applicant must: (aa) install the system specified for the pool in the "Individual Pool" column of the table below (or alternatively must not install any system for the pool). If specified, the applicant must install a timer, to control the pool's pump; and (bb) install the system specified for the spa in the "Individual Spa" column of the table below (or alternatively must not install any system for the spa). If specified, the applicant must install a timer to control the spa's pump.		✓ ✓	
(h) The applicant must install in the dwelling: (aa) the kitchen cook-top and oven specified for that dwelling in the "Appliances & other efficiency measures" column of the table below; (bb) each appliance for which a rating is specified for that dwelling in the "Appliances & other efficiency measures" column of the table, and ensure that the appliance has that minimum rating; and (cc) any clothes drying line specified for the dwelling in the "Appliances & other efficiency measures" column of the table.		✓ ✓ ✓	✓
(i) If specified in the table, the applicant must carry out the development so that each refrigerator space in the dwelling is "well ventilated".		✓	
(j) The applicant must install the photovoltaic system specified for the dwelling under the "Photovoltaic system" heading of the "Alternative energy" column of the table below, and connect the system to that dwelling's electrical system.	✓	✓	✓
(iii) Thermal Performance and Materials	Show on DA plans	Show on CC/CDC plans & specs	Certifier check
(a) The applicant must attach the certificate referred to under "Assessor details" on the front page of this BASIX certificate (the "Assessor Certificate") to the development application and construction certificate application for the proposed development (or, if the applicant is applying for a complying development certificate for the proposed development, to that application). The applicant must also attach the Assessor Certificate to the application for a final occupation certificate for the proposed development.			
(iii) Thermal Performance and Materials	Show on DA plans	Show on CC/CDC plans & specs	Certifier check
(b) The Assessor Certificate must have been issued by an Accredited Assessor in accordance with the Thermal Comfort Protocol.			
(c) The details of the proposed development on the Assessor Certificate must be consistent with the details shown in this BASIX Certificate, including the details shown in the "Thermal Loads" table below.			
(d) The applicant must show on the plans accompanying the development application for the proposed development, all matters which the Thermal Comfort Protocol requires to be shown on those plans. Those plans must bear a stamp of endorsement from the Accredited Assessor, to certify that this is the case.	✓		
(e) The applicant must show on the plans accompanying the application for a construction certificate (or complying development certificate, if applicable), all thermal performance specifications set out in the Assessor Certificate, and all aspects of the proposed development which were used to calculate those specifications.		✓	
(f) The applicant must construct the development in accordance with all thermal performance specifications set out in the Assessor Certificate, and in accordance with those aspects of the development application or application for a complying development certificate which were used to calculate those specifications.		✓	✓
(g) Where there is an in-slab heating or cooling system, the applicant must:  (aa) Install insulation with an R-value of not less than 1.0 around the vertical edges of the perimeter of the slab; or (bb) On a suspended floor, install insulation with an R-value of not less than 1.0 underneath the slab and around the vertical edges of the perimeter of the slab.	✓	✓	✓
(h) The applicant must construct the floors and walls of the development in accordance with the specifications listed in the table below.	✓	✓	✓
(i) The applicant must show on The plans accompanying The development application for The proposed development, The locations of ceiling fans set out in The Assessor Certificate.	✓		
(j) The applicant must show on the plans accompanying the application for a construction certificate (or complying development certificate, if applicable), the locations of ceiling fans set out in the Assessor Certificate.		✓	

3. Commitments for common areas and central systems/facilities for the development (non-building specific)

(a) Buildings 'Other'

