Brett Crowther
C/- Mackenzie Architects International

Flood Risk Assessment and Flood Emergency Response Plan (FERP): 1-3 Gondola Road, North Narrabeen NSW

ENVIRONMENTAL

WATER

WASTEWATER

GEOTECHNICAL

CIVIL

PROJECT MANAGEMENT

P2310036JR03V02
October 2024

Limitations Statement

The sole purpose of this report and the associated services performed by Martens & Associates Pty Ltd is to provide a Flood Risk Assessment and Flood Emergency Response Plan (FERP) at the subject site in accordance with the scope of services set out in the contract / quotation between Martens & Associates Pty Ltd and Mackenzie Architects International (hereafter known as the Client). That scope of works and services were defined by the requests of the Client, by the time and budgetary constraints imposed by the Client, and by the availability of access to the site.

Martens & Associates Pty Ltd derived the data in this report primarily from a number of sources which included site inspections, correspondence regarding the proposal, examination of records in the public domain, interviews with individuals with information about the site or the project, and field explorations conducted on the dates indicated. The passage of time, manifestation of latent conditions or impacts of future events may require further examination / exploration of the site and subsequent data analyses, together with a re-evaluation of the findings, observations and conclusions expressed in this report.

In preparing this report, Martens & Associates Pty Ltd may have relied upon and presumed accurate certain information (or absence thereof) relative to the site. Except as otherwise stated in the report, Martens & Associates Pty Ltd has not attempted to verify the accuracy of completeness of any such information (including for example survey data supplied by others).

The findings, observations and conclusions expressed by Martens & Associates Pty Ltd in this report are not, and should not be considered an opinion concerning the completeness and accuracy of information supplied by others. No warranty or guarantee, whether express or implied, is made with respect to the data reported or to the findings, observations and conclusions expressed in this report. Further, such data, findings and conclusions are based solely upon site conditions, information and drawings supplied by the Client *etc*. in existence at the time of the investigation.

This report has been prepared on behalf of and for the exclusive use of the Client, and is subject to and issued in connection with the provisions of the agreement between Martens & Associates Pty Ltd and the Client. Martens & Associates Pty Ltd accepts no liability or responsibility whatsoever for or in respect of any use of or reliance upon this report by any third party.

Head Office
Suite 201, 20 George Street
Hornsby, NSW 2077, Australia
ACN 070 240 890 ABN 85 070 240 890
Phone: +61-2-9476-9999
Fax: +61-2-9476-8767
Email: mail@martens.com.au
Web: www.martens.com.au

Document and Distribution Status

Author(s)	Reviewer(s)	Project Manager	Signature
Ida Samadian Paul Dinh	Jono Frecker	Gray Taylor	

Revision No.	Description	Status	Release Date	Document Location			
				File Copy	Mackenzie Architects International		
1	Development Application	Final	08.04.2024	1P, 1E	1P		
2	Updated architectural plans	Final	23.10.2024	1P, 1E	1P		

Distribution Types: F = Fax, H = hard copy, P = PDF document, E = Other electronic format. Digits indicate number of document copies.

All enquiries regarding this project are to be directed to the Project Manager.

Contents

1 Introduction

1.1 Overview

Martens & Associates Pty Ltd (MA) have prepared this flood risk assessment and flood emergency response plan (FERP) to support a development application (DA) for a proposed shop top housing development at 1-3 Gondola Road, North Narrabeen NSW (the site). Refer to Attachment A for the site survey provided by C&A Surveyors and Attachment B for the proposed architectural plans provide by Mackenzie Architects International (MAI).

1.2 Project Scope and Objectives

Project scope and objectives are:

1. Review Northern Beaches Council flood mapping, flooding controls and proposed development plans.
2. Consult with architect regarding site design for flooding compliance.
3. Prepare a flood risk management plan including:
    a. Site flooding mechanisms and characteristics.
    b. Flood emergency response plan requirements, including:
        i. Flood warning mechanisms.
        ii. Roles and responsibilities.
        iii. Flood response phases and triggers.
        iv. Evacuation and/or shelter-in-place requirements.
    c. Prepare a compliance assessment in accordance with Northern Beaches Council floodplain development controls including, Pittwater DCP B3.11 Flood Prone Land.

1.3 Relevant Guidelines

This report has been prepared in accordance with the following guidelines and policies:

1. Australian Institute for Disaster Resilience (2012), *Technical flood risk management guideline: Flood hazard.*

2. Commonwealth of Australia (2019), *Australian Rainfall and Runoff – A Guide to Flood Estimation*.

3. Molino, S. Morrison, T. Howard, M. Opper, S.A (2013), *Technical Guideline for the use of the SES Timeline Evacuation Model in Flood Evacuation Planning*, Proceedings of the 2013 Floodplain Management Association Conference.

4. Northern Beaches Council (2020), Pittwater 21 Development Control Plan.

5. Northern Beaches Council (2022a), Pittwater Local Environmental Plan 2014.

6. Northern Beaches Council (2022b), Guidelines for development on flood prone land.

7. NSW Department of Infrastructure, Planning and Natural Resources (2005), *Floodplain Development Manual*.

1.4 Definitions

AEP	Annual exceedance probability: the probability of a flood event occurring within a year. A 1% AEP flood has a 1% chance of occurring in any given year.
ARI	Average recurrence interval: the average time between flood events occurring. A 1 in 100-year ARI flood occurs on average once every 100 years.
ARR	Australian Rainfall & Runoff
BOM	Bureau of Meteorology
CC	Climate change
Council	Northern Beaches Council
DA	Development application
FERP	Flood emergency response plan
FFL	Finished floor level
FPL	Flood planning level
ICSM	Intergovernmental Committee on Surveying and Mapping
MA	Martens & Associates Pty Ltd

MAI	Mackenzie Architects International
PMF	Probable maximum flood: the most extreme flood event possible for a certain location, with an approximate ARI of 100,000 to 10,000,000 years.

2 Site Description and Flooding Characteristics

2.1 Location and Site Description

Existing site description summary is provided in Table 1.

Table 1: Existing site description summary. Refer to Attachment A for site survey.

Address	1-3 Gondola Road, North Narrabeen NSW
Lot / DP	Lot 187 [the eastern portion] and 188 [the western portion] in DP 16719
Site Area	1289.3 m^2
Local Government Area (LGA)	Northern Beaches Council (Council)
Current Land Use	Commercial for the western portion of the site and the eastern portion of the site is vacant.
Current Zoning	E1 – Local Centre
Site Description	The site consists of two lots. The western portion of the site consists of a two-storey commercial building with a two-level car park at the rear of the site, at ground level and a first floor car park that is accessible via an elevated ramp. The lot is covered with concrete apart from a small garden area out the front. The eastern portion of the site is currently a vacant lot.
Surrounding Land Uses	The site is surrounded by a single storey commercial building to the west, residential developments to the south, Gondola Road to the north and Minarto Lane to the east.
Site Elevation	The site is relatively flat with an average elevation of approximately 2.18 mAHD. The site elevation ranges between 1.98 mAHD in the southeastern portion of the site and 2.37 mAHD in the northwestern portion of the site.
Site Grading & Aspect	< 1 %
Site Drainage	The site is located at the base of a valley between two adjacent northwest-southeast aligned ridges approximately 50 m south of Nareen Creek channel and 120 m west of Narrabeen Lagoon. Drainage is via overland flow to the Council stormwater network on Gondola Road.

2.2 Proposed Development

Refer to architectural drawings prepared by Mackenzie Architects International (MAI) for the proposed site layout (Attachment B). The proposed development will include:

- Demolition of the existing structures on the site.
- Construction of a new shop top housing development including:
  - Two levels of residential apartments consisting of 12 units in total.

- A raised ground floor level consisting of two commercial spaces and a car park area including a toilet, electrical services, loading/car wash space and entrance to basement level.
- A basement floor level consisting of car park area including service rooms, a toilet, and two bin rooms (external access only).
- A car park access ramp on the southeast side of the building connecting Minarto Lane up to the ground floor level car park and descending to the basement car park via the roller security gate at southwest side of the ground floor car park.
- A communal roof top area including a toilet, lift lobby, and an open space with gardens.

2.3 Flood Data

2.3.1 Previous Local Flood Studies

A review of previous flood investigations was undertaken to assess likely local flood behaviour and characteristics for the site and local catchment. Review identified two previous flood studies which would be relevant to this report.

BMT WBM (2013) and WMAwater (2019) conducted two flood assessments for this catchment on behalf of Northern Beaches Council (Council) using TUFLOW hydraulic modelling and summarised the assessments in the reports *Narrabeen Lagoon Flood Study* (the BMT WBM flood study) and *Ingleside, Elanora and Warriewood Overland Flow Flood Study* (the WMAwater flood study).

2.3.2 Council Data

In addition, a comprehensive flood information report was previously acquired from Council for the western portion of the site and is provided in Attachment C. The report provides flood data based on the BMT WBM and the WMAwater flood studies. A summary of key data from the Council flood information report has been provided in Table 2.

Table 2: Council flood information report summary.

