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# Flood Management Report

15 Lakeside Crescent, North Manly

## Issue A

Prepared for: Linda & Sean O'brien

Prepared by: Sarah Raaff

# Flood Management Report

**Project no:** 2412001

**Issue:** A

**Date:** 24.01.2025

**Client:** Linda & Sean O'brien

**Engineer:** Sarah Raaff

**Principal review:** Michael Wachjo

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

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| Issue | Engineer | Peer Review | Principal Review | Description | Date |
|---|---|---|---|---|---|
| A | S.Raaff | H.Stubley | M.Wachjo | Report for DA submission | 24.01.2025 |

# Contents

# 1. Introduction

At the request of Linda & Sean O'brien, Northern Beaches Consulting Engineers have assessed the flooding regime at 15 Lakeside Crescent, North Manly 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 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) – Part E11 Flood Prone Land*
- *NSW Government Floodplain Management Manual (2005)*
- *Council supplied flood information*

## 1.1 Aim

This study explores the impact of mainstream flooding envisaged to occur at the subject site up to the 1% AEP storm event. The development under consideration is located at 15 Lakeside Crescent, North Manly. This area is predicted to experience mainstream flooding 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 15 Lakeside Crescent, North Manly consists of a ground floor extension, new carport, alfresco, pool coping and landscaping (refer Appendix C).

## 1.3 Site Conditions

The property is approximately 627m$^2$ and located within the Northern Beaches Council (Warringah Area) LGA. The subject site is relatively flat with a localised high point in the centre of the property and a mild slope to the north western and south eastern boundaries. Manly Creek runs in a easterly trajectory adjacent to the south eastern boundary of the property before discharging to Queenscliff Beach.


*Figure 1: Site locality (source: SIXmaps NSW)*

## 1.4 Flood Behaviour

The development lies within the Manly Creek Catchment. Flooding within the area occurs when intense local rainfall generates runoff exceeding the capacity of council's drainage infrastructure causing the creek banks to overtop. This is also exacerbated when such an event coincides with a king tide.

# 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 (Refer Appendix A):

| | |
|---|---|
| Flood Planning Level (FPL) (Max): | 3.66 m AHD |
| Predicted 1% AEP flood level (Max): | 3.16 m AHD |
| Predicted 1% AEP flood depth (Max): | 1.46 m |
| 1% AEP Maximum Velocity (Max): | 0.50 m/s |
| Probable Maximum Flood (PMF) level: | 5.66 m AHD |
| Probable Maximum Flood (PMF) Depth: | 3.96 m |
| Probable Maximum Flood (PMF) velocity: | 1.07 m/s |
| Flood Hydraulic Category: | Flood Storage |
| Flood Risk Precinct: | Medium – High Risk |
| Flood Life Hazard Category: | H5 |
| Mapping of relevant extents: | Refer Appendix B |
| Ground Floor Level (FFL): | 3.175m AHD (refer Appendix C) |
| First Floor Level (FFL): | 6.080m AHD (refer Appendix C) |

# 3. Assessment of Impacts

## 3.1 Development Matrix

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

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

Figure 2 - 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 effects caused by Development

***A1: Development shall not be approved unless it can be demonstrated in a Flood Management Report that is has been designed and can be constructed so that in all events up to the 1% AEP event:***

***(a) There are no adverse impacts on flood levels or velocities caused by alterations to the flood conveyance; and***
***(b) There are no adverse impacts on surrounding properties; and***
***(c) It is sited to minimise exposure to flood hazard.***
***Major developments and developments likely to have a significant impact on the PMF flood regime will need to demonstrate that there are no adverse impacts in the Probable Maximum Flood.***

Development Compliance: The subject site is wholly located within the 1% AEP flood extent and is classified as flood storage. The proposed carport is to be flush with natural ground level and the proposed ground floor extension and alfresco are to have an open substructure to allow flood waters to flow beneath unimpeded. The proposed ground floor extension is located below the FPL (Refer section 4.3), however the extension is less than 30m2. The proposed pool coping is expected to cause a flood blockage; however this is offset by the demolition of the existing garage/storage structure (Refer section 4.1-A2 for further detail). Any proposed pool fencing is to be a minimum 50% open, up to the 1% AEP flood level (RL 3.16m AHD). Therefore, the proposed development is not anticipated to have an adverse impact on the conveyance of flood waters across the site or surrounding properties and is not expected to increase exposure to flood hazard.

***A2: Development shall not be approved unless it can be demonstrated in a Flood Management Report that in all events up to the 1% AEP event there is no net loss of flood storage.***
***Consideration may be given for exempting the volume of standard piers from flood storage calculations.***
***If Compensatory Works are proposed to balance the loss of flood storage from the development, the Flood Management Report shall include detailed calculations to demonstrate how this is achieved.***

Development Compliance: The proposed development works are wholly located within flood storage. The proposed ground floor extension, alfresco and decking are to be constructed with a minimum 50% open substructure to allow the passage of flood waters to flow unimpeded. Further, the proposed carport is to be built at natural ground level.

The pool coping is expected to cause a combined flood blockage of approximately 13m3. However, the demolition of the existing garage and outbuilding structure is expected to provide an additional flood storage volume of 70m3. Hence, compensatory works are not required, and the development will result in a net increase of flood storage (Refer Appendix B for flood storage calculations).

## 4.2 Building Components and Structural Soundness

***B1: All buildings shall be designed and constructed with flood compatible materials in accordance with "Reducing Vulnerability of Buildings to Flood Damage: Guidance on Building in Flood Prone Areas", Hawkesbury-Nepean Floodplain Management Steering Committee (2006).***

**Development Compliance:** All buildings located within the 1% AEP flood extent are to be designed and constructed with flood compatible materials 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 element | Recommendations |
|---|---|
| **Ground Floor** | |
| Raised concrete slab | • In areas of high silt deposition, use a deeper slab rebate to hold more slit without it bridging the wall cavity. |
| Slab on ground | • In areas of high slit deposition, use a deeper slab rebate to hold more slit without it bridging the wall cavity. |
| Suspended timber floor | • Ventilation needed to ensure drying and to prevent decay of timber components.<br>• Allow for some loss of load bearing capacity with manufactured/engineered timber beams.<br>• Select plywood flooring with waterproof glue bond.<br>• Avoid particleboard flooring (which weakens after immersion) and underfloor thermal and noise insulation or remove it post-flood to assist drying.<br>• 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.<br>• Provide a minimum 450mm clearance required between underside of timber structure and ground as per BCA.<br>• Timber used in sub-floor structural members and in flooring should be minimum H3 (Avoid using LVL's) |
| **Load Bearing Wall System** | |
| Cavity Brick (double brick) | • Provide for ingress of water to balance hydrostatic forces inside and outside of the walls.<br>• Include openings into cavity to facilitate removal of slit from cavity. |
| Timber wall frame | • Provide for ingress of water to balance hydrostatic forces inside and outside of the walls.<br>• Include openings into cavity to facilitate removal of slit from cavity.<br>• With load bearing members such as stud wall frame; lintels; spanning beams:<br>- Avoid materials/glue bonds which can weaken significantly with immersion, &<br>- Prevent deterioration from moisture over time by providing adequate drainage and ventilation.<br>• Bracing is critical to resist forces from wind gusts and flowing water. |
| **Non Load Carrying Components Exterior Wall Cladding** | |
| Brick Veneer cladding with stud frame | • Improve brick wall stability through use of inside fixed ties.<br>• Use articulation joints to limit cracking from uneven foundation movement. |

| | |
|---|---|
| | • Provide generous venting through brickwork to balance hydrostatic forces and maximise cavity drying rate to minimise timber decay.<br>• Protect frame from failure and bottom sliding. For locations where there may be a high frequency of flooding use stainless steel or other high durability ties with angled surfaces to promote runoff. |
| Sheet or plank weatherboard cladding on stud frame e.g. fibre cement, plywood | • Use materials not impaired by immersion e.g. fibre cement or waterproof plywood sheets. |
| Non Load Carrying Components Interior Lining of Walls | |
| Bare Face Bricks or Cement Render | • Staining of light-coloured face bricks may be a consideration. |
| Plywood with Stud Frame | • Grades with waterproof bond recover strength after drying out.<br>• Horizontal sheet fixing can reduce replacement costs.<br>• With a timber frame, the cavity should be well ventilated to reduce the chance of timber decay.<br>• Leave lower edge lining 30mm above bottom wall plate or cut notches to allow entry of water, ventilation, and silt removal. Use deeper skirting boards to cover openings on lining. Screw fixings enables easy removal. |
| Plasterboard with Stud Frame | • As sheets are weakened and can incur permanent damage and loss of strength, ignore wall bracing contribution from lining.<br>• Horizontal sheet fixing can reduce replacement costs.<br>• With a timber frame, the cavity should be well ventilated to reduce chance of timber decay.<br>• Leave at least 30mm above bottom wall plate or cut notches to allow entry of water, ventilation, and silt removal. Use deeper skirting boards to cover openings on lining. Screw fixings enables easy removal. |
| Non load carrying component | |
| Plasterboard | • Insert small air vents in the ceiling to relieve pressure from trapped air in the room and ventilate enclosed areas to reduce risk of timber decay. |
| Non-structural components (Joinery, built-in furniture): | • Avoid false floors in cupboards and wardrobes<br>• Build units on legs to allow for cleaning and free flowing air underneath<br>• Provide holes for drainage and ventilation to closed-off areas and hollow components<br>• Construct joints so they shed water<br>• Use supports at closer centres with structural ply panelling to limit permanent distortion (position supports at less than 500mm centres).<br>• Refer section 6 of Reducing Vulnerability of Buildings to Flood Damage for further details of non-structural component design. |

Any new structures are to be constructed of fit for purpose building materials in accordance with "Reducing vulnerability of buildings to flood damage". It is not recommended to use timber framed construction for any new structures below the FPL (3.66m AHD) or any construction which result in voids that are difficult to clean out after a flooding event. However, if timber framed construction is to be used, then the builder is to ensure that new structures are to be constructed in accordance with the above table.

***B2: All new development 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. Where shelter-in-place refuge is required, the structural integrity for the refuge is to be up to the Probable Maximum Flood level. Structural certification shall be provided confirming the above.***

**Development Compliance:** All new structures are to be designed and constructed to ensure structural integrity up to the FPL (3.66m AHD), taking into account the forces of floodwater, wave action, flowing water with debris and buoyancy and immersion. The required on-site refuge (refer section 4.5) is proposed to be located on the first floor (FFL 6.08m AHD). The on-site refuge is to be designed and constructed to ensure structural integrity up to the PMF (5.66m AHD), taking into account the forces of floodwater, wave action, flowing water with debris and buoyancy and immersion.

The existing ground floor structure may need to be strengthened to accommodate the provision of the on-site refuge. Structural adequacy of the existing structure and need for strengthening of the existing ground floor structure to support the on-site refuge are to be determined by a structural engineer.

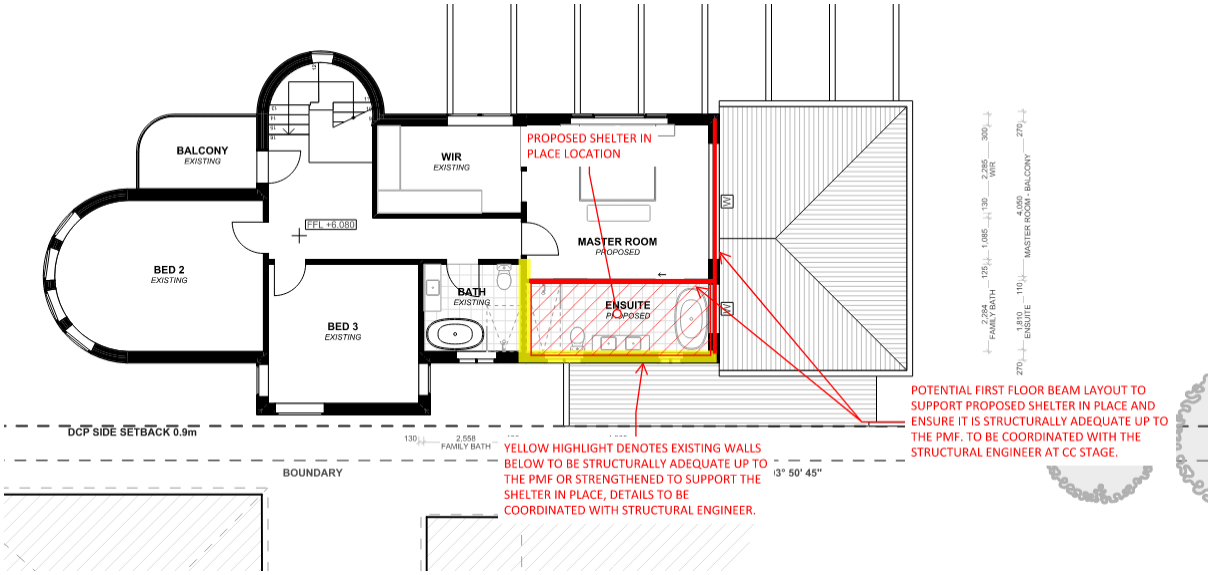


*Figure 3: Potential shelter in place location and structural layout - Details to be confirmed with structural engineer*

***B3: 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 within the subject structure must have residual current devices installed that turn off all electricity supply to the property when flood waters are detected.***

**Development Compliance:** The switchboard and main circuit unit must be fitted above the FPL (3.66m 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 (3.66m AHD) and conduits must be laid such that they are free draining. All existing electrical equipment and power points located below the FPL (3.66m AHD) within the subject structure must have residual current devices installed that turn off all supply of electricity to the property when flood waters are detected.