(i) Materials	Show on DA plans	Show on CC/CDC plans & specs	Certifier check
(a) The details of the proposed development on the Assessor Certificate must be consistent with the details shown in this BASIX Certificate, including the details shown in the "Floor types", "External wall types", "Internal wall types", "Ceiling and roof types", "Frames" and "Glazing" tables below.			✓
(b) The applicant must show on the plans accompanying the application for a construction certificate (or complying development certificate, if applicable), all specifications included in the tables below.		✓	
(c) The applicant must construct the floors, walls, roof, ceiling and roof, windows, glazed doors and skylights of the development in accordance with the specifications listed in the tables below. In the case of glazing, a 5% variance from the area values listed in the "Frames" and "Glazing" tables is permitted.	✓	✓	✓
(d) The applicant must show through receipts that the materials purchased for construction are consistent with the specifications listed in the below tables.			✓

Floor types			
Floor type	Area (m2)	Insulation	Low emissions option
-	-	-	-

External wall types				
External wall type	Construction type	Area (m2)	Low emissions option	Insulation
-	-	-	-	-

Internal wall types			
Internal wall type	Construction type	Area (m2)	Insulation
-	-	-	-

Reinforcement concrete frames/columns		
Building has reinforced concrete frame/columns?	Volume (m³)	Low emissions option
-	-	-

Ceiling and roof types			
Ceiling and roof type	Area (m²)	Roof Insulation	Ceiling Insulation
-	-	-	

Glazing types				Frame types			
Single glazing (m²)	Double glazing (m²)	Triple glazing (m²)	Aluminium frames (m²)	Timber frames (m²)	uPVC frames (m²)	Steel frames (m²)	Composite frames (m²)
-	-	-	-	-	-	-	-

(b) Common areas and central systems/facilities

(i) Water	Show on DA plans	Show on CC/CDC plans & specs	Certifier check
(a) If, in carrying out the development, the applicant installs a showerhead, toilet, tap or clothes washer into a common area, then that item must meet the specifications listed for it in the table.		✓	✓
(b) The applicant must install (or ensure that the development is serviced by) the alternative water supply system(s) specified in the "Central systems" column of the table below. In each case, the system must be sized, be configured, and be connected, as specified in the table.	✓	✓	✓
(c) A swimming pool or spa listed in the table must not have a volume (in kLs) greater than that specified for the pool or spa in the table.	✓	✓	
(d) A pool or spa listed in the table must have a cover or shading if specified for the pool or spa in the table.		✓	
(e) The applicant must install each fire sprinkler system listed in the table so that the system is configured as specified in the table.		✓	✓
(f) The applicant must ensure that the central cooling system for a cooling tower is configured as specified in the table.		✓	✓

Common area	Showerheads rating	Toilets rating	Taps rating	Clothes washers rating
All common areas	no common facility	no common facility	no common facility	no common laundry facility

Central systems	Size	Configuration	Connection (to allow for...)
Central water tank - rainwater or stormwater (No. 1)	2000.00	To collect run-off from at least: - 185.00 square metres of roof area of buildings in the development	-

(ii) Energy	Show on DA plans	Show on CC/CDC plans & specs	Certifier check
(a) If, in carrying out the development, the applicant installs a ventilation system to service a common area specified in the table below, then that ventilation system must be of the type specified for that common area, and must meet the efficiency measure specified.		✓	✓
(b) In carrying out the development, the applicant must install, as the "primary type of artificial lighting" for each common area specified in the table below, the lighting specified for that common area. This lighting must meet the efficiency measure specified. The applicant must also install a centralised lighting control system or Building Management System (BMS) for the common area, where specified.		✓	✓

(ii) Energy	Show on DA plans	Show on CC/CDC plans & specs	Certifier check
(c) The applicant must install the systems and fixtures specified in the "Central energy systems" column of the table below. In each case, the system or fixture must be of the type, and meet the specifications, listed for it in the table.	✓	✓	✓