Element	Site Details
1% AEP Flood Level	3.03 mAHD
1% AEP (CC) Flood Level [1]	3.90 mAHD
PMF Flood Level	4.89 mAHD
Flood Planning Level (FPL) [2]	4.40 mAHD
Flood Life Hazard Category	H5
Flood Risk Precinct	High Risk Precinct
1% AEP Hydraulic Category	Flood Storage
PMF Hydraulic Category	Flood Storage

Notes

1. CC = Climate Change, includes additional 30% rainfall intensity and 0.9 m sea level rise.
2. Flood Planning level (1% AEP (CC) equals flood level plus 0.5m freeboard).

2.4 Flooding Behaviour

Based on the BMT WBM flood study and Council's flood information report, we note the following for flooding at the site.

2.4.1 Catchment Description

We note the following regarding the catchment upstream of the site:

- The site is located within the Nareen Creek catchment within the wider Narrabeen Lagoon catchment.
- The Nareen Creek catchment is primarily urbanised with residential and some commercial land use. There are some bushland/wetland areas such as Narroy Park along the creek. The catchment has an area of approximately 160 ha.
- The Narrabeen Lagoon catchment is comprised of bushland and urban areas. Garigal National Park encompasses a large portion of the catchment's western region. Urban areas are located primarily along the catchment's perimeter from north to east to south, including the suburbs of Warriewood, Elanora Heights, North Narrabeen, Narrabeen, Cromer, Beacon Hill, and Oxford Falls.
- The wider catchment's total area is approximately 5,500 ha and is shown in figure 1-1 of the Narrabeen Lagoon Flood Study (BMT WBM, 2013).

2.4.2 Site Flood Characteristics and Mechanisms

The following flood mechanisms and characteristics have been determined based on the lowest site level of 1.98 mAHD:

- The site is affected by flood overbank flows from Narrabeen Lagoon. This is the dominant flood mechanism contributing to peak flood levels at the site (BMT WBM, 2013).

- Constriction of the Narrabeen Lagoon floodway at the lagoon entrance to the ocean, combined with intermittent closing & opening of the lagoon entrance, causes flood waters to back up onto the site and prolong the duration of inundation.

- The 1% AEP critical storm duration event for the Narrabeen Lagoon catchment is 9 hours and produces a maximum water level of 3.03 mAHD, a maximum depth of 1.05m and maximum velocity of 0.2 m/s at the site.

- The PMF critical storm duration event for the lagoon catchment is 5 hours, and produces a maximum water level of 4.89 mAHD, a maximum depth of 2.91 m, and a maximum velocity of 0.98 m/s at the site.

- The 1% AEP with climate change event produces a maximum water level of 3.90 mAHD and a maximum depth of 1.92m at the site. Velocities and durations in 1% AEP with climate change were not provided in either the BMT WBM study or Council flood report but are expected to be somewhere between the 1% AEP and PMF event.

- The development represents an intensification of development for the site and requires the consideration of climate change impacts. Thus, the FPL for this site is based on the 1% AEP with climate change flood level (3.90 mAHD), plus 0.5 m freeboard, equal to 4.40 mAHD.

3 Flood Risk Management

3.1 Overview

This section provides a flood risk assessment for the proposed development by addressing the controls set out in the Pittwater Council DCP part B3.11 'Flood Prone Land' and B3.12 'Climate Change', and in accordance with Council guidelines for development on flood prone land.

3.2 Flood Design Details

Elements of the proposed development were iteratively and holistically designed to ensure project objectives, and compliance with council's flood planning controls were met. For detailed drawings of the proposed development including building levels, refer to the architectural plans provided by Mackenzie Architects International (Attachment B). A summary of prescriptive control levels and proposed floor levels is provided in Table 3.

Table 3: Building levels and prescriptive planning control levels.

Floor	Level (mAHD)	Prescriptive Level	Level (mAHD)
Basement level	1.40	N/A (Flood protected)	N/A
Ground floor level	4.40	FPL	4.40
Residential levels	≥ 8.0	FPL	4.89

Notes

1. FPL = 1% AEP with climate change flood level plus 0.5 m freeboard.

Residential levels and ground floor level are above the FPL (1% AEP with climate change flood level plus 0.5 m freeboard). The basement level is below the FPL although it is protected from flooding as described in Section 3.2.1. General flood hazard mitigation strategies for these levels are described in the following sections.

3.2.1 Basement Level

The basement level is located below the flood planning level of 4.40 mAHD. To achieve compliance with Pittwater 21 DCP part B3.11 controls A1(c), C1, D5, and D6, the proposed basement will be flood proofed up to the flood planning level.

Building levels below the FPL are enclosed, with all potential water entry points, such as ventilation, stairwells, elevator shafts, driveway crests and others located above the flood planning level of 4.40 mAHD. There are two bin rooms (at 2.00 mAHD) opening to the Minarto Lane level at the southeast side of the site which are totally isolated from the rest of the

basement with flood proof walls surrounding the bin rooms. Also, there is a fire stair egress point from the building (at 2.00 mAHD) from Minarto Lane at the east side of the which goes up via stairs to 4.4 mHAD to reach the ground floor level before going back down to the basement.

The proposed design ensures that flood water must rise to a level of 4.40 mAHD on the ground floor car park space and entrance stairs from the Minarto Lane before it can enter the basement, making the basement level flood free up to the 1% AEP with climate change event plus 0.5 m freeboard (4.40 mAHD).

3.2.2 Ground Floor Level

This level is at the FPL, we make the following comments:

- Occupants in the external ground floor area (approximately 2.10 mAHD) can access the building via the set of external stairs and platform lift at the front of the building or via the raised driveway.
- Flood water ingress via car park access ramp is prevented for flood waters below the FPL (4.40 mAHD) by using a raised driveway. The driveway ramp provides an inclined connection between Minarto Lane (at 2.00 mAHD) and ground floor car park (at 4.4 mAHD) before descending to the basement level via the rear of the ground floor.

3.2.3 Residentials Levels and Roof Top Level

Residential levels and roof top levels are above the PMF flood level. Occupants can access these levels via the stairs near the centre of the site.

3.3 Flood Storage and Impact

In accordance with the applicable DCP B3.11 controls, A2, C4, and D6, the proposed development has been designed such that there is negligible loss of flood storage at the site in any events up to the 1% AEP with climate change flood event and there is minimal change to flood conveyance or flood impacts at the site or surrounding sites.

3.3.1 Existing flood storage

The western portion of the site is occupied by a two-storey building with an approximate ground level building footprint of 519.2 m^2.

The eastern portion of the site is presently vacant. Prior to 2009, the eastern portion of the site was occupied by a building, shed and garage with an approximate combined footprint of 220 m^2. MA considers that adopting the building footprint that previously existed is reasonable since

the site is zoned E1 (local centre) and would reasonable be expected to have some level of development on it.

The site area based on the survey (Attachment A) is 1289.3 m^2 which brings the available storage area in the existing (prior to 2009) case to 550 m2. Red polygons in Figure 1 show present building footprint at the western portion of the site and building footprint prior to 2009 at the eastern portion of the site. Background aerial photo in Figure 1 is the historical aerial photo in 2005 from the NSW historical imagery portal. Based on current aerial photos and survey, MA understands that the building footprint in the western portion of the site has remained unchanged since at least 2005.

Figure 1: Building footprint used to calculate the existing flood storage (background arial from NSW historical imagery portal, 2005).

3.3.2 Proposed flood storage

There are several areas around the proposed development that would be affected by flood waters and considered as available areas for flood storage up to the 1% AEP (with climate change) flood level plus 0.5 m (4.4 m). These are:

- Two bin rooms opening to the Minarto Lane.

- Portion of the entrance stair area from Minarto Lane.
- Portion of the ground floor car park access ramp from Minarto Lane.
- External ground floor area

The green polygon in Figure 2 has an approximate area of 300 m^2 and represents the above-mentioned available flood storage areas in the proposed development. Basement floor plan provided by MAI has been used as a background plan in Figure 2.

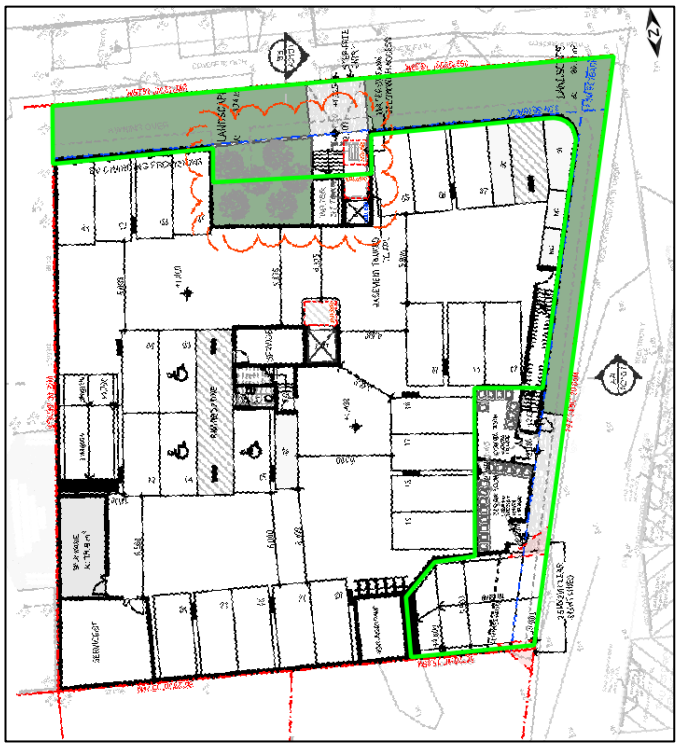


Figure 2: Available proposed area for flood storage.