## 4.3 Floor Levels

*C4: A one-off addition or alteration below the Flood Planning Level of less than 30 square metres (in total, including walls) may be considered only where:*
*(a) it is an extension to an existing room; and*
*(b) the Flood Planning Level is incompatible with the floor levels of the existing room; and*
*(c) out of the 30 square metres, not more than 10 square metres is below the 1% AEP flood level.*

*This control will not be permitted if this provision has previously been utilised since the making of this Plan. The structure must be floodproofed to the Flood Planning Level, and the Flood Management Report must demonstrate that there is no net loss of flood storage in all events up to the 1% AEP event.*

Development Compliance: The proposed ground floor extension is to be located at the existing ground floor level of FFL 3.175m AHD which is below the FPL (3.66m AHD). The proposed extension is to be less than 30 square metres. Further, the FPL is incompatible with the existing floor level and the whole extension is to be located above the 1% AEP flood level (RL 3.16m AHD). Therefore, compliance with the requirements of this condition is achieved. In addition, the proposed development is to be flood proofed up to the FPL (RL 3.66m AHD) and no net loss of flood storage is expected to occur as a result of this development (Refer section 4.1-A2).

## 4.4 Car Parking

*D1: Open carpark areas and carports shall not be located within a floodway.*

Development Compliance: The proposed open carport is not located within a floodway. It is within the flood storage and hence is compliant with this condition.

*D2: The lowest floor level of open carparks and carports shall be constructed no lower than the natural ground levels, unless it can be shown that the carpark or carport is free draining with a grade greater than 1% and that flood depths are not increased.*

Development Compliance: The proposed carport is to be located at natural ground level (RL 2.32m AHD).

*D3: Carports must be of open design, with at least 2 sides completely open such that flow is not obstructed up to the 1% AEP flood level. Otherwise it will be considered to be enclosed.*
*When undertaking a like-for-like replacement and the existing garage/carport is located on the street boundary and ramping is infeasible, consideration may be given for dry floodproofing up to the 1% AEP flood level.*

Development Compliance: The front of the carport is proposed to be completely open. Further, the front of the rear alfresco deck must be completely open and the proposed privacy screening and alfresco balustrade must be greater than 50% open up to the 1% AEP flood level (RL 3.16m AHD) to allow for flood waters to flow through the carport unimpeded. The perimeter of the carport is to be restricted from being used for storage and kept clear from obstructions so as to ensure flood waters can freely enter the carport. Therefore, 1% AEP flood waters are not anticipated to obstruct or impact the conveyance of flood waters across the site.

*D4: Where there is more than 300mm depth of flooding in a car park or carport during a 1% AEP flood event, vehicle barriers or restraints are to be provided to prevent floating vehicles leaving the site. Protection must be provided for all events up to the 1% AEP flood event*

Development Compliance: There is a maximum ponding depth of 840mm at the location of the proposed carport during a 1% AEP flood event. Therefore, vehicle restraints or barriers such as a removable chain or removable bollards must be provided to prevent vehicles floating away during a 1% AEP flood event. The vehicle restraint must be designed and certified by a structural engineer to withstand the forces of a floating vehicle with flood forces up to the FPL.

## 4.5 Emergency Response

*E1: If the property is affected by a Flood Life Hazard Category of H3 or higher, then Control E1 applies and a Flood Emergency Assessment must be included in the Flood Management Report.*
*Where flood-free evacuation above the Probable Maximum Flood level is not possible, new development must provide a shelter-in-place refuge where:*
*a)The floor level is at or above the Probable Maximum Flood level; and*
*b)The floor space provides at least 2m2 per person where the flood duration is long (6 or more hours) in the Probable Maximum Flood event, or 1m2 per person for less than 6 hours;*
*c)It is intrinsically accessible to all people on the site, plainly evident, and self-directing, with sufficient capacity of access routes for all occupants without reliance on an elevator; and) It must contain as a minimum: sufficient clean water for all occupants; portable radio with spare batteries; torch with spare batteries; and a first aid kit*

Development Compliance: The property is affected by a Flood Life Hazard Category of H5. Flood free evacuation above the PMF (5.66m AHD) is not possible, therefore a shelter-in place refuge is recommended. The first floor (FFL 6.08m AHD) is proposed to provide an on-site refuge above the PMF (5.66m AHD) (Details to be coordinated at CC stage.). The on-site refuge must have appropriate access installed to enable access points from all areas within the development and is to be designed and constructed in accordance with Section 4.4 of this report to ensure structural integrity up to the PMF (5.66m AHD).

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.
- 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

## 4.6 Fencing

***F1: Fencing, (including pool fencing, boundary fencing, balcony balustrades and accessway balustrades) shall be designed so as not to impede the flow of flood waters and not to increase flood affectation on surrounding land. At least 50% of the fence must be of an open design from the natural ground level up to the 1% AEP flood level. Less than 50% of the perimeter fence would be permitted to be solid. Openings should be a minimum of 75 mm x 75mm.***

**Development Compliance:** All fencing is to be constructed of an open design to allow the 1% AEP floodwater to flow through the property unimpeded. The fencing must be a minimum of 50% open from natural ground level up to the 1% AEP flood level (RL 3.16m AHD), with openings a minimum of 75mm x 75mm.

## 4.7 Storage of Goods

***G1: Hazardous or potentially polluting materials shall not be stored below the Flood Planning Level unless adequately protected from floodwaters in accordance with industry standards.***

**Development Compliance:** All hazardous or potentially polluting materials are to be stored above the FPL of 3.66m AHD.

## 4.8 Pools

***H1: 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 waterproofed and/or located at or above the Flood Planning Level. All chemicals associated with the pool are to be stored at or above the Flood Planning Level.***

**Development Compliance:** The pool is existing with an existing coping level of 2.74m AHD (approx. 300mm above NGL). The pool coping is proposed to be extended and hence the existing pool coping level is to be maintained at RL 2.74m AHD which will result in no net loss of flood storage (Refer section 4.1-A2 for further detail). All new electrical and chemical equipment associated with the pool must be waterproofed and/or located above the Flood Planning Level of 3.66m AHD.

# 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 Council Development Control Plan (DCP).* Please contact the author if further clarification is required.

NORTHERN BEACHES CONSULTING ENGINEERS P/L

Author:

Sarah Raaff

Engineer 2

Reviewed By:

Michael Wachjo

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

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# APPENDIX A

Council Flood Information

# BASIC
# FLOOD INFORMATION REPORT

**Property:** 15 Lakeside Crescent NORTH MANLY NSW 2100
**Lot DP:** Lot 56 DP 12578
**Issue Date:** 20/05/2024
**Flood Study Reference:** Manly Lagoon Flood Study 2013, BMT WBM

## Flood Information[1]:

### Map A - Flood Risk Precincts
Maximum Flood Planning Level (FPL) [2, 3, 4]: 3.66 m AHD

### Map B - 1% AEP Flood
1% AEP Maximum Water Level [2, 3]: 3.16 m AHD
1% AEP Maximum Depth from natural ground level[3]: 1.46 m
1% AEP Maximum Velocity: 0.50 m/s

### Map C - 1% AEP Hydraulic Categorisation
1% AEP Hydraulic Categorisation: Flood Storage

### Map D - Probable Maximum Flood (PMF)
PMF Maximum Water Level [4]: 5.66 m AHD
PMF Maximum Depth from natural ground level: 3.96 m
PMF Maximum Velocity: 1.07 m/s

### Map E - Flood Life Hazard Category in PMF
H5

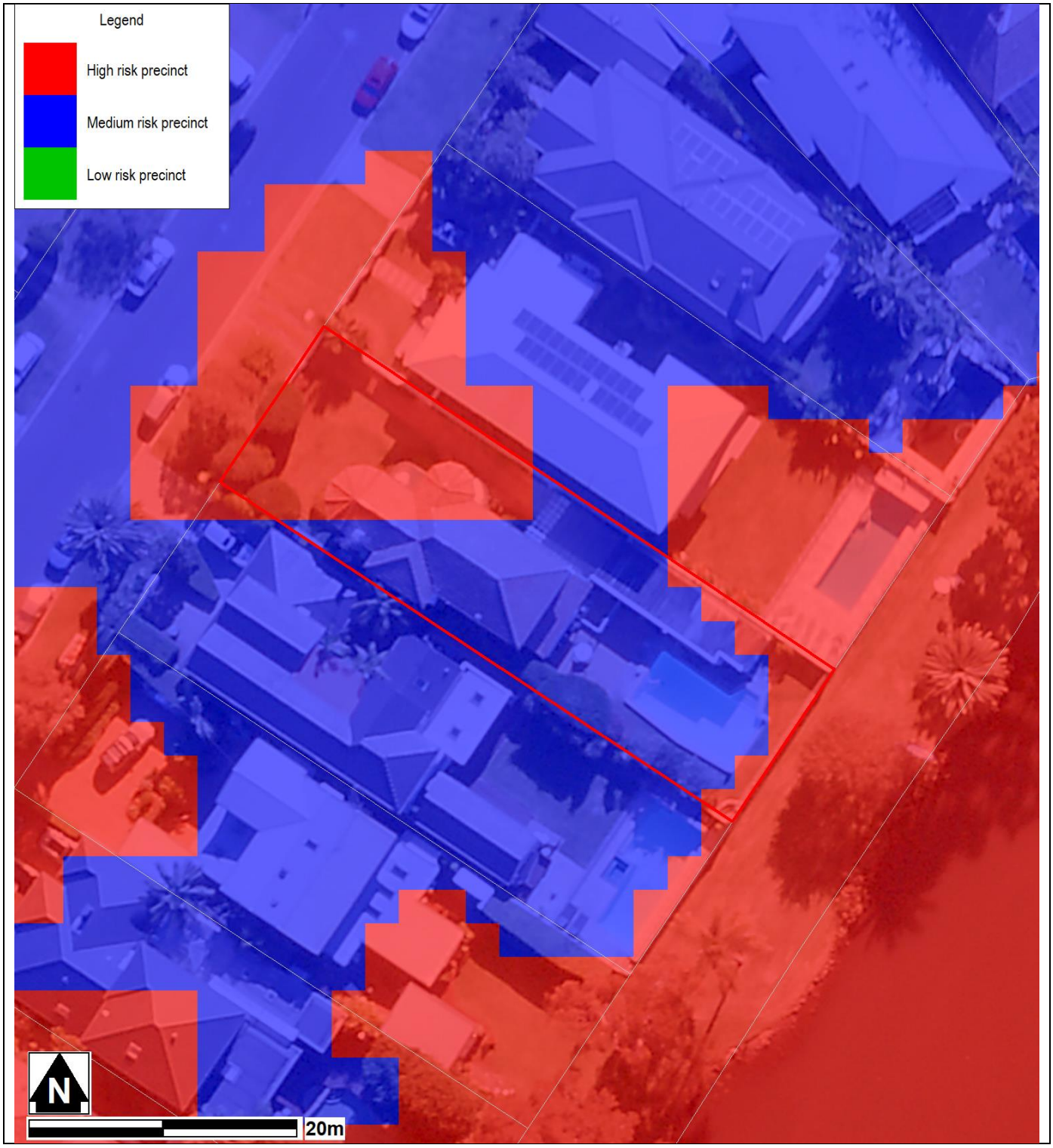
(1) The provided flood information does not account for any local overland flow issues nor private stormwater drainage systems.
(2) Overland flow/mainstream water levels may vary across a sloping site, resulting in variable minimum floor/ flood planning levels across the site. The maximum Flood Planning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