Central energy systems	Type	Specification
Other	-	-

## APPENDIX D

Council Flood Information (Obsolete) dated 14<sup>th</sup> February 2025



# COMPREHENSIVE FLOOD INFORMATION REPORT

**Property:** 4B Holloway Place CURL CURL NSW 2096

**Lot DP:** Part Lot 1 DP 604615

**Issue Date:** 14/02/2025

**Flood Study Reference:** Greendale Creek Flood Study 2023, WMA

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

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

Maximum Flood Planning Level (FPL) <sup>2, 3, 4</sup>: 6.19 m AHD

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

1% AEP Maximum Water Level <sup>2, 3</sup>: 5.69 m AHD

1% AEP Maximum Depth from natural ground level<sup>3</sup>: 0.34 m

1% AEP Maximum Velocity: 0.51 m/s

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

1% AEP Hydraulic Categorisation: Flood Storage / Flood Fringe

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

PMF Maximum Water Level (PMF) <sup>4</sup>: 5.53 m AHD

PMF Maximum Depth from natural ground level: 1.08 m

PMF Maximum Velocity: 1.05 m/s

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

H3 – H1

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

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

## **Notes**

### **General**

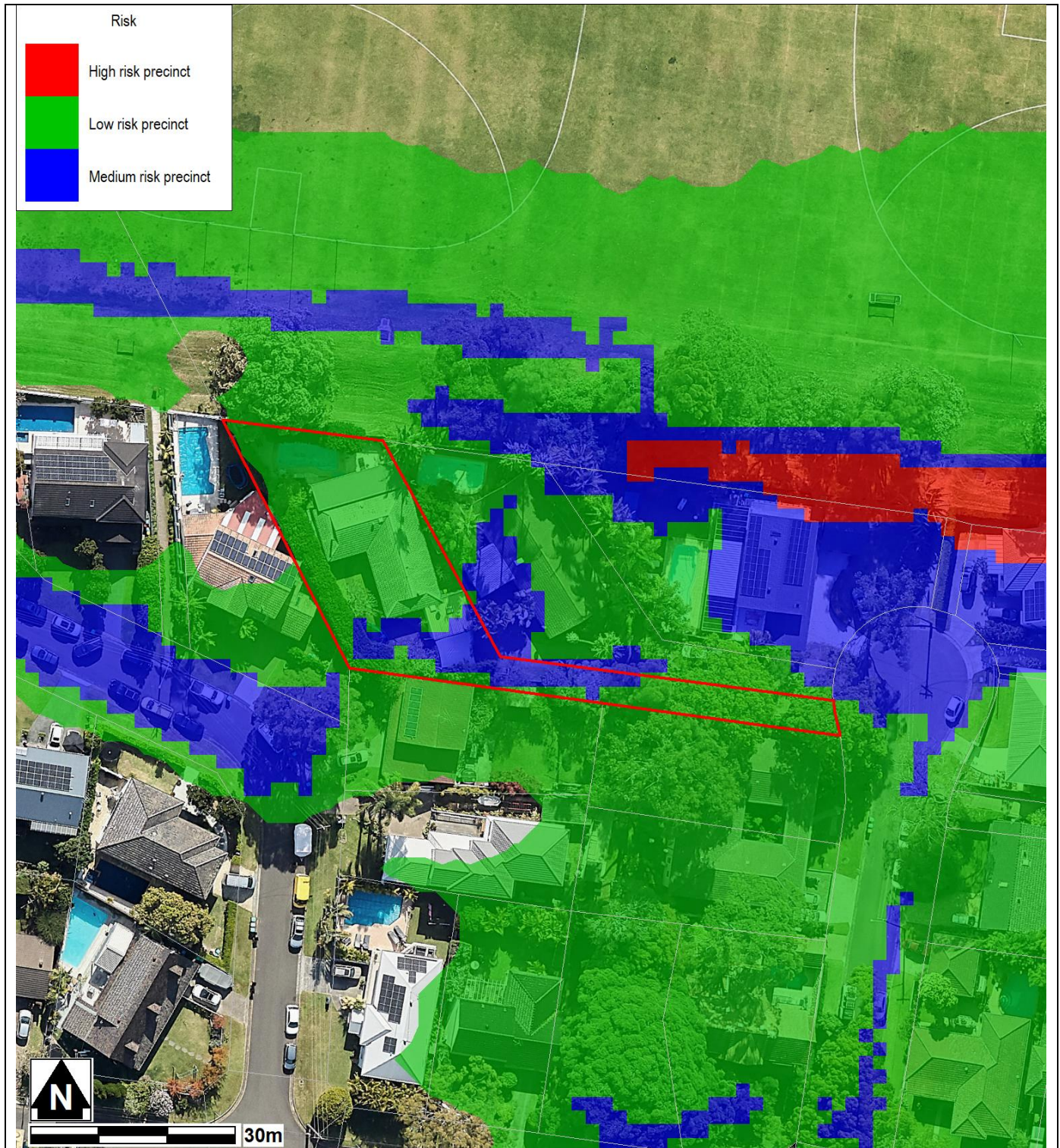
- All levels are based on Australian Height Datum (AHD) unless otherwise noted.
- This is currently the best available information on flooding; it may be subject to change in the future.
- Council recommends that you obtain a detailed survey of the above property and surrounds to AHD by a registered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