The flood storage area of the site decreases from 550 m^2 in the existing case to 300 m^2 in the proposed development. We consider that this loss of flood storage is negligible in the context of the flood storage available to Narrabeen Lagoon, which is in the order of ten thousand times larger.

3.3.3 Other Flood Hazard Mitigation Works

A summary of design elements to be implemented at detailed design stage to ensure compliance with Council's DCP is provided below:

- All structural elements below the FPL are to be constructed from flood compatible materials.

- All structures are to be designed to ensure structural integrity from flood forces and buoyancy forces by a suitably qualified structural engineer.
- The external platform lift is to be waterproofed including all electrical and mechanical components, and designed to withstand flood forces up to the FPL.
- All electrical equipment, wiring, fuel lines or any other service pipes below the FPL are to be waterproofed.
- The storage of toxic or potentially polluting goods, materials or other products is to be above the FPL.

3.4 Flood Hazard and Duration Assessment

3.4.1 Hazard Assessment

This section assesses flood hazards and critical storm durations for the site to assess viable flood emergency response strategies.

The site is likely affected by flooding from Narrabeen Lagoon.

Flood velocities at the site are moderate and less than 0.98 m/s up to PMF flood events. A summary of calculated life hazard categories for the site are shown in Table 4, based on ARR flood hazard curves (2019) (Figure 3) and the *Technical Flood Risk Management Guideline: Flood Hazard, Australian Institute for Disaster Resilience* (2012), in accordance with Pittwater 21 DCP B3.11 control E1.

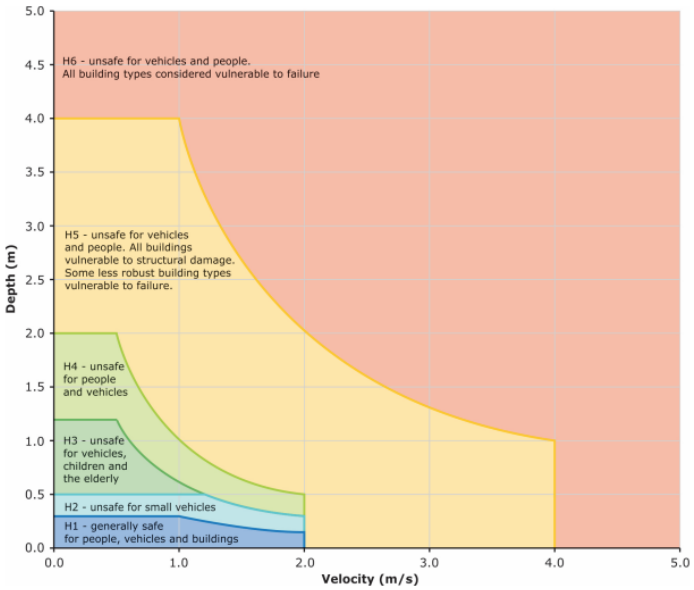


Figure 3: Flood Hazard Curves (Geoscience Australia, 2019).

Table 4: Calculated life hazards for the site.

Flood Event	Water Level (mAHD)	Water Depth (m)	Water Velocity (m/s)	Flood Life Hazard Category
1% AEP	3.03	1.05	0.20	H3
1% AEP (CC) [1]	3.90	1.92	Unknown (less than 0.98 m/s)	H4/H5 [2]
PMF	4.89	2.91	0.98	H5 [3]

Notes

1. CC = Climate Change, includes additional 30% rainfall intensity and 0.9 m sea level rise.
2. 1% AEP (CC) life hazard determined from water depth of 1.88 m and assumed velocity between 0.20 - 0.98 m/s.
3. PMF life hazard value also provided by Council in the flood information report, found in Attachment C.

The site is affected by a life hazard category of H3 or higher for all events equal to or greater than a 1% AEP event, and as such, a flood emergency assessment is required as stated in DCP B3.11 control E1.

3.4.2 Storm and Isolation Durations

Figure 7-7 of the BMT WBM study shows flood levels in Narrabeen Lagoon for the 1% AEP event for the 2-hour, 9-hour, and 18-hour duration events, and is shown below in Figure 4.

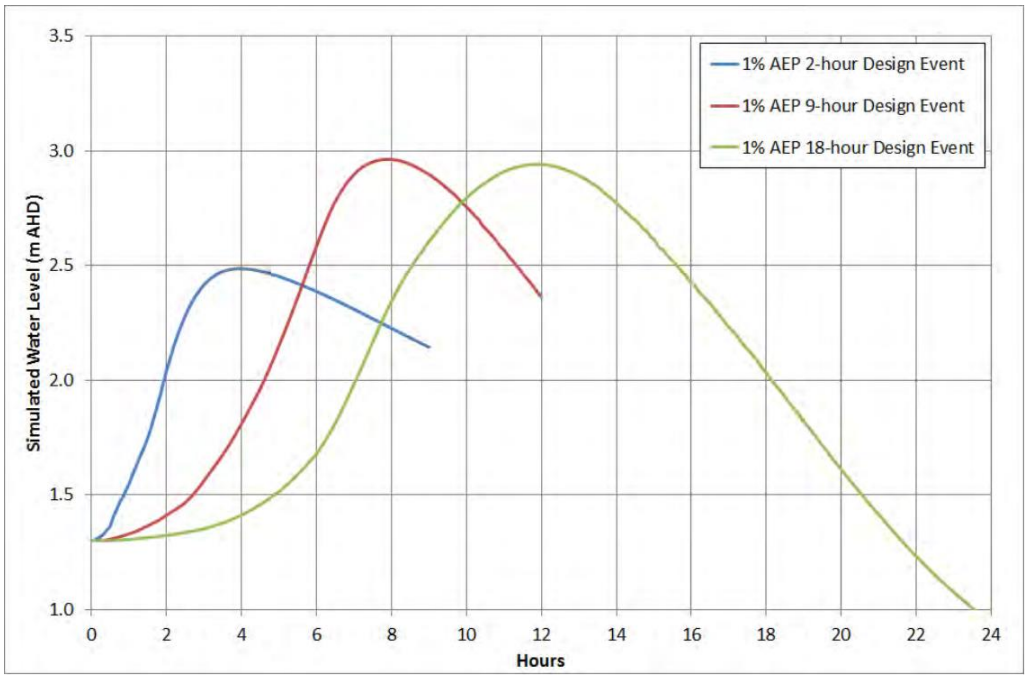


Figure 4: Simulated water level response in Narrabeen Lagoon (BMT WBM, 2013).

Based on the survey provided by C&A Surveyors (Attachment A), Lidar provided by Intergovernmental Committee on Surveying and Mapping (ICSM 2011) and ARR flood hazard curves (2019), site occupants can

evacuate until the flood water level near the site is above 1.95 mAHD. According to Figure 4, shortest warning time in the 1% AEP event is approximately 1.75 hr. Previous flood studies have not reported the Narrabeen Lagoon water level hydrograph in the PMF event. MA considers the warning time for the critical duration PMF event to reach the flood level of 1.95 mAHD would be approximately 1 hour which is shorter than the shortest warning time in the 1% AEP flood event. The evacuation warning times from the start of the storm event and isolation durations have been summarised in Table 5 below.

Table 5: warning time and isolation durations in 1% AEP flood event.

1% AEP Critical Duration Event	Warning Time / Isolation start time (hrs)	Isolation End Time (hrs)	Isolation duration (hrs)
1% AEP 2-hour	1.75	approximately 11.5	approximately 9.75
1% AEP 9-hour	4.5	approximately 14	approximately 9.5
1% AEP 18-hour	6.75	18.5	11.75

3.4.3 Summary

Based on the warning time, isolation durations and evacuation guidelines, MA recommends evacuation as the preferred emergency response in all flood events. See section 4.6 for further evacuation details.

4 Flood Emergency Response Plan

4.1 Overview

This FERP makes recommendations to ensure that in the event of a flood at the site, risk to personal safety and the environment is appropriately managed. The plan provides strategic level advice and assumes that detailed design of various site controls will be undertaken prior to issue of a construction certificate and implemented as part of the site's construction and on-going operation.

This FERP has been prepared in accordance with control E1 of the Pittwater 21 DCP part B3.11 'Flood Prone Land', which requires a flood emergency assessment for sites which are affected by a life hazard category of H3 or higher. As stated by Council (2022a), the site is within the high-risk flood precinct for both the 1% AEP and PMF events. The Site has a long isolation duration up to 11.75 hr in the 1% AEP flood event and has a warning time of approximately one hour in the critical duration PMF event. The car park capacity of the site allows adequate timing for all the occupants on the site to evacuate in less than one hour. As such, the recommended emergency response selected for this site is evacuation through the route discussed in section 4.6.2.

4.2 Flood Warning Mechanisms

Monitoring weather forecasts and conditions near the site will help to manage the flood risk. A number of methods to monitor the risk of flooding are detailed in the following sections.

4.2.1 Bureau of Meteorology

The Bureau of Meteorology (BoM) generates a number of information sources useful for monitoring the weather forecast and conditions near the site. These should be monitored daily by site management. These services are:

1. Rainfall maps (http://www.bom.gov.au/jsp/watl/rainfall/pme.jsp) can be used to estimate the daily rainfall expected to occur over the next 24, 48, 72, and 96 hours as well as the total rainfall for the next 4 and 8 days.