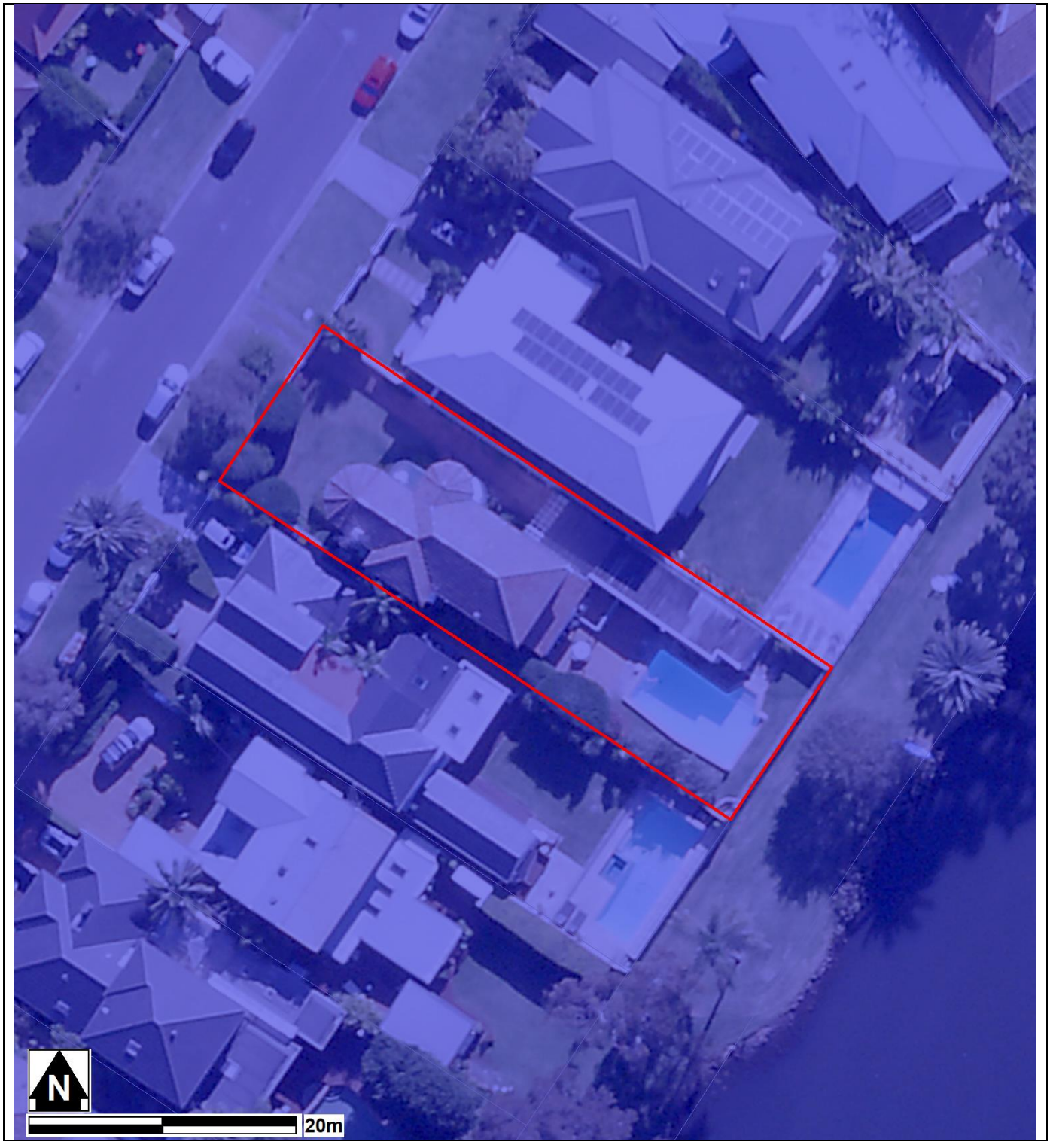
# MAP A: FLOOD RISK PRECINCTS




**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.

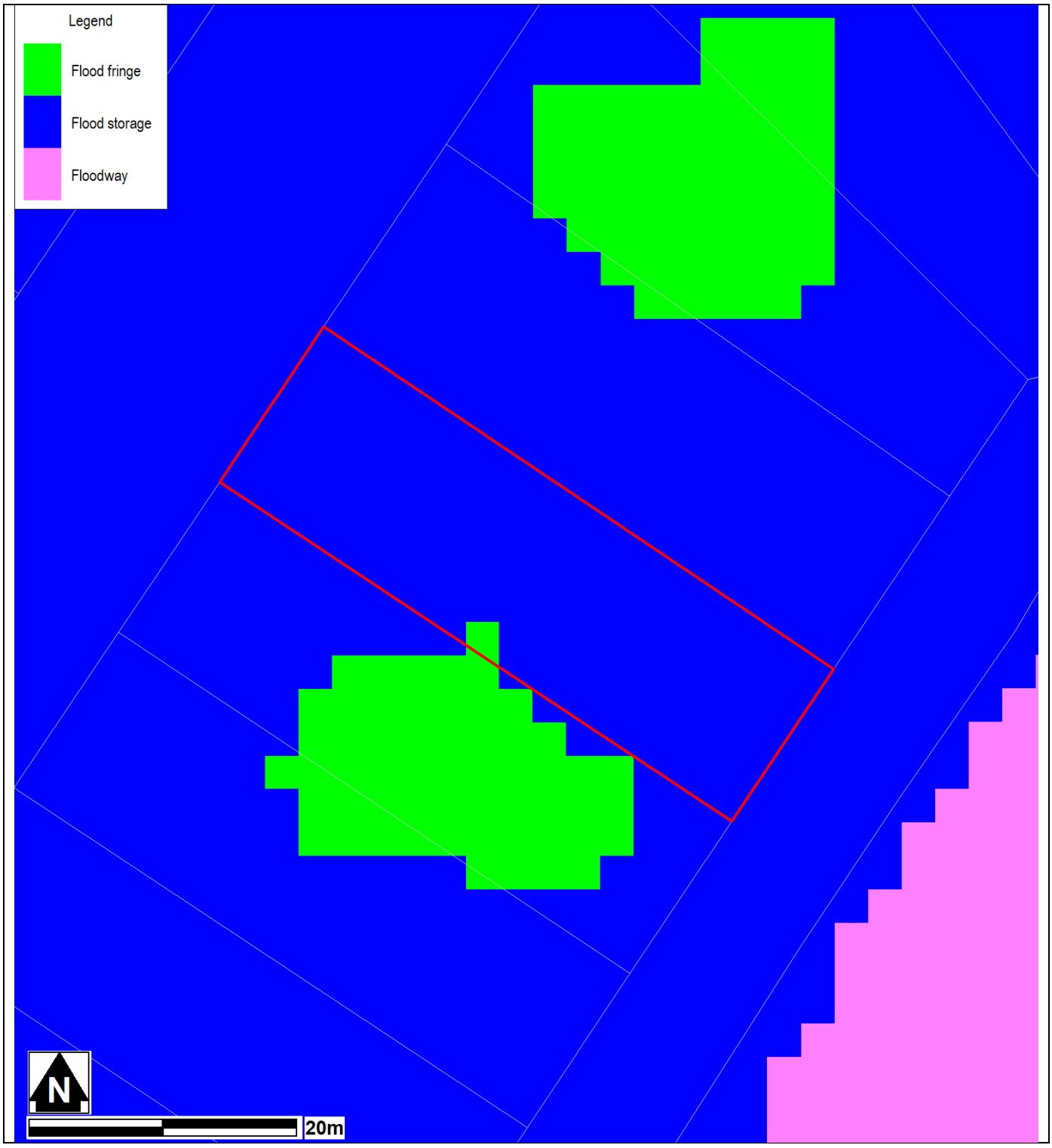
# MAP B: FLOODING - 1% AEP EXTENT




**Notes:**

- Extent represents the 1% Annual Exceedance Probability (AEP) flood event.
- Flood events exceeding the 1% AEP can occur on this site.
- Extent does not include climate change.
- Cadastre Lines (Source: NSW Government Land and Property Information), flood levels/extents (Source: Manly Lagoon Flood Study 2013, BMT WBM) and aerial photography (Source: NearMap 2014) are indicative only.