### **Property**

- Please note that if a development on the property is proposed completely outside of the Flood Planning Area (Medium Flood Risk Precinct), a formal Flood Management Report would not need to be submitted to council with a Development Application for Residential Development.
- Climate change data is not available 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: Greendale Creek Flood Study 2023, WMA) 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: Greendale Creek Flood Study 2023, WMA) 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	5.69	N/A	N/A	6.19	5.51	0.46	0.15
2	N/A	N/A	5.68	N/A	N/A	6.18	5.51	0.75	0.80
3	N/A	N/A	5.69	N/A	N/A	6.19	N/A	N/A	N/A
4	N/A	N/A	5.68	N/A	N/A	6.18	N/A	N/A	N/A
5	N/A	N/A	5.68	N/A	N/A	6.18	5.51	0.54	0.45
6	N/A	N/A	5.69	N/A	N/A	6.19	5.52	0.27	0.32
7	N/A	N/A	5.68	N/A	N/A	6.18	5.53	0.48	0.27
8	N/A	N/A	5.67	N/A	N/A	6.17	5.51	0.53	0.40
9	N/A	N/A	5.68	N/A	N/A	6.18	5.53	0.50	1.03
10	N/A	N/A	5.05	0.18	0.34	5.55	5.52	0.64	0.78
11	5.00	0.18	5.04	0.22	0.23	5.54	5.52	0.70	0.51
12	5.00	0.22	5.04	0.26	0.19	5.54	5.52	0.74	0.31
13	N/A	N/A	5.56	N/A	N/A	6.06	5.51	0.62	0.71
14	N/A	N/A	5.51	N/A	N/A	6.01	5.51	0.50	0.76
15	N/A	N/A	5.44	N/A	N/A	5.94	5.50	0.65	0.12