2. Occasionally BoM issues Weather Warnings for NSW via their website (http://www.bom.gov.au/nsw/warnings/). These warnings provide both general warnings across NSW and warnings for more specific locations. There are two types of warnings that may indicate that flooding is imminent on the site: Severe Weather Warnings and Severe Thunderstorm Warnings.

Specifically, these warnings should be monitored for references to flash flooding in the Sydney metropolitan area. Warnings are generally issued with up to 60 minutes notice however for very large events (i.e. east coast lows), warnings may be issued with 24 hours' notice or more.

3. The radar service operated by BoM shows current rainfall location and intensity for the Sydney area (http://www.bom.gov.au/products/IDR713.loop.shtml).

4.2.2 Observing Site Flood Levels

Water level recording equipment is currently installed in Narrabeen Lagoon entrance at Ocean Street Bridge and is managed by Manly Hydraulics Laboratory (MHL), which publishes the automatically collected water levels. Recent data is shown on the MHL website (https://www.mhl.nsw.gov.au/Station-213408D) with the latest information approximately 5 minutes behind the current time. These recordings are updated every 15 minutes. Site management should monitor the website daily to be informed of any rise in the water levels in the Narrabeen Lagoon.

4.2.3 Other Warnings

Site management may also be alerted to flood warnings via the following mechanisms:

- SES emergency alert telephone warning system.
- Media warnings (TV, radio, internet etc.).
- Police and / or SES door knocking.
- Weather apps (e.g. 'Early Warning Network').

If site management or visitors / residents receive a flood warning via any of the mechanisms described above, they should undertake evacuation immediately (see section 4.6).

4.3 Flood Engineering Control Features

The following features of the proposed site design reduce the risk of site occupants coming into contact with flood waters:

1. The proposed development's ground floor has a finished floor level (FFL) of 4.40 mAHD which is 1.37 m above the peak 1% AEP flood level and 0.5m above the 1% AEP with climate change level at the site.

2. The proposed development second storey FFL is at 8.00 mAHD which is 3.11 m above the peak PMF level, hence all residential floor levels are not affected by flood events up to and including the PMF.

3. The proposed developments ground floor and basement levels are flood proofed by the use of a ramped driveway, entrance stairs, flood proof walls and enclosed design of all potential water entry points. Refer to section 3.2 for further details.

4.4 Roles and Responsibilities

4.4.1 Site Management

The managers of the site have the responsibility to implement and maintain the requirements of this FERP. Specifically, they are to ensure that:

- Management and staff are subscribed to flood and weather warnings systems/services and are trained in the application of this FERP and interpretation of rainfall and weather warning information published by BOM.
- Monitor weather forecasts and flood warnings daily.
- Ensure any alerts received from the flood warnings, media alerts, Early Warning Network app, BoM, or otherwise are issued directly via phone call or text message to all residents and occupants.
- A suitable number of flood kits are kept on the premises which are to include a first aid kit, portable radio and spare batteries, megaphone, torch and spare batteries, hi-vis vests.
- All occupants are aware of the risk that flooding poses and flood emergency procedures.
- The FERP is kept up to date.
- The FERP is reviewed a minimum of every 5 years or following flood events which trigger an emergency response.
- The site is cleaned and checked following a flood event.
- Sufficient financial resources are provided for the above.
- Keep hard copies of the FERP on site and accessible to all residents and staff.
- Implement the procedures in this FERP in the event of a flood.

- Liaise with residents and emergency services in the event of a flood.

Site Management will be legally responsible to ensure that these tasks are occurring.

4.4.2 Occupants and Residents

All persons within the premises are to follow the directions of site management and emergency services personnel during a flood event on site.

4.5 Flood Response Phases and Triggers

4.5.1 Overview

There are four flood response phases for flooding on the site:

- **Prepared** – will apply at all times when the other phases do not apply.
- **Alert** – this is triggered when heavy rainfall is forecast or a severe weather warning is issued indicating potential flooding at the site.
- **Respond** – this occurs when a flood response is triggered by one of several means indicating a flood is occurring or is likely to occur at the premises.
- **Recover** – this occurs following a flood response operation of any scale and lasts until operations have returned to normal, after which the 'Prepare' phase applies.

4.5.2 Prepared

During the Prepared phase, weather forecasts and warnings are checked daily and the flood emergency response plan arrangements are maintained including:

- Warning alert services are subscribed to so that BOM severe weather warnings are received direct by mobile phone.
- All the necessary equipment to implement the FERP is supplied and maintained.
- Relevant persons are trained in the interpretation of the rainfall, flood information and warning information published by BoM.
- This FERP is kept up to date and reviewed every five years or following a flood.

4.5.3 Alert

The alert phase is triggered by any of the following:

- Heavy rainfall is forecast (≥ 100 mm in the next 24 hours).
- BoM issues a severe weather warning for the Sydney metropolitan area with a chance of flash flooding.

In the alert phase, the rain forecast and warnings are monitored every 2 hours until BoM advise that heavy rainfall has passed.

4.5.4 Respond

The respond phase is triggered by any of the following:

- BoM issues a severe weather warning for the Sydney metropolitan area with a chance of flash flooding on the site.
- SES issues an evacuation order which covers the site.

In the respond phase, management will:

- Evacuate the site, and lockdown the site if there is sufficient time to do so.
- Ensure that all occupants are notified to evacuate through the car park exit to Minarto Lane followed by the route described in 4.6.2.
- Liaise with residents to determine how many occupants are currently on site.

4.5.5 Recover

The recovery phase occurs once the flood situation has ended. If flood waters reached the interior of the building, the site should be thoroughly cleaned and repaired if necessary. In any case the building should be fully inspected to ensure all structural elements, systems and equipment are in working order and remove any debris from the site.

In any flood event affecting the site, a debrief should be held with site management and all Flood Wardens, and the FERP should be reviewed.

4.6 Evacuation Details

4.6.1 Evacuation Rate

The generally accepted design rate of vehicle evacuation during flood events is 600 vehicles per hour per lane of traffic (Molino et al, 2013). This is considered conservative, and actual evacuation rates will likely be faster. Given the car park can hold a maximum of 40 cars, and allowing for reversing manoeuvres, evacuation of a completely full car park should take no longer than 10 minutes should all vehicles attempt to leave the site at once. A further 30 minutes is allowed for residential residents to pack enough belongings and commercial staff to secure their premises. Allowing an additional 5 minutes for occupants to access the car park, evacuating the site can happen in 45 min from the start of the storm. This is less than the one hour warning time available in the PMF as discussed in section 3.4.2, therefore, occupants can safely evacuate the site prior to the site becoming flood-affected.

4.6.2 Evacuation Route

Based on Figure 7-13 from BMT WBM flood study, Mona Vale Road at northwest of the site is located outside the PMF extent. Therefore, MA recommends evacuation from the site to Mona Vale Road using the below directions (Figure 5):

- Turn right from the car park driveway onto Minarto Lane,
- Turn right onto Rickard Road
- Continue straight ahead onto Anna Road.
- Continue straight ahead onto Elanora Road.
- Turn right onto Marinna Road.
- Turn left onto Powderworks Road.
- Turn either left or right onto Mona Vale Road.

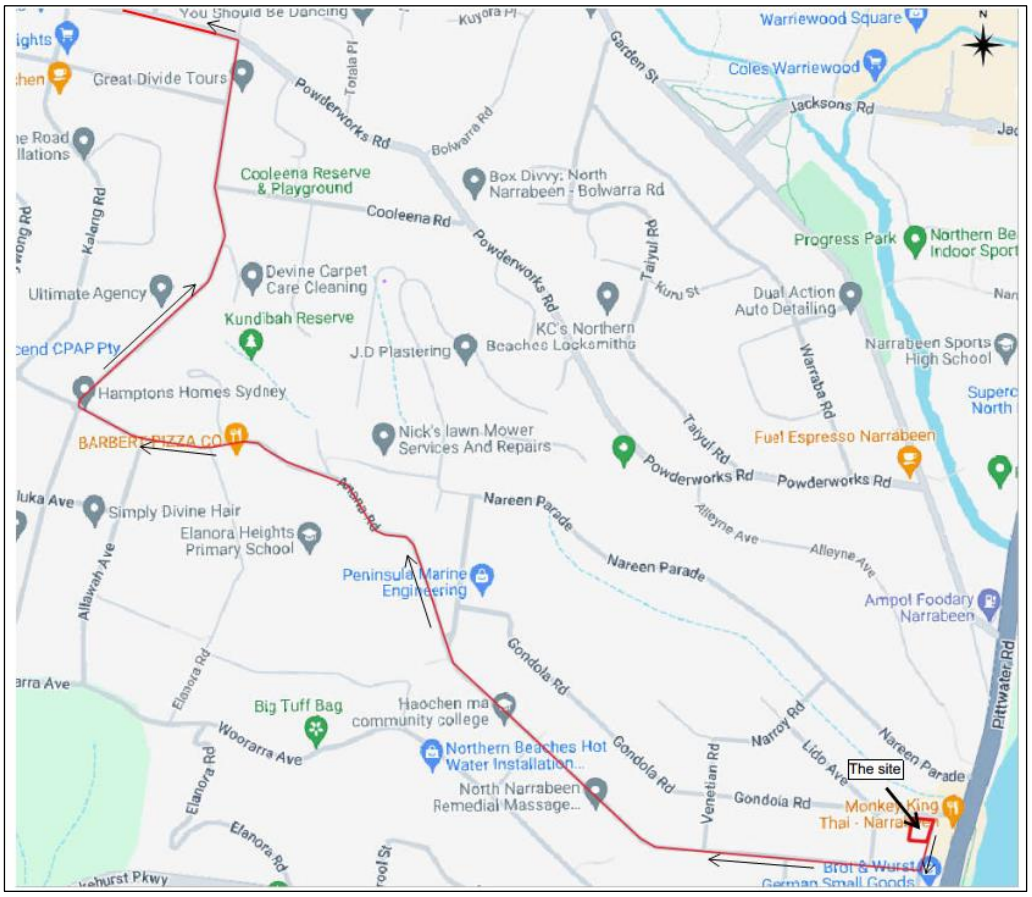


Figure 5: Evacuation route (background map from google map, 2024).