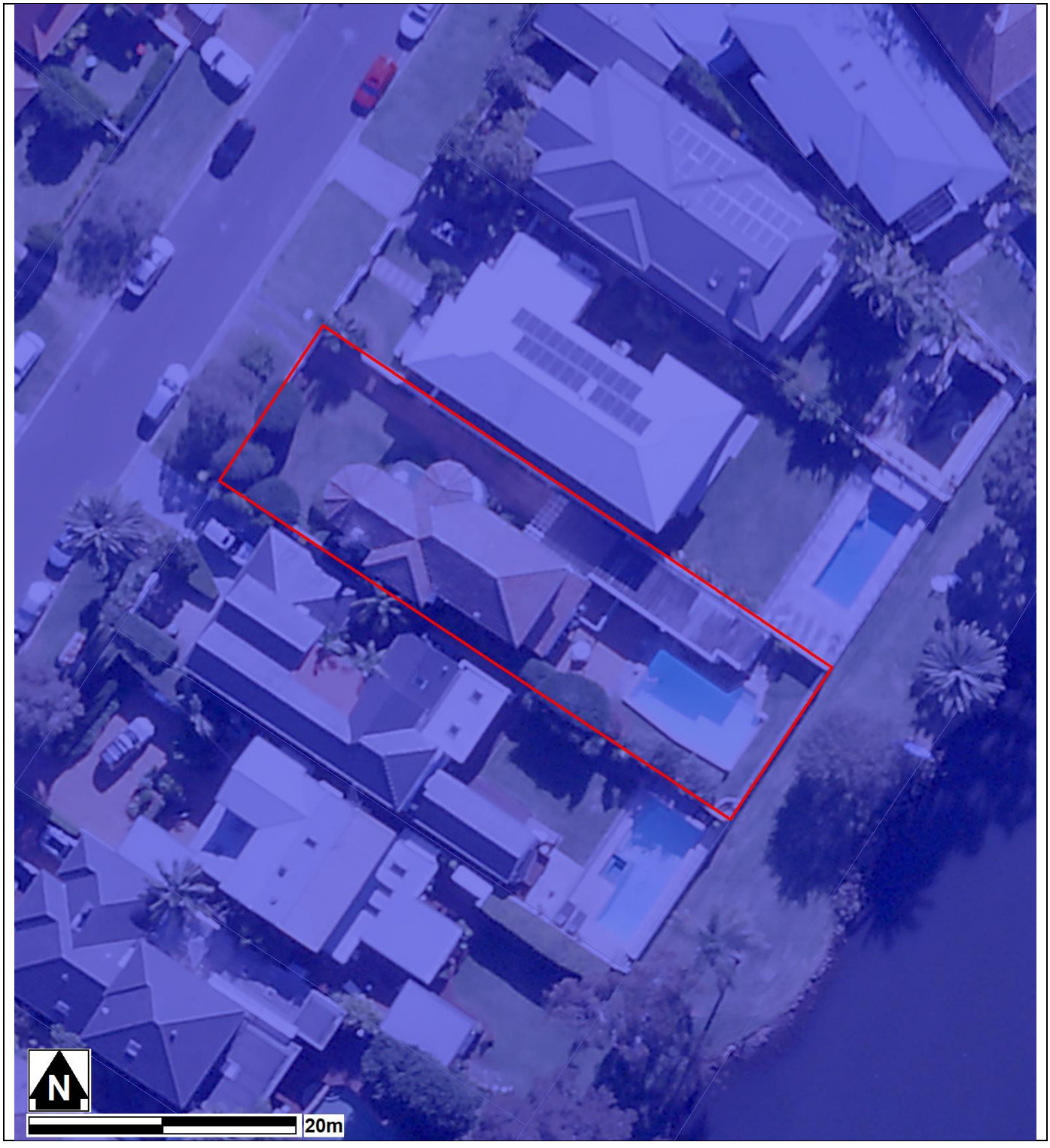
# MAP C: 1% AEP FLOOD HYDRAULIC CATEGORY EXTENT MAP




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

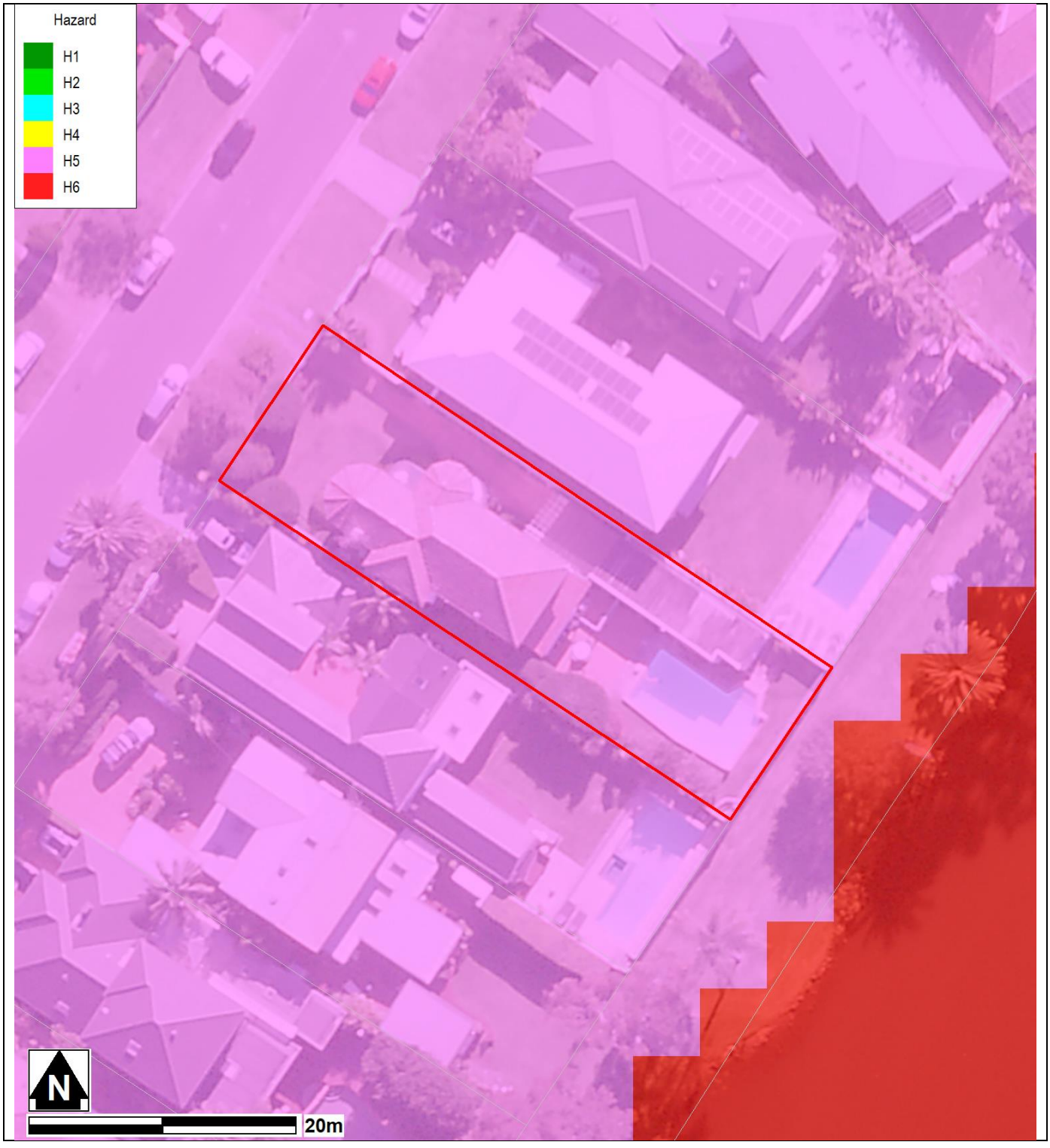
# MAP D: PROBABLE MAXIMUM FLOOD EXTENT




**Notes:**

- Extent represents the Probable Maximum Flood (PMF) flood event.
- Extent does not include climate change.
- Cadastre Lines (Source: NSW Government Land and Property Information), flood levels/extents (Source: Manly Lagoon Flood Study 2013, BMT WBM) and aerial photography (Source: NearMap 2014) are indicative only.

# MAP E: FLOOD LIFE HAZARD CATEGORY IN PMF




**Notes:**

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

# Preparation of a Flood Management Report

### Introduction

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

### Planning Requirements for Flood Prone Land

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

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

| LEP Clauses | DCP Clauses |
|---|---|
| Manly LEP (2013) – 5.21 Flood Planning<br>Manly LEP (2013) – 5.22 Special Flood Considerations | Manly DCP (2013) – 5.4.3 Flood Prone Land |
| Warringah LEP (2011) – 5.21 Flood Planning<br>Warringah LEP (2011) – 5.22 Special Flood Considerations<br>Warringah LEP (2000) – 47 Flood Affected Land * | Warringah DCP (2011) – E11 Flood Prone Land |
| Pittwater LEP (2014) – 5.21 Flood Planning<br>Pittwater LEP (2014) – 5.22 Special Flood Considerations | Pittwater 21 DCP (2014) – B3.11 Flood Prone Land<br>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

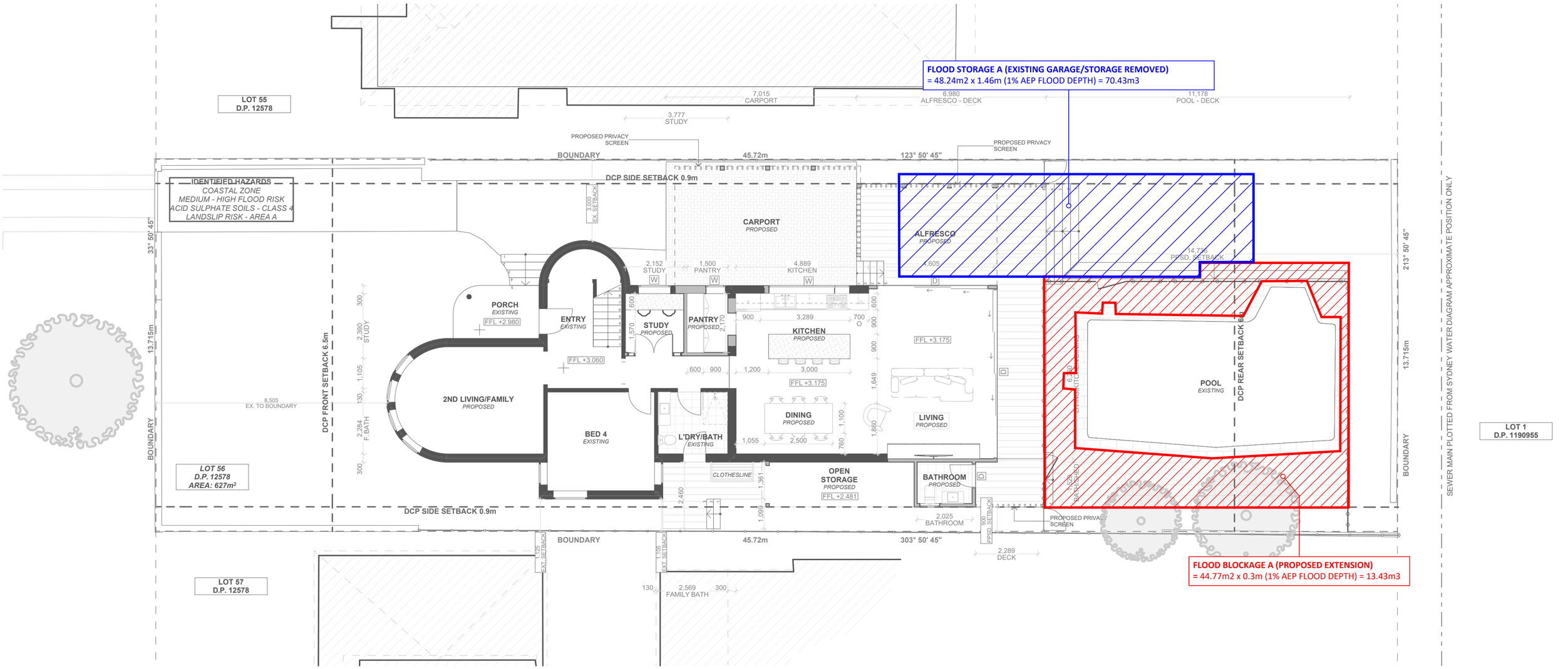
Further information and guidelines for development are available on Council's website at:

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 .

# APPENDIX B

Flood Storage Calculations




## 1 PROPOSED GROUND FLOOR PLAN

Scale 1:100

# FLOOD STORAGE CALCULATIONS

**FLOOD STORAGE CALCULATIONS**

FLOOD BLOCKAGE = 13.43m3
FLOOD STORAGE = 70.43m3

NET FLOOD STORAGE INCREASE = 70.43m3 - 13.43m3 = 57m3

THEREFORE, THE PROPOSED DEVELOPMENT WILL RESULT IN A NET INCREASE IN FLOOD STORAGE OF 57m3

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**LEGEND**

- EXISTING
- DEMOLISHED
- METAL ROOFING
- TILED ROOFING
- TIMBER STUD
- TILED FLOOR
- TIMBER FLOOR
- BRICKWORK

**CLIENT**
Linda & Sean Obrien

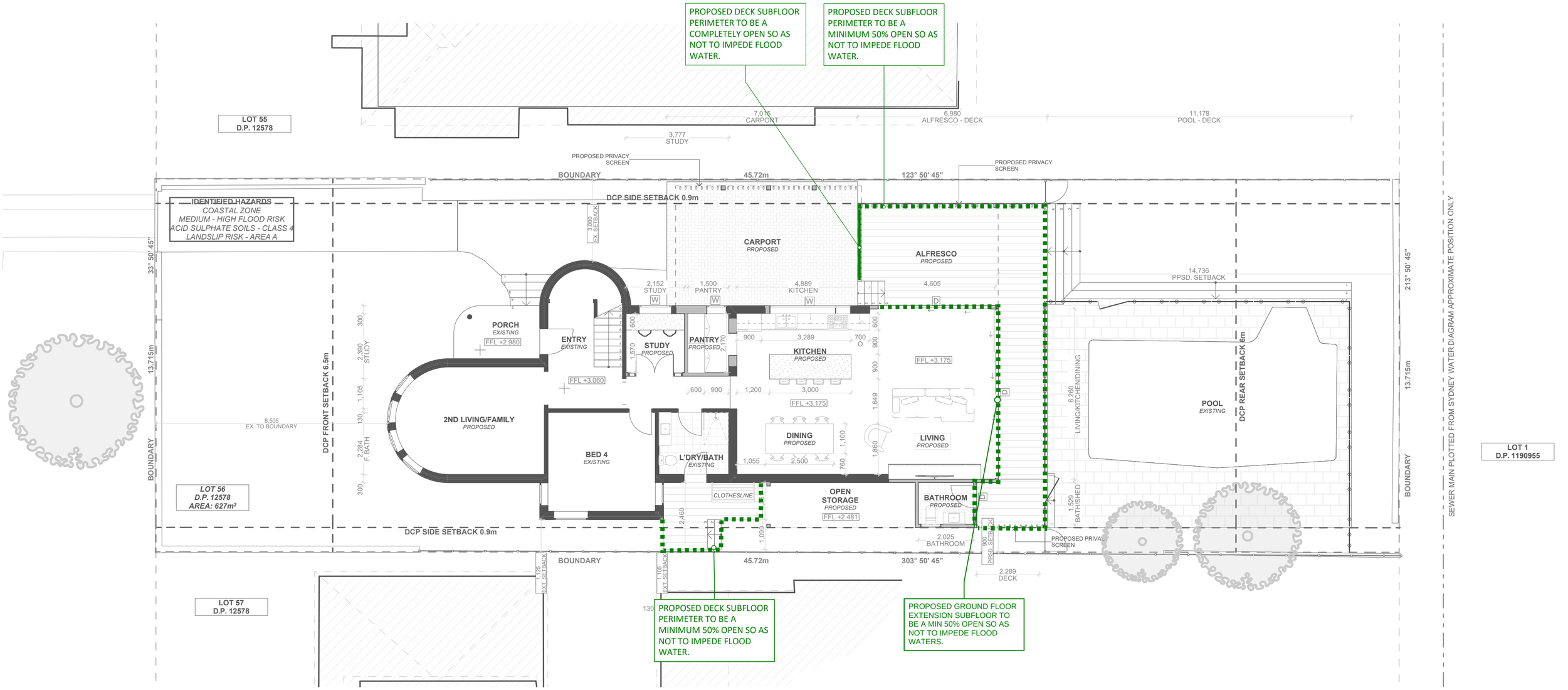
**PROJECT ADDRESS**
15 Lakeside Cresent, North Manly NSW 2100

**DRAWING NO.**
DP04

**DATE**
Monday, 9 December 2024

**DRAWING NAME**
PROPOSED GROUND FLOOR PLAN

**SCALE**
1:100 @A2




## 1 PROPOSED GROUND FLOOR PLAN

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# PROPOSED OPEN SUBFLOOR WALL PLAN


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**LEGEND**

- EXISTING
- DEMOLISHED
- METAL ROOFING
- TILED ROOFING
- TIMBER STUD
- TILED FLOOR
- TIMBER FLOOR
- BRICKWORK

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**DRAWING NO.**
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**DATE**
Monday, 9 December 2024