WL – Water Level

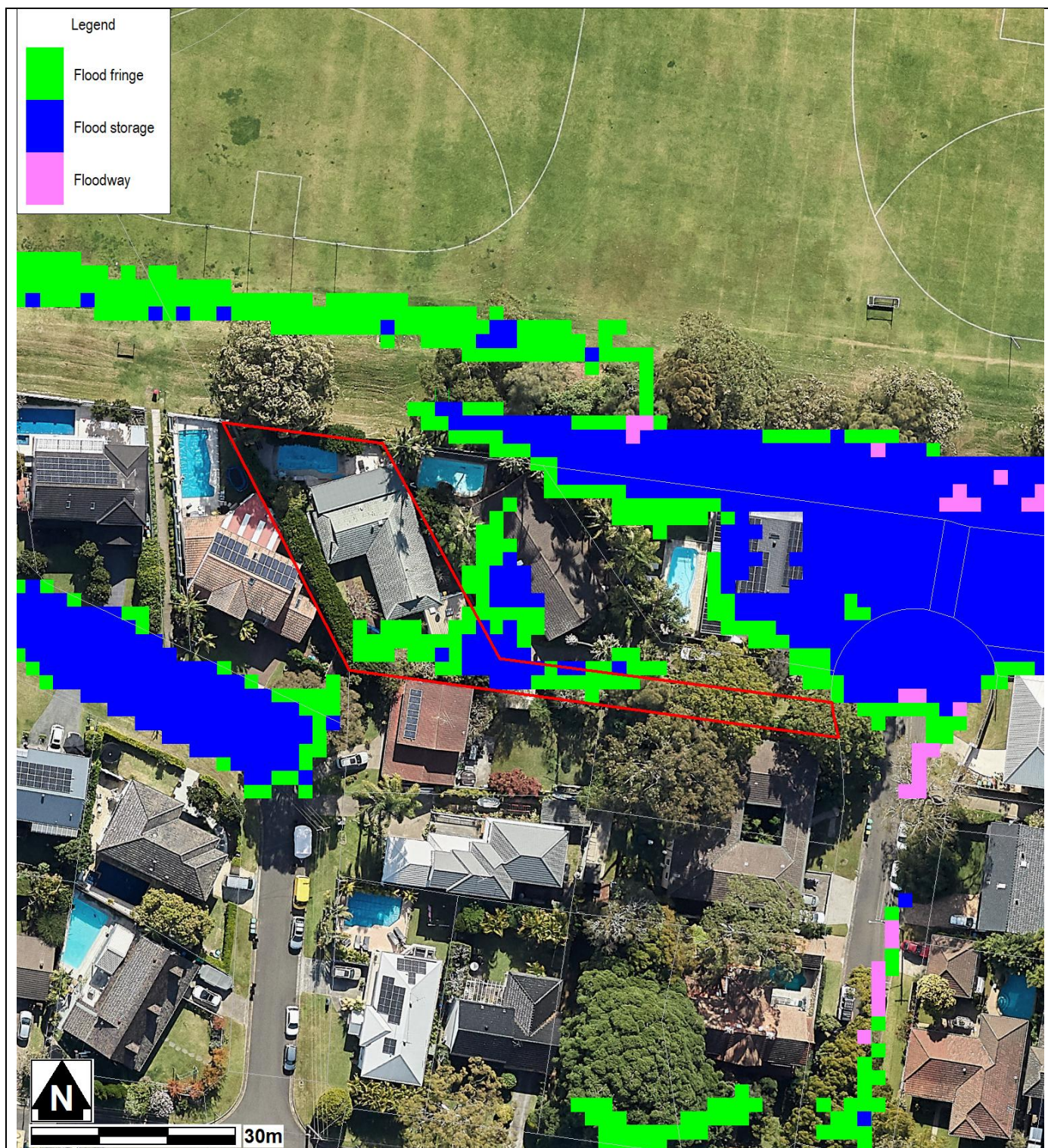
PMF – Probable Maximum Flood

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

### Notes:

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

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

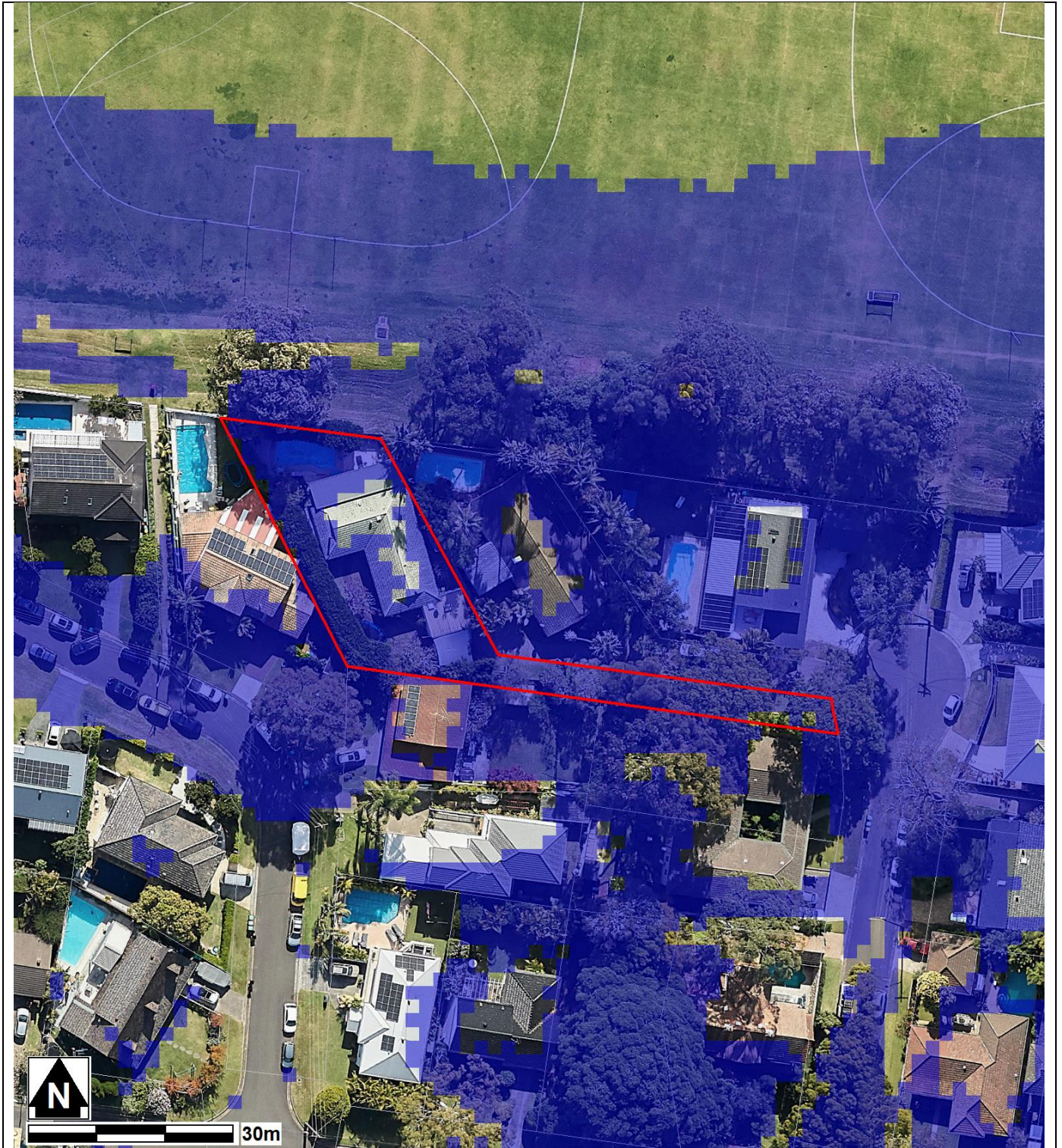


## Notes:

- Extent represents the 1% Annual Exceedance Probability (AEP) flood event
- Extent does not include climate change
- Cadastre Lines (Source: NSW Government Land and Property Information), flood levels/extents (Source: Greendale Creek Flood Study 2023, WMA) and aerial photography (Source: NearMap 2014) are indicative only