5 Flooding Compliance Assessment

This compliance assessment was conducted in accordance with Northern Beaches Council flood planning policies and guidelines provided in the; *Pittwater Local Environmental Plan (2014)*, *Pittwater 21 Development Control Plan*, Council's *Flood Prone Land Design Standard*, and Council's *Guidelines for development on flood prone land*. We note the following based on these policies:

1. A High Flood Risk Precinct is defined as flood prone land within the 1% AEP planning area (areas below the 1% AEP flood level plus 0.5m Freeboard), that is subject to high hydraulic hazard or is within the floodway.

2. A Medium Flood Risk Precinct is all flood prone land within the 1% AEP planning area that is not within the High Flood Risk Precinct.

3. A Low Flood Risk Precinct is defined as flood prone land (areas within the extent of the PMF) that are not within the High or Medium Flood Risk Precincts.

4. The site is classified as a 'high flood risk precinct' by Council.

5. The proposed development represents an 'intensification of development' for the site and is required by Council to use a higher FPL that considers the impact of climate change. This FPL is equal to the 1% AEP plus climate change level, plus 0.5m freeboard, which is equal to 4.40 mAHD.

6. The site lies below the 1% AEP flood and is identified as a 'flood storage' hydraulic category for both the 1% AEP and PMF events by Council (2022).

7. The site is affected by a life hazard category of H3 – H5, thus, a flood emergency assessment is required as part of this report (see sections 3 & 4).

Compliance of the proposed development with Council flood planning policies and guidelines relating to flood risk management is outlined in Table 6. Council requires compliance with the Pittwater LEP (2014) and the Pittwater 21 DCP for the proposed development. Flood specific controls are provided in part B3.11 'Flood Prone Land'. We note that:

- The proposed development is classified as 'shop top housing' which is defined as "one or more dwellings above a ground floor retail premises" in the Pittwater LEP Dictionary (2014).

- Shop top housing is classified as a residential land use group according to B3.11, Table 1.

This assessment demonstrates that the proposed development complies with Council's flood requirements.

		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 A2	A1 A2	A1 A2	A1 A2	A1 A2
B	Building Components & Structural	B1 B2 B3	B1 B2 B3	B1 B2 B3	B1 B2 B3	
C	Floor Levels	C2 C3	C1 C3 C4 C6	C1 C3 C4 C6 C7	C3	C5
D	Car Parking	D1 D2 D3 D4 D7	D1 D2 D3 D4 D5 D6	D1 D2 D3 D4 D5 D6	D1 D2 D3 D4 D5 D6	D1
E	Emergency Response	E1 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 6: Development Control Matrix from Pittwater 21 DCP (2014) part B3.11 'Flood Prone Land' with prescriptive controls highlighted.

Table 6: Compliance with Northern Beaches Council, Pittwater 21 DCP (2014) part B3.11 Flood Prone Land, development control matrix prescriptive controls.

Pittwater 21 DCP B3.11 Flood Prone Land Requirement	Compliance
A. FLOOD EFFECTS CAUSED BY DEVELOPMENT	
A1 Development shall not be approved unless it can be demonstrated in a Flood Management Report that it 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.	Complies – see below items. (1) The proposed development will not materially affect flood levels velocities or conveyance, and will cause no adverse flood impacts on the site and surrounding properties due to the following: i. The site is classified as a 'flood storage' hydraulic category by Council for both the 1% AEP and PMF events and is located outside the floodway. ii. Flood storage area of the site decreases from 550 m2 in the existing case to 300 m2 in the proposed development. MA considers that this loss of flood storage is negligible in the context of the flood storage available to Narrabeen Lagoon, which is in the order of ten thousand times larger (refer to section 3.3). (2) The proposed development minimises exposure to flood hazards by flood proofing all levels up to the ground floor level which is equal to the flood planning level of 4.40 mAHD, and by constructing all habitable floor levels above the PMF level (refer to section 3.2). (3) Since the site is classified as being in a flood storage area, MA considers that the possibilities of adverse flood impacts in the PMF event, is low.
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.	(4) Complies - as discussed at (1)ii. loss of flood storage caused by the proposed development for all flood events with flood levels less than or equal to the FPL (1% AEP flood level with climate change) is negligible in the context of the flood storage available to Narrabeen lagoon. (Refer to section 3.3).

Pittwater 21 DCP B3.11 Flood Prone Land Requirement		Compliance	
B. 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).	(5)	Complies - all structural elements, external and internal finishes up to the FPL of 4.40 mAHD are to be constructed from flood compatible building components. The building structure shall be designed to withstand the forces of floodwater, debris, buoyancy, and inundation. Details to be provided at the detailed design stage.
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.	(6)	Complies - all structures are to be constructed from flood compatible building components and buildings shall be designed to withstand the forces of floodwater, debris, buoyancy and inundation up to the PMF level of 4.89 mAHD. Details to be provided at the detailed design stage.
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.	(7)	Complies - all electrical services, power points, fittings, and equipment are to be placed above the FPL and / or waterproofed.
C. FLOOR LEVELS			
C1	New floor levels within the development shall be at or above the Flood Planning Level.		Complies – see the below items.
		(8)	The proposed (commercial) ground floor has a level of 4.40 mAHD which is equal to the FPL. The upper ground floor and above residential floors are thus compliant with Councils minimum floor level requirement.
		(9)	The proposed development's basement carpark area is flood proofed up to the FPL by flood proof walls and providing all access to it via the ground floor which is at the FPL (refer to section 3.2).

Pittwater 21 DCP B3.11 Flood Prone Land Requirement		Compliance
C3	All new development must be designed and constructed so as not to impede the floodway or flood conveyance on the site, as well as ensuring no net loss of flood storage in all events up to the 1% AEP event. For suspended pier/pile footings: a) The underfloor area of the dwelling below the 1% AEP flood level is to be designed and constructed to allow clear passage of floodwaters, taking into account the potential for small openings to block; and b) At least 50% of the perimeter of the underfloor area is of an open design from the natural ground level up to the 1% AEP flood level; and c) No solid areas of the perimeter of the underfloor area would be permitted in a floodway	Complies – see the below items. (10) As discussed at (1), loss of flood storage due to the proposed development is negligible and causes no adverse changes to flood conveyance on the site (refer to section 3.3 for more details). (11) As discussed at (1), the proposed development isnot expected to produce adverse flood effects on the site or surrounding properties. The site is classified as flood storage for the 1% AEP and PMF events by Council and thus development does not affect the floodway.
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.	(12) Not applicable – the development is not classified as alterations and additions.
C6	Consideration may be given to the retention of an existing floor level below the Flood Planning Level when undertaking a first floor addition provided that: a) it is not located within a floodway; and b) the original foundations are sufficient to support the proposed final structure above them. The Flood Management Report must include photos and the structural certification required as per Control B2 must consider whether the existing foundations are adequate or should be replaced; and c) none of the structural supports/framing of existing external walls of are to be removed unless the building is to be extended in that location; and d) the ground floor is floodproofed.	(13) Not applicable – no existing floor level below the FPL is going to be retained.
D.	**CAR PARKING**	
D1	Open carpark areas and carports shall not be located within a floodway.	(14) Not applicable – no open car park areas are proposed.

	Pittwater 21 DCP B3.11 Flood Prone Land Requirement		Compliance
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.	(15)	Not applicable – no open car park areas are proposed.
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.	(16)	Not applicable – no carports are proposed.
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	(17)	Not applicable – the carpark areas are not flood affected in the 1% AEP flood event.
D5	Enclosed Garages must be located at or above the 1% AEP level	(18)	Not applicable – no enclosed garages are proposed.
D6	All enclosed car parks (including basement carparks) must be protected from inundation up to the Flood Planning Level. All access, ventilation, driveway crests and any other potential water entry points to any enclosed car parking shall be above the Flood Planning Level. Where a driveway is required to be raised it must be demonstrated that there is no net loss to available flood storage in any event up to the 1% AEP flood event and no impact on flood conveyance through the site. Council will not accept any options that rely on electrical, mechanical or manual exclusion of the floodwaters from entering the enclosed carpark		Complies – see below notes for details. (19) As discussed at (9), all levels of the proposed development that are below the FPL are flood proofed, with all water entry points at or above the FPL. (20) As discussed at (1), loss of flood storage or impact on flood conveyance on the site due to the proposed development including the driveway and access ramp is negligible in the context of the flood storage available to Narrabeen Lagoon. (21) The physical structure of the proposed building and raised car ramp provide constant flood proofing for the lower levels. No mechanical, electrical, manual or temporary flood barries are used.