**DRAWING NAME**
PROPOSED GROUND FLOOR PLAN

**SCALE**
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# APPENDIX C

Proposed Development Plans & Survey

# ACTION PLANS

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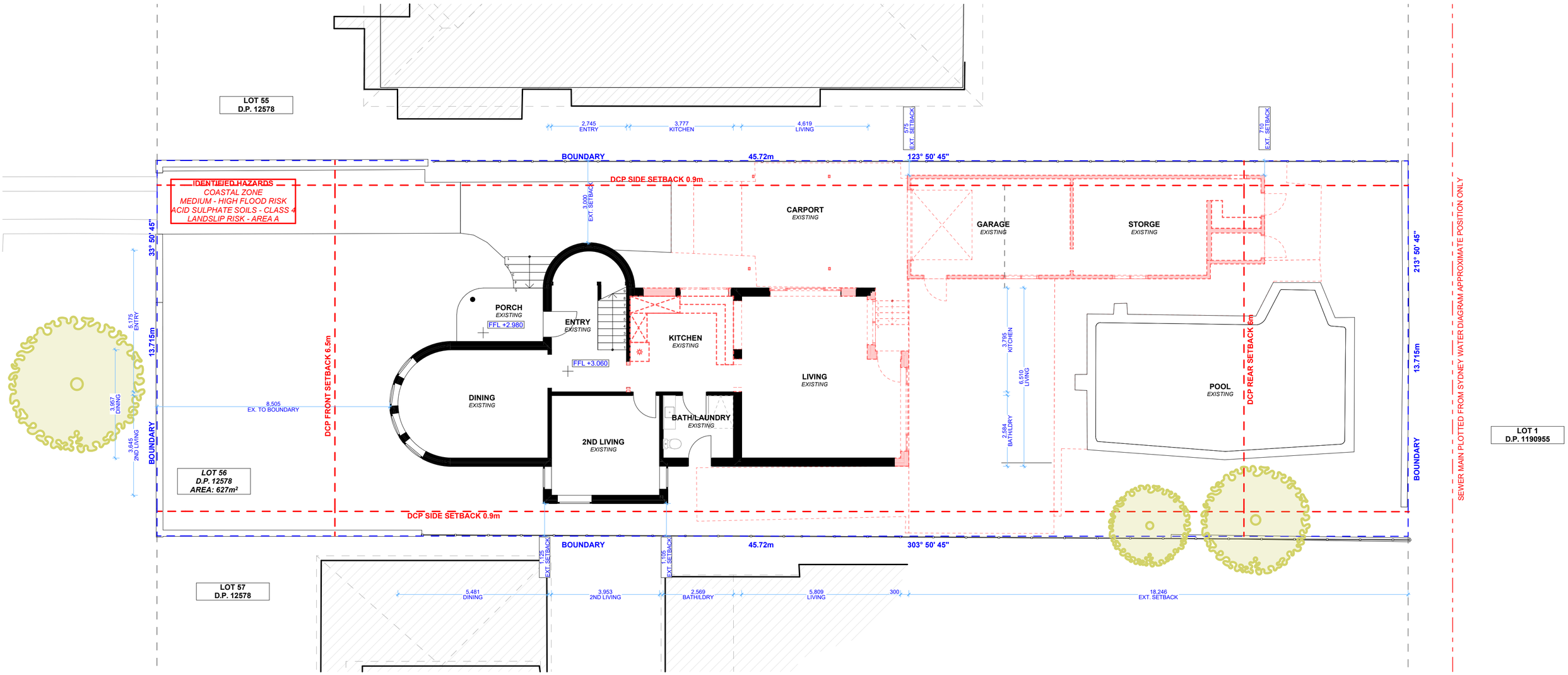
**PLANS PUBLISHED 09/12/2024**

## 15 Lakeside Cresent, North Manly NSW 2100

# DESIGN PLANS

**These plans are for not for submission or construction.**

| ITEM DETAILS | DEVELOPMENT APPLICATION | | | |
|---|---|---|---|---|
| ADDRESS | **15 Lakeside Crescent, North Manly NSW 2100** | | | |
| LOT & DP/SP | **LOT 56 DP 12578** | | | |
| COUNCIL | **NORTHERN BEACHES COUNCIL (WARRINGAH)** | | | |
| SITE AREA | 627m² | | | |
| FRONTAGE | 13.715m | | | |
| CONTROLS | **PERMISSIBLE / REQUIRED** | **EXISTING** | **PROPOSED** | **COMPLIANCE** |
| | m / m² / % | m / m² / % | m / m² / % | |
| **LEP** | | | | |
| LAND ZONING | R2 – LOW DENSITY RESIDENTIAL | R2 | R2 | **YES** |
| MINIMUM LOT SIZE | 600m² | 627m² | UNCHANGED | **YES** |
| FLOOR SPACE RATIO | NOT IDENTIFEID | N/A | N/A | **N/A** |
| MAXIMUM BUILDING HEIGHT | 8.5m | 7.665m | UNCHANGED | **YES** |
| **HAZARDS** | | | | |
| ACID SULFATE SOILS | CLASS 4 | N/A | N/A | **N/A** |
| FLOOD PLANNING | YES | N/A | N/A | **N/A** |
| DEVELOPMENT ON SLOPING LAND | AREA 2 | N/A | N/A | **N/A** |
| COASTAL HAZARDS | CHAPTER 2 | N/A | N/A | **N/A** |
| HIGH/MED/LOW FLOOD RISK PRECINCT | HIGH AND MEDIUM | N/A | N/A | **N/A** |
| **DCP** | | | | |
| WALL HEIGHT | 7.2m | 6.136m | UNCHANGED | **YES** |
| NUMBER OF STOREYS | 2 | 2 | UNCHANGED | **YES** |
| SIDE BOUNDARY ENVELOPE | 4m | | UNCHANGED | **YES** |
| SIDE BOUNDARY SETBACKS | 0.9m | N: 3m<br>S: 1.105m | N: UNCHANGED<br>S: 0.9m | **YES** |
| FRONT BOUNDARY SETBACK | 6.5m | 8.505m | UNCHANGED | **YES** |
| REAR BOUNDARY SETBACK | 6.0m | 18.246m | 14.736m | **YES** |
| LANDSCAPE OPEN SPACE | 40% (250.8m²) | 35.48%<br>(222.51m²) | 35.37%<br>(221.81m²) | **NO** |
| PRIVATE OPEN SPACE | 60m² | 170.66m² | 219.68m² | **YES** |




## 1 EXISTING GROUND FLOOR PLAN

Scale 1:100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**LEGEND**

- EXISTING
- DEMOLISHED
- METAL ROOFING
- TILED ROOFING
- TIMBER STUD
- TILED FLOOR
- TIMBER FLOOR
- BRICKWORK

**CLIENT**
Linda & Sean Obrien

**PROJECT ADDRESS**
15 Lakeside Cresent, North Manly NSW 2100

**DRAWING NO.**
DP02

**DATE**
Monday, 9 December 2024

**DRAWING NAME**
EXISTING GROUND FLOOR PLAN

**SCALE**
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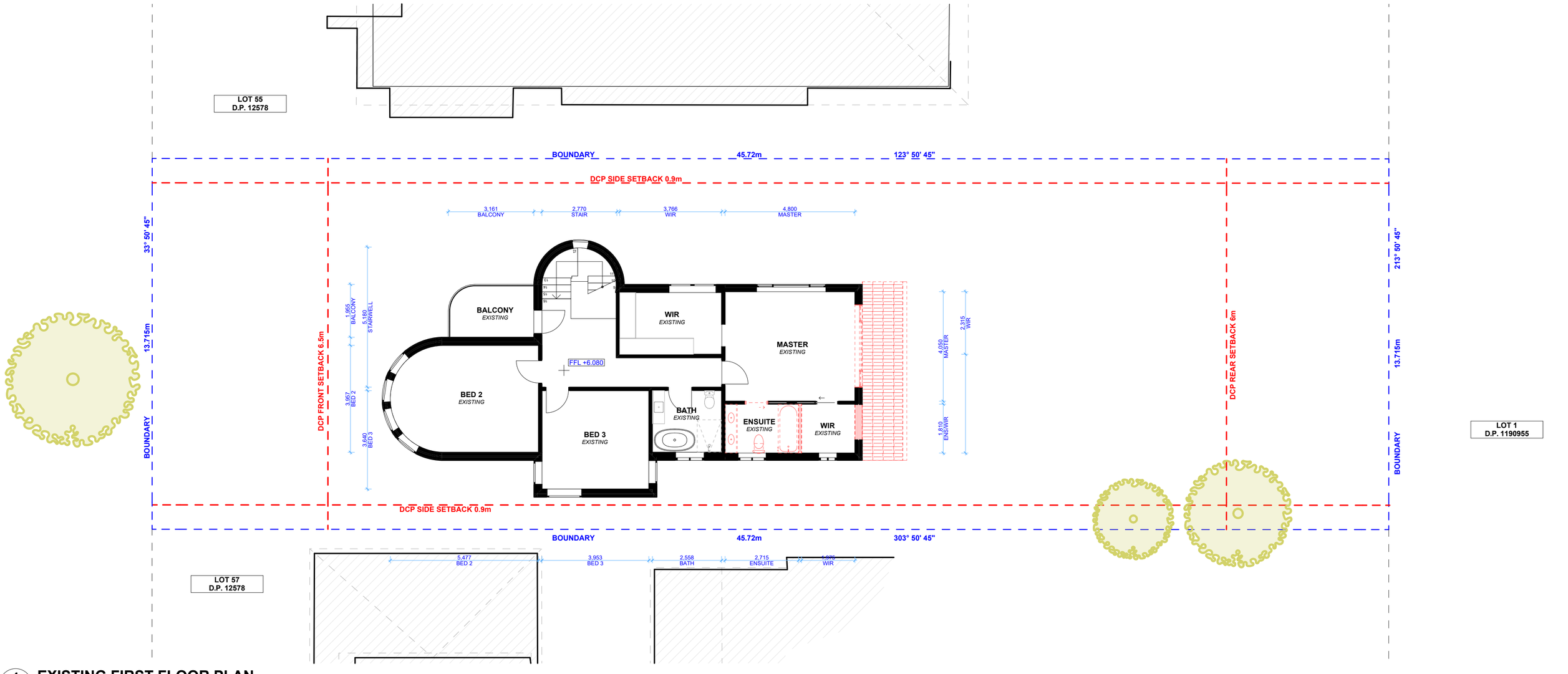


## 1 EXISTING FIRST FLOOR PLAN

Scale 1:100

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- EXISTING
- DEMOLISHED
- METAL ROOFING
- TILED ROOFING
- TIMBER STUD
- TILED FLOOR
- TIMBER FLOOR
- BRICKWORK

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15 Lakeside Cresent, North Manly NSW 2100

**DRAWING NO.**
DP03

**DATE**
Monday, 9 December 2024

**DRAWING NAME**
EXISTING FIRST FLOOR PLAN

**SCALE**
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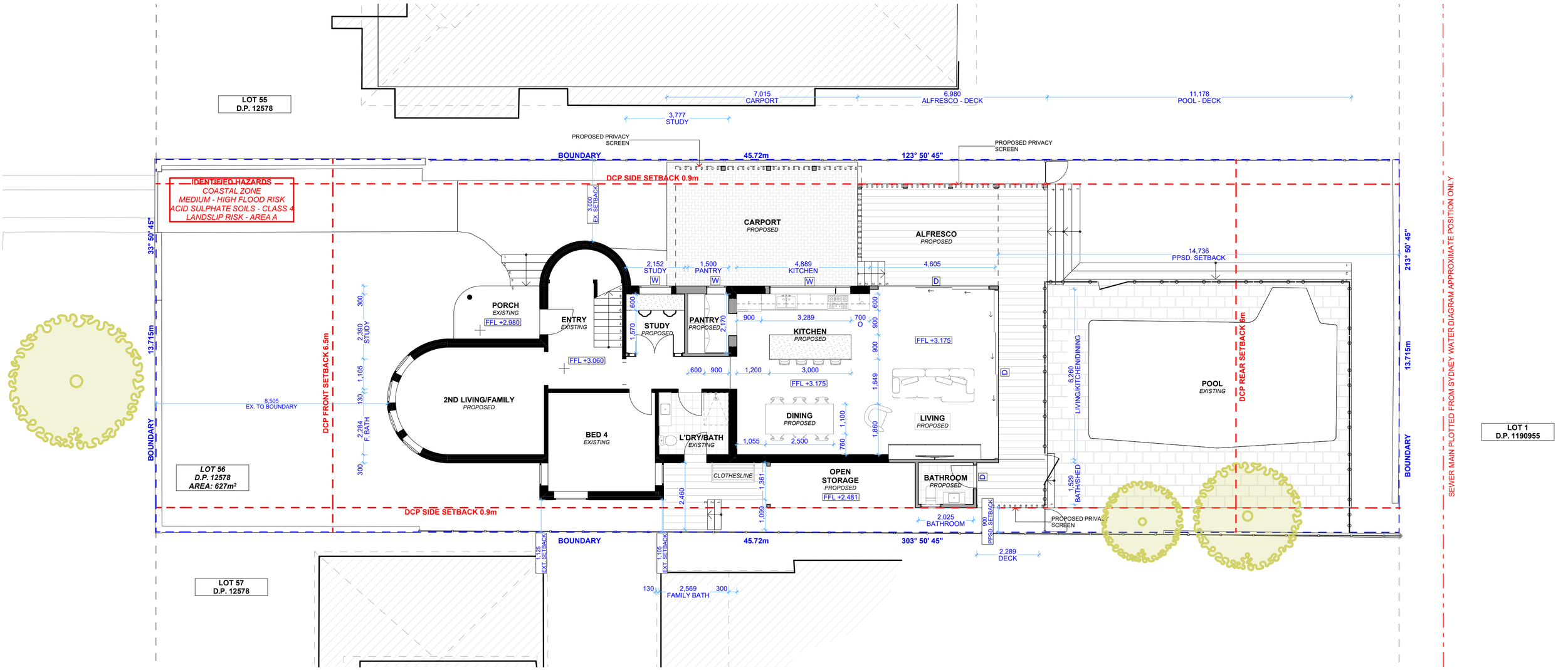


# 1 PROPOSED GROUND FLOOR PLAN

Scale 1:100


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- EXISTING
- DEMOLISHED
- METAL ROOFING
- TILED ROOFING
- TIMBER STUD
- TILED FLOOR
- TIMBER FLOOR
- BRICKWORK