## MAP D: PMF EXTENT MAP

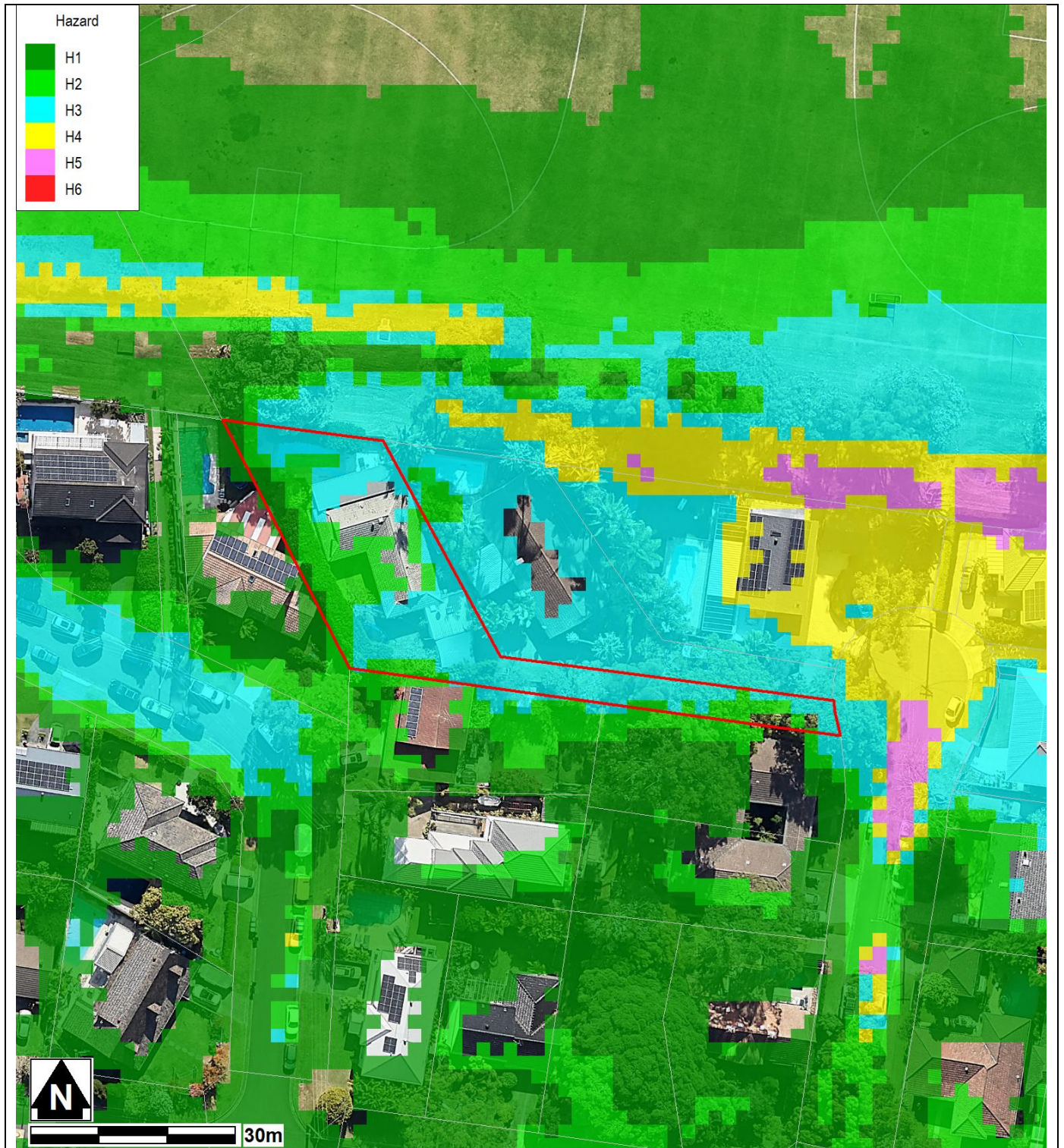


### Notes:

- 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: Greendale Creek Flood Study 2023, WMA) and aerial photography (Source: NearMap 2014) are indicative only