Pittwater 21 DCP B3.11 Flood Prone Land Requirement	Compliance
E. 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. If the property is affected by a Flood Life Hazard Category of H6, then development is not permitted unless it can be demonstrated to the satisfaction of the consent authority that the risk level on the property is or can be reduced to a level below H6 or its equivalent. If the property is flood affected but the Flood Life Hazard Category has not been mapped by Council, then calculations for its determination must be shown in the Flood Management Report, in accordance with the "Technical Flood Risk Management Guideline: Flood Hazard", Australian Institute for Disaster Resilience (2012). 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 d) 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 Class 10 classified buildings and structures (as defined in the Building Codes of Australia) are excluded from this control. In the case of change of use or internal alterations to an existing building, a variation to this control may be considered if justified appropriately by a suitably qualified professional. Note that in the event of a flood, occupants would be required to evacuate if ordered by Emergency Services personnel regardless of the availability of a shelter-in-place refuge.	Complies – see the below items for details. (22) Refer to section 4 for Flood Emergency Response Plan. (23) The site is affected by Flood Life Hazard Category of H3 - H5 (refer to section 3.4.1). Evacuation is the primary flood emergency response for the site (refer to section 4.6). (24) MA considers the warning time for the evacuation route to be inundated by flood water in the PMF to be approximately one hour. Proposed car park capacity allows the evacuation to complete in less than an hour, thus evacuation is considered as a safe emergency response in flood events. (25) Evacuation route from the site to Mona Vale Road which is outside the PMF extent, and provides arterial connection to the rest of Sydney, is described in section 4.6.2. (26) A suitable number of flood kits are to be kept on each floor of the premises by building management. Flood kits are to include a first aid kit, portable radio and spare batteries, torch and spare batteries, hi-vis vests and water bottles.

Pittwater 21 DCP B3.11 Flood Prone Land Requirement		Compliance	
F. 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.	(27)	Not applicable – no fencing is proposed.
G. 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.	(28)	Complies - hazardous or potentially polluting materials are not expected to be stored on site but all areas which could be used to store these materials are protected up to the FPL.
H. 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.	(29)	Not applicable – no pools are proposed.

6 Conclusion

A review of relevant flood information indicates that the site is impacted by longer duration lagoon flooding. The site is located outside of the floodway for all flood events and is classified as a flood storage hydraulic category.

Hazards during flood events are high, with the site being classified as a high-risk flood precinct for both the 1% AEP and PMF events. The site is affected by a flood life hazard category of H3 for the 1% AEP event and H5 for the PMF event.

A FERP has been prepared to ensure that the site can operate safely in the floodplain environment. The proposed development incorporates several flood mitigation measures which allow evacuation to take place as an appropriate emergency response. With the implementation of the FERP procedures the risk to life is reduced to acceptable levels.

A Flood Risk Assessment, flood storage assessment and a compliance assessment have been provided and demonstrate that the proposed development is compatible with the existing floodplain environment and achieves Council's flood planning requirements. We note that:

1. The proposed development is expected to have acceptable offsite flood impacts.

2. Compliance with Council's flood planning level requirements for building and car park levels is achieved.

3. The proposed development satisfies flood hazard and flood storage controls set out in Council's DCP.

4. Evacuation to Mona Vale Road withing an hour from the start of the storm is recommended as an emergency response in flood event.

Proposed flood characteristics will be largely consistent with existing conditions, and differences due to the proposed development are negligible.

7 References

Australian Institute for Disaster Resilience (2012), *Technical flood risk management guideline: Flood hazard.*

Ball J, Babister M, Nathan R, Weeks W, Weinmann E, Retallick M, Testoni I, (Editors) (2019), *Australian Rainfall and Runoff: A Guide to Flood Estimation*, Commonwealth of Australia.

BMT WBM (September 2013), *Narrabeen Lagood Flood Study*.

Bureau of Meteorology (2019), *Rainfall IFD Data System*, http://www.bom.gov.au/water/designRainfalls/revised-ifd/.

Molino, S. Morrison, T. Howard, M. Opper, S. A (2013), *Technical Guideline for the use of the SES Timeline Evacuation Model in Flood Evacuation Planning*, Proceedings of the 2013 Floodplain Management Association Conference.

Northern Beaches Council (2020) Pittwater 21 Development Control Plan

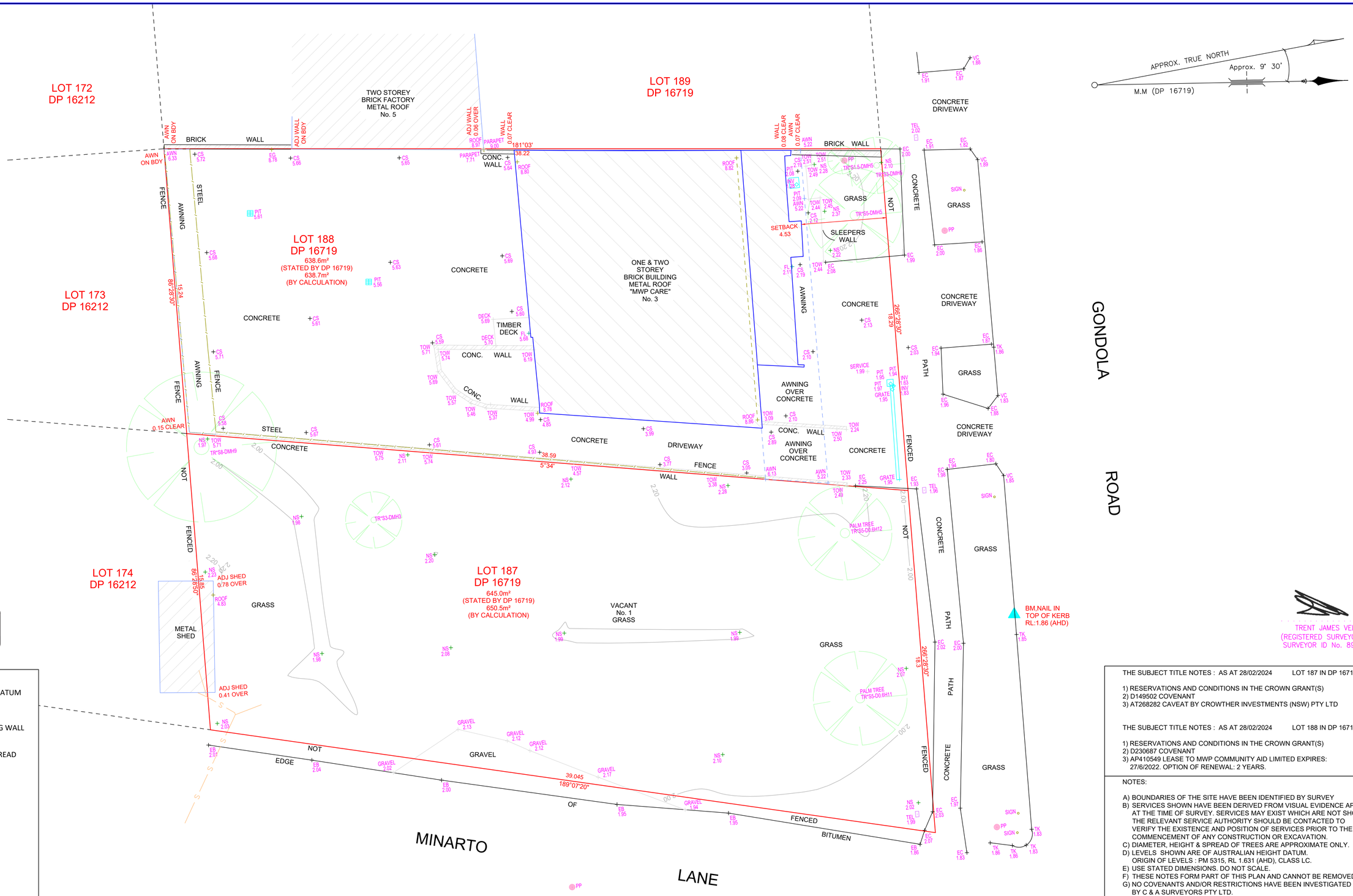
Northern Beaches Council (2022a) Pittwater Local Environmental Plan 2014

Northern Beaches Council (2022b), Guidelines for development on flood prone land, https://www.northernbeaches.nsw.gov.au/planning-and-development/building-and-renovations/development-applications/guidelines-development-flood-prone-land.

NSW Department of Infrastructure, Planning and Natural Resources (2005), *Floodplain Development Manual*.