**CLIENT**
Linda & Sean Obrien

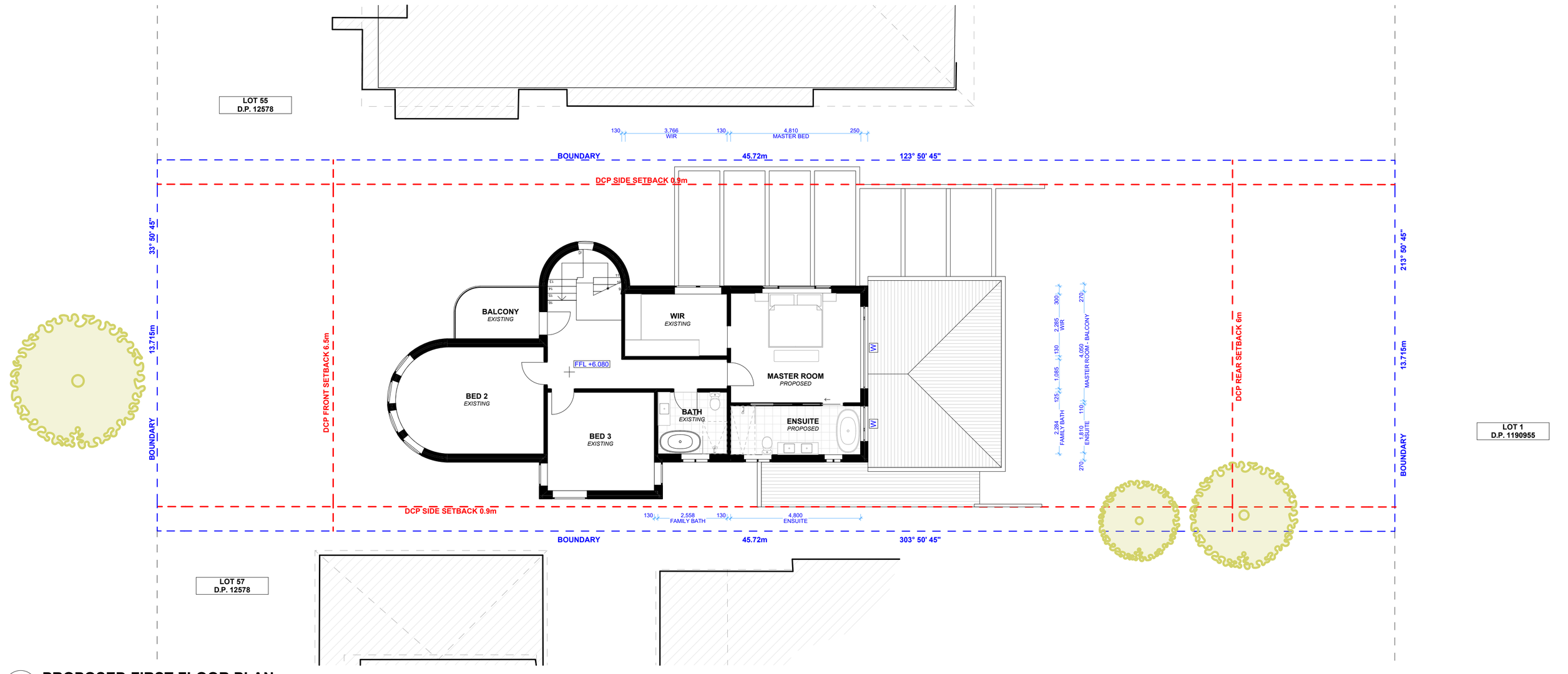
**PROJECT ADDRESS**
15 Lakeside Cresent, North Manly NSW 2100

**DRAWING NO.**
DP04

**DATE**
Monday, 9 December 2024

**DRAWING NAME**
PROPOSED GROUND FLOOR PLAN

**SCALE**
1:100 @A2

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**Scale 1:100**


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**LEGEND**

- EXISTING
- DEMOLISHED
- METAL ROOFING
- TILED ROOFING
- TIMBER STUD
- TILED FLOOR
- TIMBER FLOOR
- BRICKWORK

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**DRAWING NO.**
DP05

**DATE**
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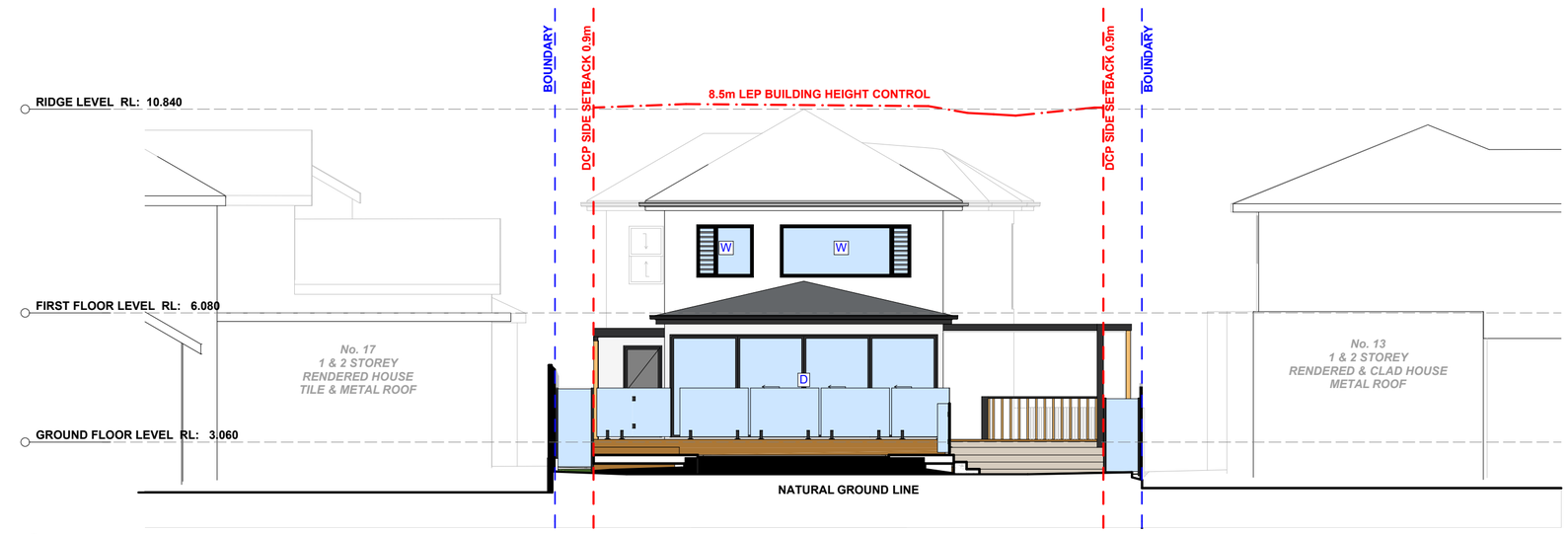
**DRAWING NAME**
PROPOSED FIRST FLOOR PLAN

**SCALE**
1:100 @A2


## 1 NORTH ELEVATION

Scale 1:100




## 2 EAST ELEVATION

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**LEGEND**

- METAL ROOFING
- TILED ROOFING
- TIMBER CLAD
- BRICKWORK
- CONCRETE
- EXISTING

**CLIENT**
Linda & Sean Obrien

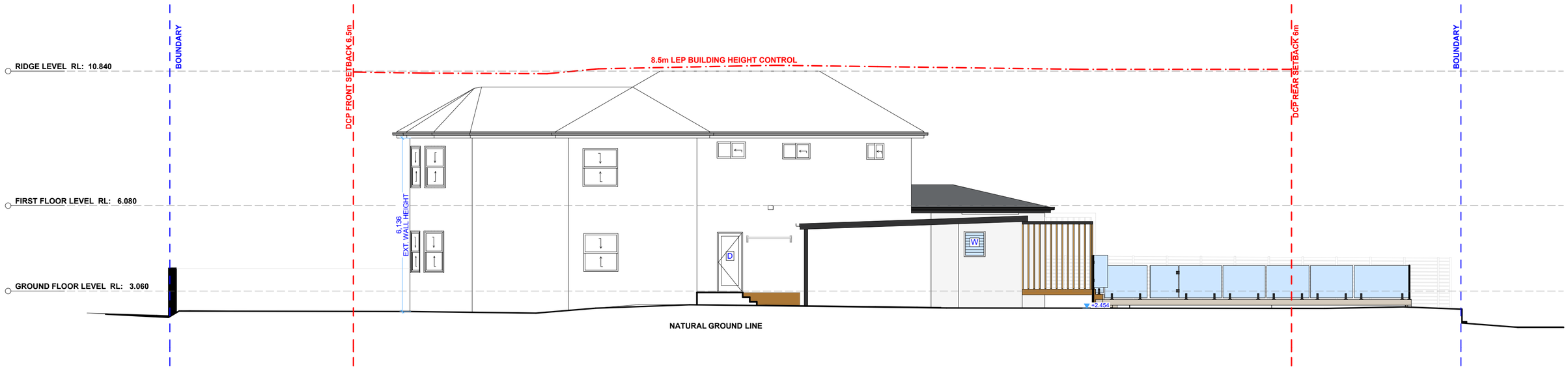
**PROJECT ADDRESS**
15 Lakeside Cresent, North Manly NSW 2100

**DRAWING NO.**
**DP06**

**DATE**
Monday, 9 December 2024

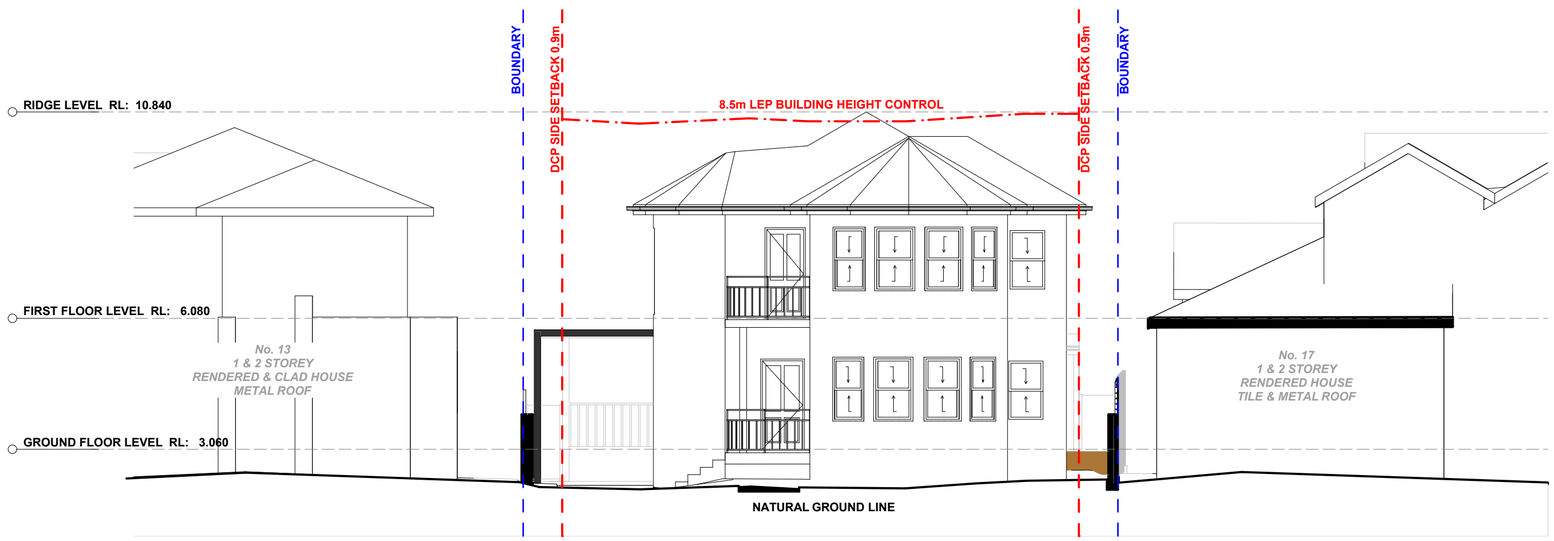
**DRAWING NAME**
NORTH / EAST ELEVATION

**SCALE**
1:100 @A2




## 1 SOUTH ELEVATION

Scale 1:100




## 2 WEST ELEVATION

Scale 1:100

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**LEGEND**

- METAL ROOFING
- TILED ROOFING
- TIMBER CLAD
- BRICKWORK
- CONCRETE
- EXISTING

**CLIENT**
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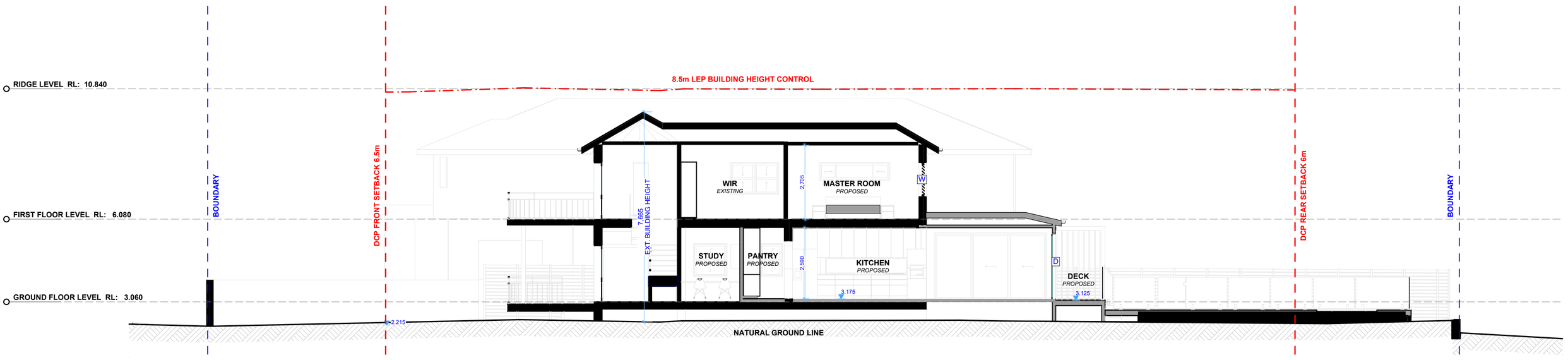
15 Lakeside Cresent, North Manly NSW 2100