## MAP F: FLOOD LIFE HAZARD CATEGORY IN PMF



### Notes:

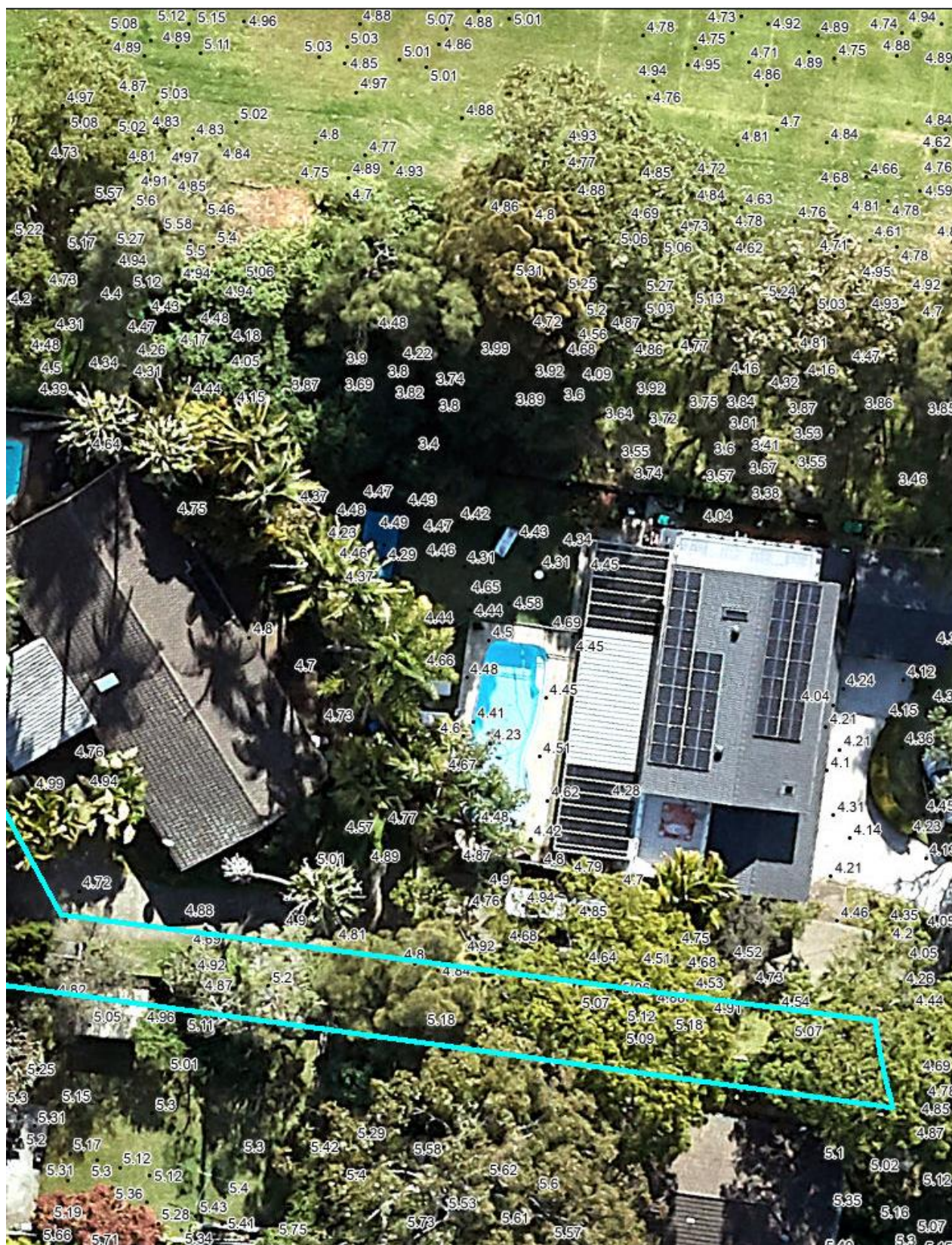
- Cadastre Lines (Source: NSW Government Land and Property Information), flood levels/extents (Source: Greendale Creek Flood Study 2023, WMA) and aerial photography (Source Near Map 2014) are indicative only.



## MAP G: INDICATIVE GROUND SURFACE SPOT HEIGHTS







**Notes:**

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



# Preparation of a Flood Management Report

## Introduction

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

## Planning Requirements for Flood Prone Land

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

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

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

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

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

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

## When is a Flood Management Report required?

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

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

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



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

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

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

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

### Preparation of a Flood Management Report

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

1. Description of development

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

2. Flood analysis

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

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

3. Assessment of impacts

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

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

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

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

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

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