8 Attachment A: Site Survey

A1



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

LEGEND:

AHD	AUSTRALIAN HEIGHT DATUM
AWN	AWNING
BM	BENCH MARK
BOW	BOTTOM OF WALL
BRW	BOTTOM OF RETAINING WALL
CONC	CONCRETE
CS	CONCRETE SURFACE
D/H/S	DIAMETER/HEIGHT/SPREAD
EB	EDGE OF BITUMEN
EC	EDGE OF CONCRETE
EG	EAVE & GUTTER
EP	ELECTRICAL BOX
FL	FLOOR LEVEL
HYD	HYDRANT
IC	INSPECTION COVER
INV	INVERT LEVEL
KO	KERB OUTLET
LH	LAMP HOLE
LIP	LIP OF KERB
NS	NATURAL SURFACE
PP	POWER POLE
RL	REDUCED LEVEL
RTK	ROLLING TOP OF KERB
SL	SURFACE LEVEL
SIP	SEWER INSPECTION POINT
SMH	SEWER MAN HOLE
SV	STOP VALE
TEL	TELSTRA PIT
TK	TOP OF KERB
TOW/TW	TOP OF WALL
TRW	TOP OF RETAINING WALL
VC	VEHICLE CROSSING
W-B	WALL TO BOUNDARY
WM	WATER METER

TRENT JAMES VELLA
(REGISTERED SURVEYOR)
SURVEYOR ID No. 8959

THE SUBJECT TITLE NOTES : AS AT 28/02/2024 LOT 187 IN DP 16719

1) RESERVATIONS AND CONDITIONS IN THE CROWN GRANT(S)
2) D149502 COVENANT
3) AT268282 CAVEAT BY CROWTHER INVESTMENTS (NSW) PTY LTD

THE SUBJECT TITLE NOTES : AS AT 28/02/2024 LOT 188 IN DP 16719

1) RESERVATIONS AND CONDITIONS IN THE CROWN GRANT(S)
2) D230687 COVENANT
3) AP410549 LEASE TO MWP COMMUNITY AID LIMITED EXPIRES: 27/6/2022. OPTION OF RENEWAL: 2 YEARS.

NOTES:

A) BOUNDARIES OF THE SITE HAVE BEEN IDENTIFIED BY SURVEY
B) SERVICES SHOWN HAVE BEEN DERIVED FROM VISUAL EVIDENCE APPARENT AT THE TIME OF SURVEY. SERVICES MAY EXIST WHICH ARE NOT SHOWN. THE RELEVANT SERVICE AUTHORITY SHOULD BE CONTACTED TO VERIFY THE EXISTENCE AND POSITION OF SERVICES PRIOR TO THE COMMENCEMENT OF ANY CONSTRUCTION OR EXCAVATION.
C) DIAMETER, HEIGHT & SPREAD OF TREES ARE APPROXIMATE ONLY.
D) LEVELS SHOWN ARE OF AUSTRALIAN HEIGHT DATUM. ORIGIN OF LEVELS : PM 5315, RL 1.631 (AHD), CLASS LC.
E) USE STATED DIMENSIONS. DO NOT SCALE.
F) THESE NOTES FORM PART OF THIS PLAN AND CANNOT BE REMOVED.
G) NO COVENANTS AND/OR RESTRICTIONS HAVE BEEN INVESTIGATED BY C & A SURVEYORS PTY LTD.

REVISION No	DESCRIPTION	DATE
V1	PLAN ISSUED	8/03/2024
V2	.....	../../..
V3	.....	../../..
V4	.....	../../..

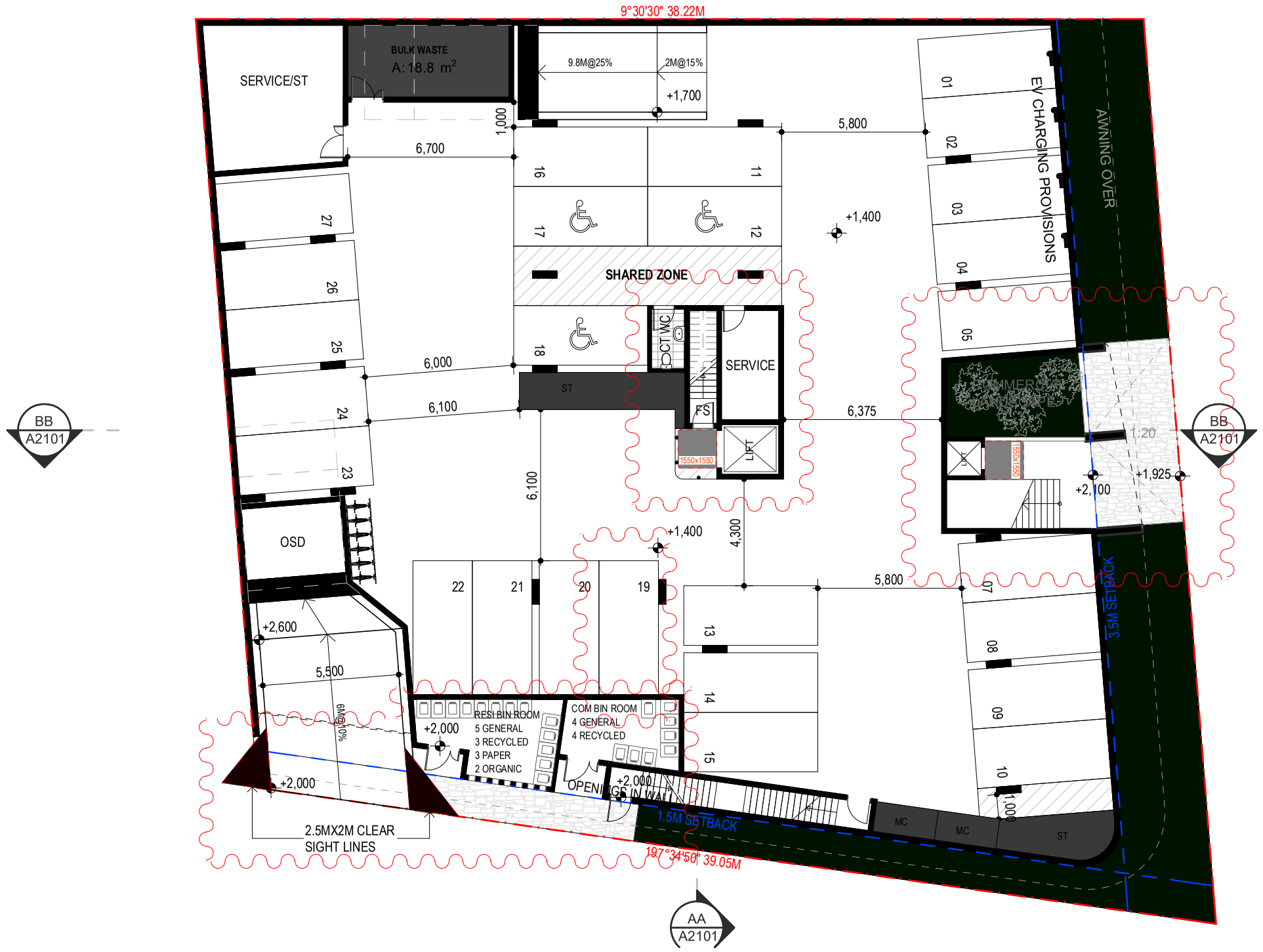
C&A SURVEYORS
30 Grose Street, Parramatta, NSW 2150
Ph: 96309299 email: Operations@candasurveyors.com.au
www.candasurveyors.com.au

DETAIL & BOUNDARY IDENTIFICATION SURVEY OF LOT 187 & 188 IN DP 16719, LOCATED AT No. 1-3, GONDOLA ROAD, NORTH NARRABEEN.

APPROXIMATE LOCATION OF BURIED SEWER MAIN BY SYDNEY WATER DBYD RECORDS
APPROXIMATE LOCATION OF BURIED WATER MAIN (WM) BY SYDNEY WATER DBYD RECORDS
ELECTRIC LINE
TELSTRA PIT
STOP VALVE
POWER POLE
WATER METER
HYDRANT
TREE
D/H/S DIAMETER/HEIGHT/SPREAD

INSTRUCTING PARTY:	Joseph El-Hage @ Mackenzie Architects International	SURVEYED BY: EH	DATUM: AHD
LGA: NORTHERN BEACHES	AREA BDY DP: LOT 187-645.0 m² LOT 188-638.6 m²	DRAWN BY: SU	CHECKED BY: KO
SURVEY DATE: 29/02/2024	AREA BY CALC: LOT 187-650.5 m² LOT 188-638.7 m²	SCALE: 1:100@A1	REF.NO: 31813-24 DET/ID
DATE DRAWN: 8/03/2024	CONTOUR INTERVAL: 0.2 m	REV No: V1	SHEET: 1 OF 1

9 Attachment B: Proposed Site Layout



SK29/02/2024/A1001 1:200@A3
1-3 Gondola Ave North Narrabeen 2101
PRELIMINARY BASEMENT PLAN
FOR CONSULTANT CO-ORDINATION

Pasted Image #1 198151B7.png

736 PACIFIC HWY
Gordon NSW 2072
Phone: (02) 9967 9966
Fax: (02) 9967 9977
www.mainternational.com.au
info@mainternational.com.au
Nominated Architect No.6033
ABN 76 091 107 201
ACN 091107201