**DRAWING NO.**
DP07

**DRAWING NAME**
SOUTH / WEST ELEVATION

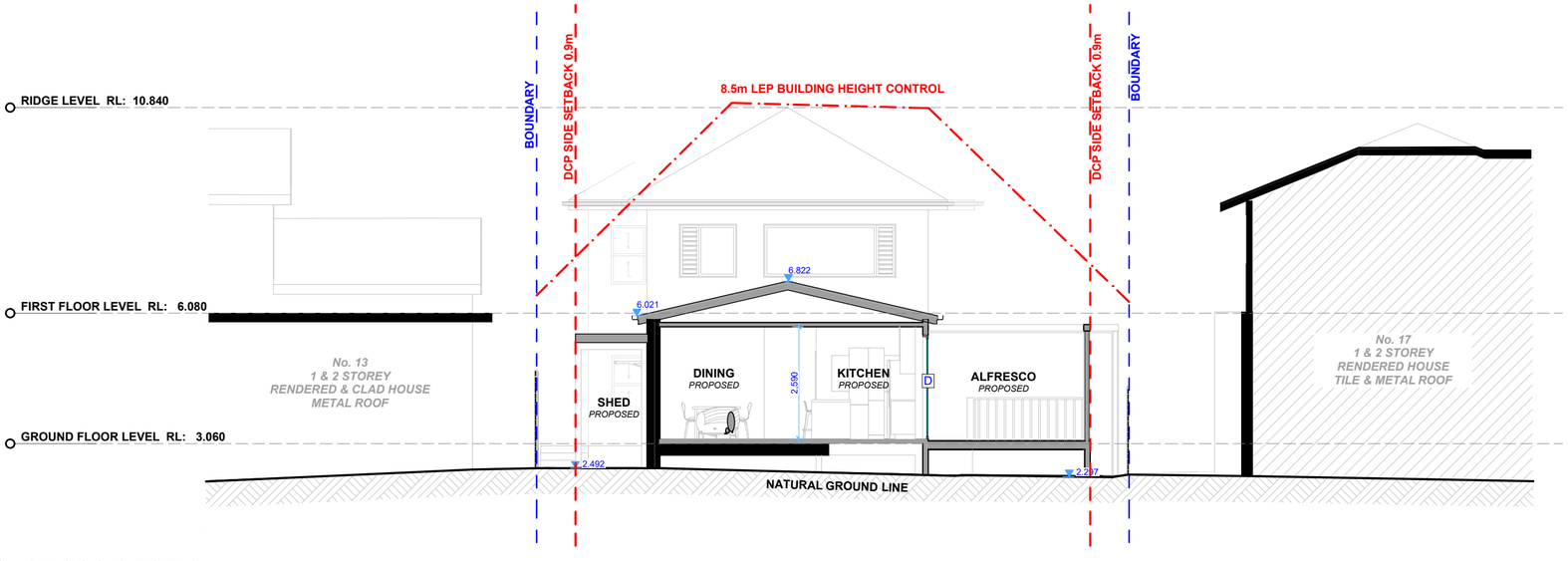
**DATE**
Monday, 9 December 2024

**SCALE**
1:100 @A2




## 1 LONG SECTION

Scale 1:100




## 2 CROSS SECTION

Scale 1:100

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m: 0426 957 518
e:operations@actionplans.com.au
w: www.actionplans.com.au

| REV. | DATE | COMMENTS | DRWN |
|---|---|---|---|
| A | 23.08.2024 | INITIAL DESIGN PLAN | AP |
| B | 13.11.2024 | REVISED DESIGN PLANS | CR |
| C | 26.11.2024 | SECOND DESIGN AMENDMENT | JW |
| D | 06.12.2024 | DESIGN AMENDMENT | CR |
| | | | |

**NOTES**


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**LEGEND**

- METAL ROOFING
- TILED ROOFING
- TIMBER CLAD
- BRICKWORK
- CONCRETE
- EXISTING

**CLIENT**
Linda & Sean Obrien

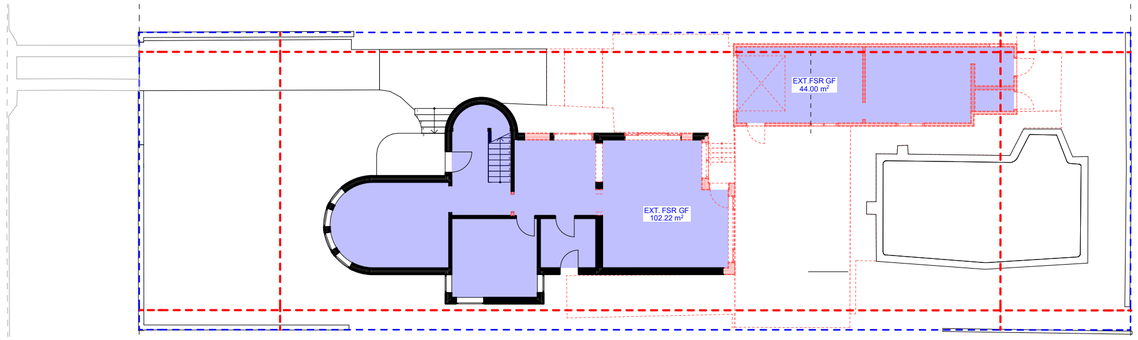
**PROJECT ADDRESS**
15 Lakeside Cresent, North Manly NSW 2100

**DRAWING NO.**
DP08

**DRAWING NAME**
LONG AND CROSS SECTIONS

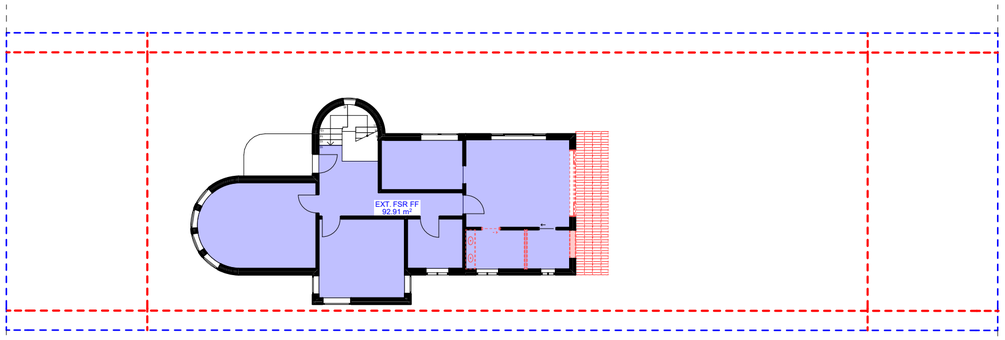
**DATE**
Monday, 9 December 2024

**SCALE**
1:100 @A2



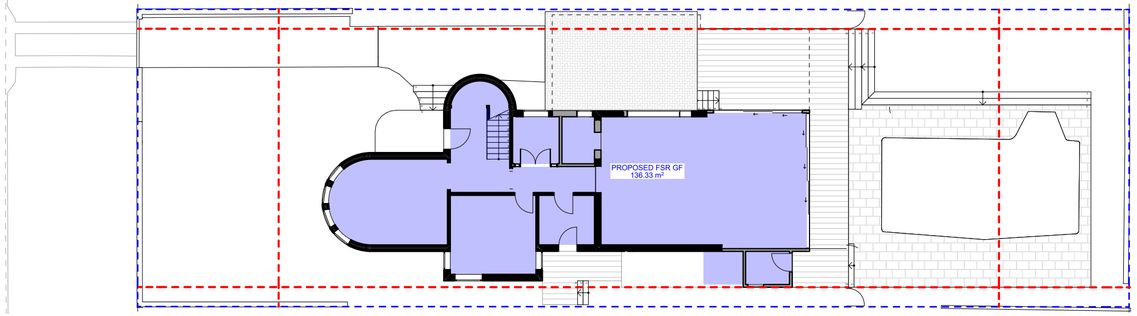

## 1 EXISTING FSR GF

Scale 1:200



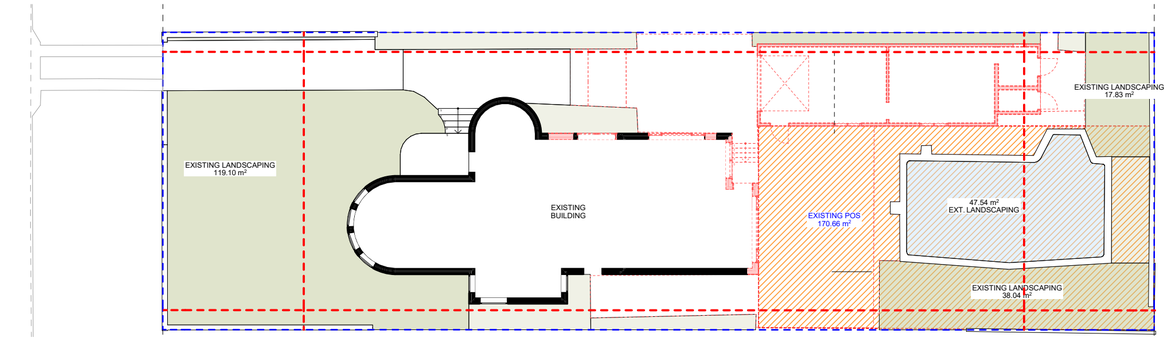

## 2 EXISTING FSR FF

Scale 1:200



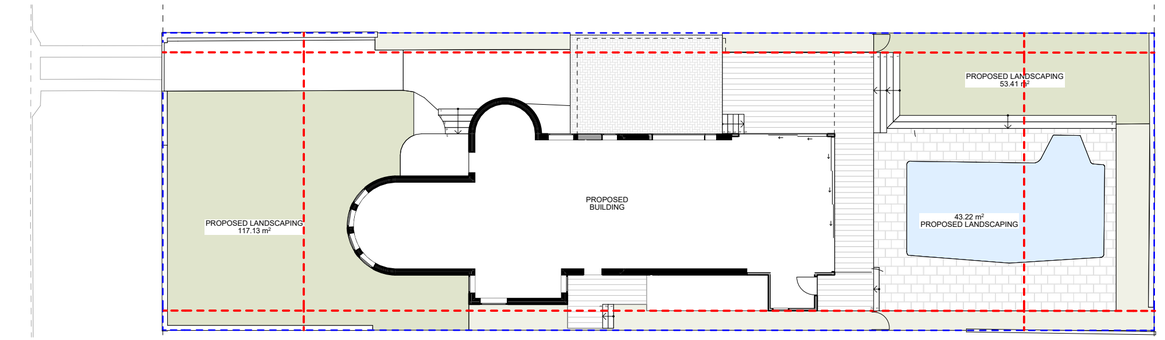

## 3 PROPOSED FSR GF

Scale 1:200




## 5 EXISTING LANSCAPING

Scale 1:200




## 6 PROPOSED LANDSCAPING

Scale 1:200

**CONTROL TABLE**
FSR

**SITE AREA: 627m2**

| CONTROL | REQUIRED | EXISTING | PROPOSED |
|---|---|---|---|
| **FLOOR SPACE RATIO** | - | 38.13% (239.13m²) | 36.44% (228.54m²) |

**TABLE LEGEND**

FSR

**CONTROL TABLE**
LANDSCAPING

**SITE AREA: 627m2**

| CONTROL | REQUIRED | EXISTING | PROPOSED |
|---|---|---|---|
| **PRIVATE OPEN SPACE** | **60**m² | **170.66**m² | **230.5**m² |
| **LANDSCAPING** | **40**% (250.8m²) | **35.48**% (222.51m²) | **27%** (170.54m²) |

**TABLE LEGEND**

LANDSCAPING > 2m

LANDSCAPING < 2m

PRIVATE OPEN SPACE

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**LEGEND**

- EXISTING
- DEMOLISHED
- METAL ROOFING
- TILED ROOFING
- TIMBER STUD
- TILED FLOOR
- TIMBER FLOOR
- BRICKWORK

**CLIENT**
Linda & Sean Obrien

**PROJECT ADDRESS**
15 Lakeside Cresent, North Manly NSW 2100

**DRAWING NO.**
**DP09**

**DATE**
Monday, 9 December 2024

**DRAWING NAME**
AREA CALCULATIONS

**SCALE**
1:200 @A2

FRONT PERSPECTIVE

BACK PERSPECTIVE

SIDE PERSPECTIVE

SIDE PERSPECTIVE


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**LEGEND**

- EXISTING
- DEMOLISHED
- METAL ROOFING
- TILED ROOFING
- TIMBER STUD
- TILED FLOOR
- TIMBER FLOOR
- BRICKWORK

**CLIENT**
Linda & Sean Obrien

**PROJECT ADDRESS**
15 Lakeside Cresent,
North Manly NSW 2100

**DRAWING NO.**
**DP10**

**DATE**
Monday, 9 December 2024

**DRAWING NAME**
PROPOSED PERSPECTIVES

**SCALE**
@A3

FRONT FACADE

BACK FACADE

DECK

POOL


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**LEGEND**

- EXISTING
- DEMOLISHED
- METAL ROOFING
- TILED ROOFING
- TIMBER STUD
- TILED FLOOR
- TIMBER FLOOR
- BRICKWORK

**CLIENT**
Linda & Sean Obrien

**PROJECT ADDRESS**
15 Lakeside Cresent,
North Manly NSW 2100

**DRAWING NO.**
**DP11**

**DATE**
Monday, 9 December 2024

**DRAWING NAME**
PROPOSED PERSPECTIVES

**SCALE**
@A3

KITCHEN - DINING

LIVING

MASTER BEDROOM

CARPORT


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**LEGEND**

- EXISTING
- DEMOLISHED
- METAL ROOFING
- TILED ROOFING
- TIMBER STUD
- TILED FLOOR
- TIMBER FLOOR
- BRICKWORK

**CLIENT**
Linda & Sean Obrien

**PROJECT ADDRESS**
15 Lakeside Cresent,
North Manly NSW 2100

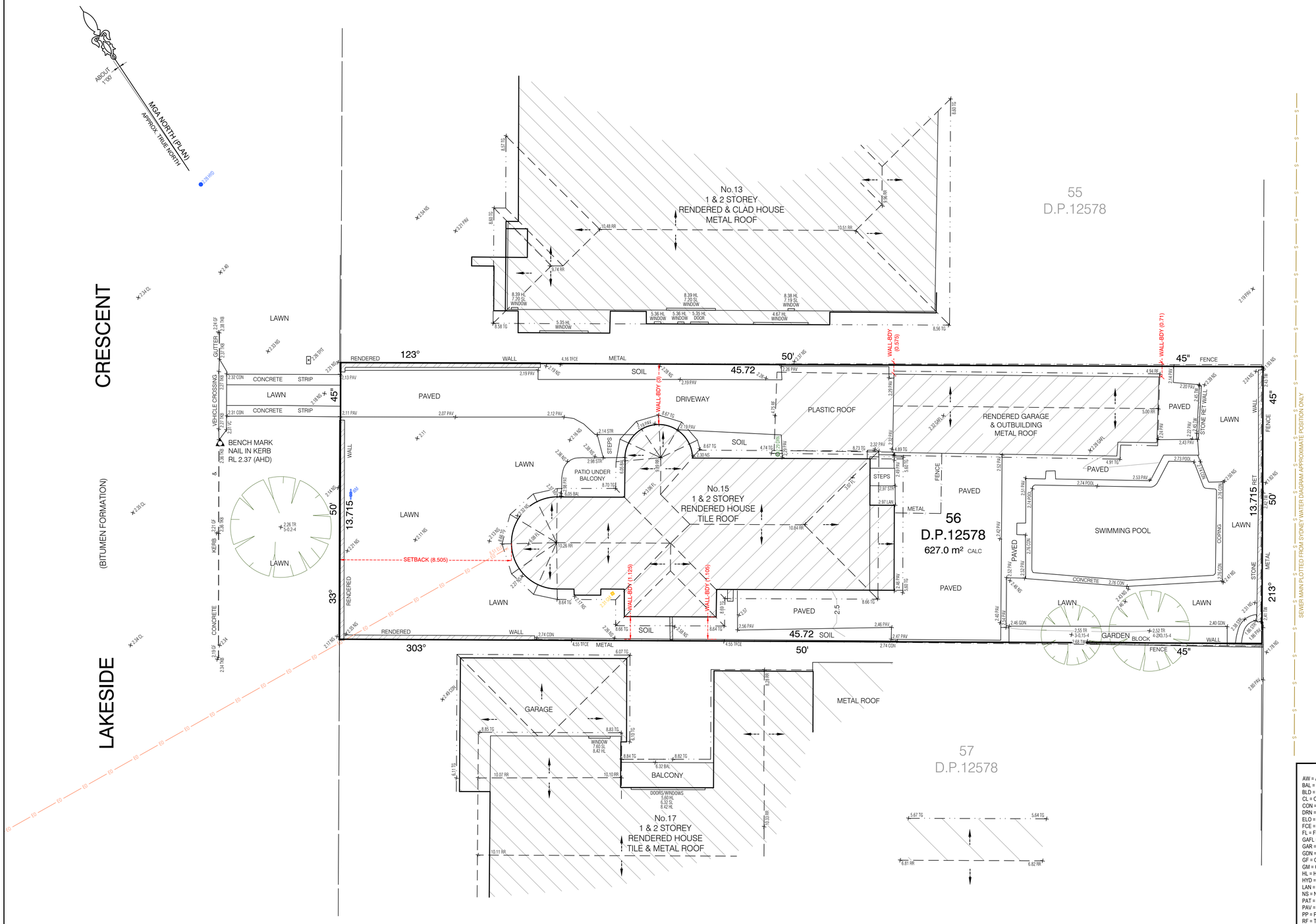
**DRAWING NO.**
**DP12**

**DATE**
Monday, 9 December 2024

**DRAWING NAME**
PROPOSED PERSPECTIVES

**SCALE**
@A3

A1




TITLE INDICATES THAT LOT 56 IN D.P.12578 IS SUBJECT TO:
- RESERVATIONS AND CONDITIONS IN THE CROWN GRANT(S)
- B845790 COVENANT (NOT INVESTIGATED)

## NOTES:

- **BOUNDARY IDENTIFICATION HAS BEEN UNDERTAKEN.**
- **WALL TO BOUNDARY DIMENSIONS SHOWN HEREON MUST NOT BE USED FOR CONSTRUCTION.**
- **IF CONSTRUCTION IS INTENDED TO BE UNDERTAKEN ON OR ADJACENT TO PROPERTY BOUNDARIES THE BOUNDARIES OF THE LAND MUST BE MARKED OR THE BUILDING SETOUT.**
- **THIS SURVEY IS FOR DESIGN PURPOSES OF THE SUBJECT LAND ONLY. THIS PLAN MUST NOT BE USED FOR ANY OTHER MATTER, PURPOSE OR CONSTRUCTION SETOUT.**
- TREE SIZES ARE ESTIMATES ONLY.
- THIS PLAN HAS BEEN PREPARED FOR THE EXCLUSIVE USE OF LINDA AND SEAN O'BRIEN.
- RELATIONSHIP OF IMPROVEMENTS TO BOUNDARIES IS DIAGRAMMATIC ONLY. WHERE OFFSETS ARE CRITICAL THEY SHOULD BE CONFIRMED BY FURTHER SURVEY.
- EXCEPT WHERE SHOWN BY DIMENSION LOCATION OF DETAIL WITH RESPECT TO BOUNDARIES IS INDICATIVE ONLY.
- ONLY VISIBLE SERVICES HAVE BEEN LOCATED. UNDERGROUND SERVICES HAVE NOT BEEN LOCATED. BEFORE YOU DIG AUSTRALIA (www.byda.com.au) SHOULD BE USED AND A FULL UTILITY INVESTIGATION, INCLUDING A UTILITY LOCATION SURVEY, SHOULD BE UNDERTAKEN BEFORE CARRYING OUT ANY CONSTRUCTION ACTIVITY IN OR NEAR THE SURVEYED AREA.
- SEWER MAIN PLOTTED FROM SYDNEY WATER SEWER DIAGRAM. LOCATION SHOULD BE MARKED ON SITE IF CRITICAL.
- CRITICAL SPOT LEVELS SHOULD BE CONFIRMED WITH SURVEYOR.
- CONTOURS SHOWN DEPICT THE TOPOGRAPHY. THEY DO NOT REPRESENT THE EXACT LEVEL AT ANY PARTICULAR POINT. ONLY SPOT LEVELS SHOULD BE USED FOR CALCULATIONS OF QUANTITIES WITH CAUTION.
- CONTOUR INTERVAL - 0.5 metre. - SPOT LEVELS SHOULD BE ADOPTED.
- POSITION OF RIDGE LINES ARE DIAGRAMMATIC 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 IN PREFERENCE TO SCALED READINGS.
- 
- 
- ANY PERMITTED DOWNLOADING, ELECTRONIC STORAGE, DISPLAY, PRINT, COPY OR REPRODUCTION OF THIS SURVEY SHOULD CONTAIN NO ALTERATION OR ADDITION TO THE ORIGINAL SURVEY.
- THIS NOTICE MUST NOT BE ERASED.

MARK REID
REGISTERED SURVEYOR BOSSI NUMBER 183

**LEGEND:**

AW = AWNING
BAL = BALCONY
BLD = EXTERNAL BUILDING
CL = CENTRELINE
CON = CONCRETE
DRN = DRAIN
ELO = ELECTRICITY LINE OVERHEAD
FCE = FENCE
FL = FLOOR LEVEL
GAFL = GARAGE FLOOR LEVEL
GAR = GARAGE
GDN = GARDEN
GF = GUTTER LEVEL
GM = GAS METER
HL = HOOD LEVEL
HYD = HYDRANT
LAN = LANDING
NS = NATURAL SURFACE
PAT = PATIO
PAV = PAVING
PP = POWER POLE
RF = TOP OF ROOF
RR = ROOF RIDGE
SCN = SCREEN
SL = SILL LEVEL
STR = STAIRS
TFCE = TOP OF FENCE
TG = TOP OF GUTTER
TKB = TOP OF KERB
TPIT = TELSTRA PIT
TR = TREE
TW = TOP OF WALL
VC = VEHICLE CROSSING
WM = WATER METER

EO = ELECTRICITY OVERHEAD
S^ = SEWER UNDERGROUND
TREE
SPREAD-DIAMETER-HEIGHT
M = MULTIPLE TRUNKS

| | | |
|---|---|---|
| 2 | TREES REMOVED | 14/08/2024 |
| 1 | FIRST ISSUE | 3/07/2024 |

BEFORE YOU DIG www.byda.com.au
Zero Damage - Zero Harm

0 1 2 3 4 5
SCALE 1:100

**HORIZONTAL DATUM:**
CO-ORDINATE SYSTEM: ASSUMED
MARKS ADOPTED: N/A

**VERTICAL DATUM:**
DATUM: AUSTRALIAN HEIGHT DATUM (AHD)
B.M. ADOPTED: PM 731
R.L. 2.293 (CLASS LB)
SOURCE: S.C.I.M.S. (24/06/2024)

**CLIENT:**

**LINDA AND SEAN O'BRIEN**

**LGA: NORTHERN BEACHES**

# BOUNDARY IDENTIFICATION AND DETAIL & LEVEL SURVEY OVER LOT 56 IN DP12578 No.15 LAKESIDE CRESCENT NORTH MANLY, NSW, 2100

CMS SURVEYORS PTY LTD
ACN 096 240 201
PO Box 463 Dee Why, NSW, 2099
2/99A South Creek Road, Dee Why, NSW, 2099
☎ (02) 9971 4802
✉ info@cmssurveyors.com.au
www.cmssurveyors.com.au

| SURVEYED | DRAWN | CHECKED | APPROVED |
|---|---|---|---|
| JM | GP | JM | RM |

| SURVEY INSTRUCTION | SCALE | DATE OF SURVEY |
|---|---|---|
| 23554 | 1:100@A1 | 28/06/2024 |

DRAWING NAME **23554detail** SHEET 1 OF 1 ISSUE **2**

CAD FILE 23554detail 2.dwg