LEGEND 2 3 4 5 10
DO NOT SCALE DRAWINGS
VERIFY ALL DIMENSIONS ON SITE BEFORE COMMENCING WORK

AMENDMENTS

No.	REVISION	BY	DATE

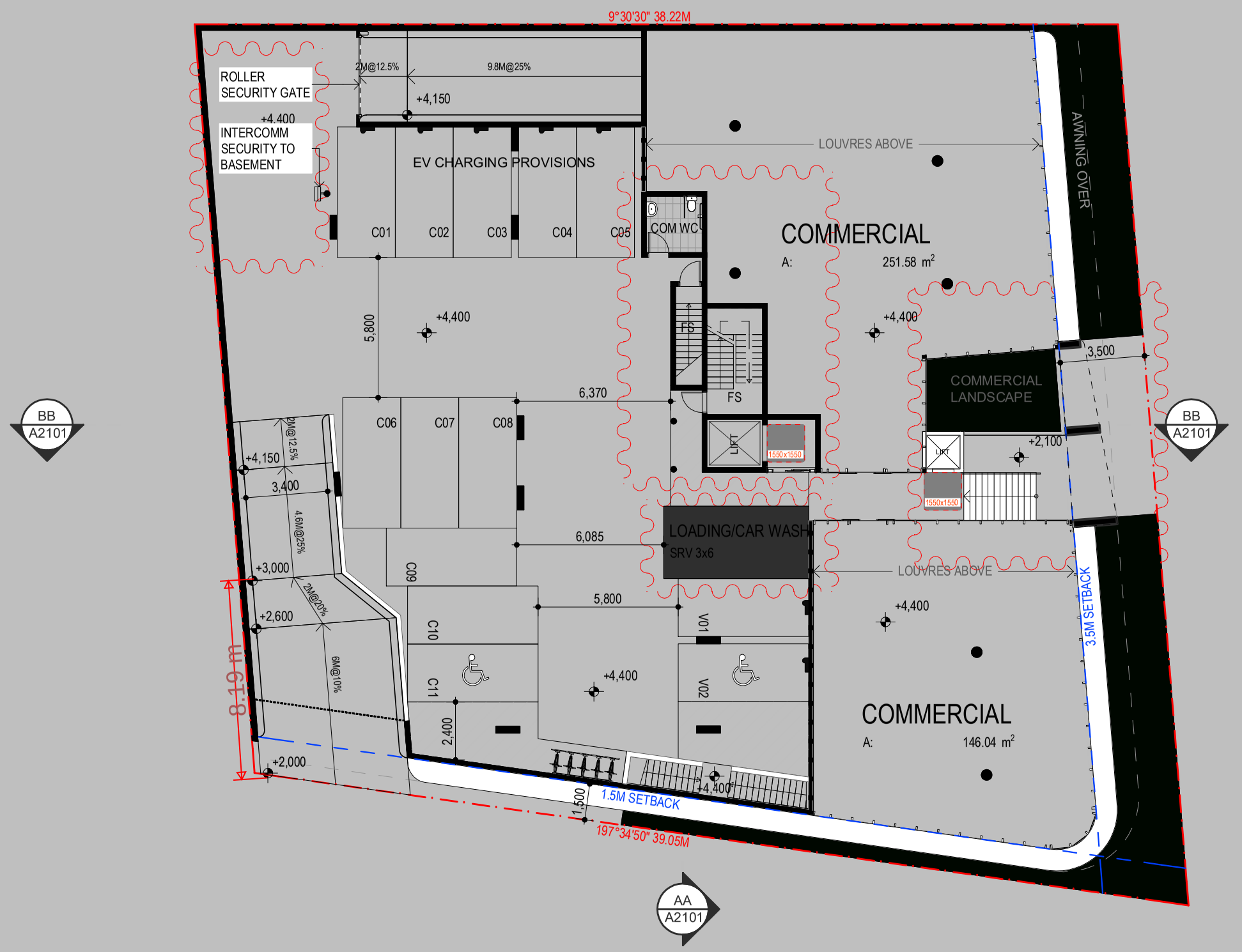
PROJECT NORTH

MULTI RESIDENTIAL DEVELOPMENT
PROJECT
1-3 Gondola Ave North
Narrabeen 2101
PROJECT NO.
15/19

DRAWING:
BASEMENT PLAN

DRAWN BY	SCALE:	DRAWING NO.:	ISSUE:
J.E	1:200@A3	A1001	WIP
CHECKED BY D.M			

-



SURVEY

Pasted Image #1 198151B7.png

736 PACIFIC HWY
Gordon NSW 2072
Phone: (02) 9967 9966
Fax: (02) 9967 9977
www.mainternational.com.au
info@mainternational.com.au

Nominated Architect No.6033
ABN 76 091 107 201
ACN 091107201

LEGEND
DO NOT SCALE DRAWINGS
VERIFY ALL DIMENSIONS ON SITE BEFORE COMMENCING WORK

AMENDMENTS

No.	REVISION	BY	DATE

PROJECT NORTH

MULTI RESIDENTIAL DEVELOPMENT
PROJECT
1-3 Gondola Ave North Narrabeen 2101
PROJECT NO.
15/19

DRAWING:
GROUND FLOOR PLAN

DRAWN BY	SCALE:	DRAWING NO.:	ISSUE:
J.E	1:200@A3	**A1002**	**WIP**
CHECKED BY D.M			

:200@A3
01
N

-

SK29/02/2024/A1003 1:200@A3
1-3 Gondola Ave North Narrabeen 2101
PRELIMINARY FIRST FLOOR PLAN
FOR CONSULTANT CO-ORDINATION

Pasted Image #1 198151B7.png

736 PACIFIC HWY
Gordon NSW 2072
Phone: (02) 9967 9966
Fax: (02) 9967 9977
www.mainternational.com.au
info@mainternational.com.au
Nominated Architect No.6033
ABN 76 091 107 201
ACN 091107201

DO NOT SCALE DRAWINGS
VERIFY ALL DIMENSIONS ON SITE BEFORE COMMENCING WORK

AMENDMENTS

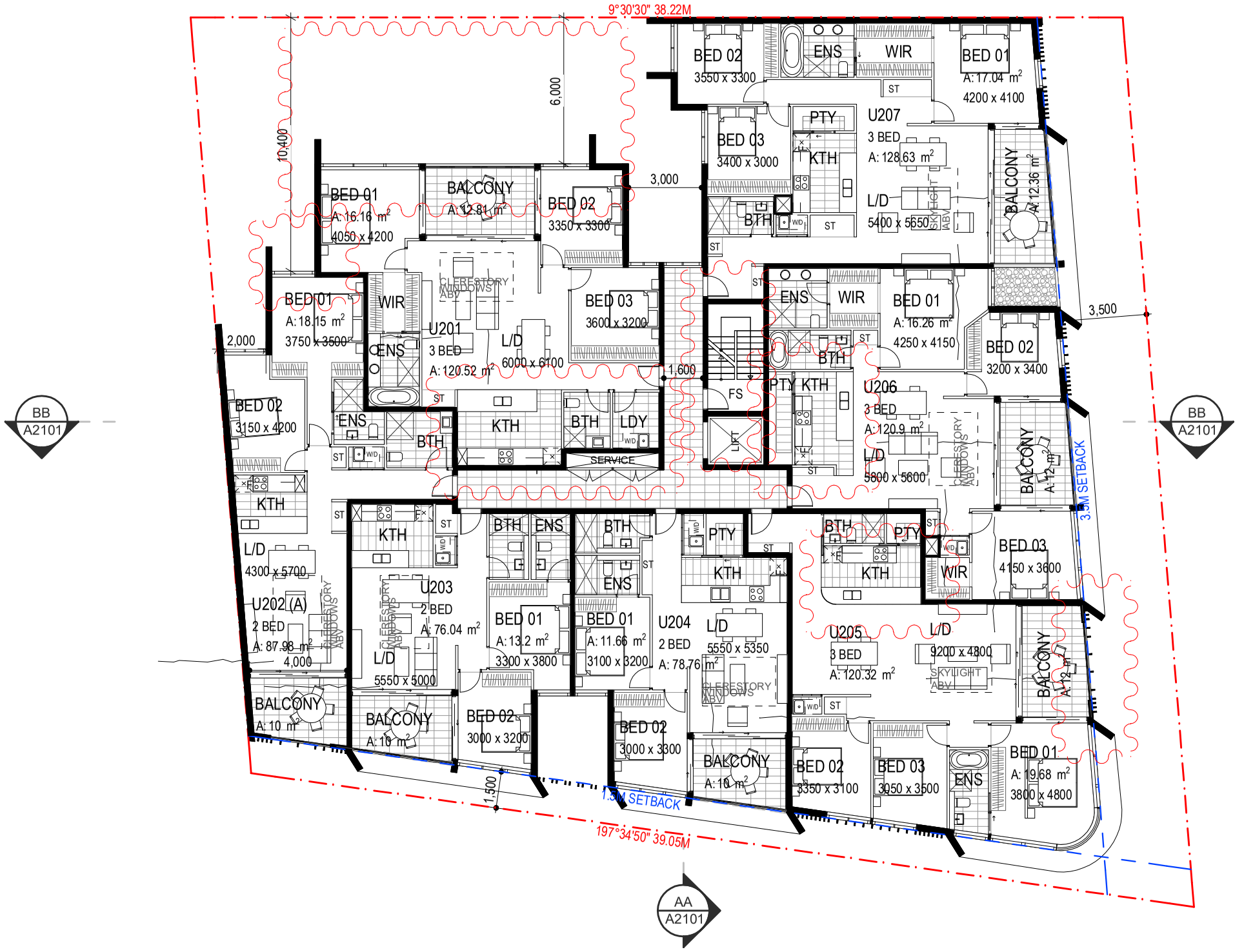
No.	REVISION	BY	DATE

PROJECT NORTH

MULTI RESIDENTIAL DEVELOPMENT
PROJECT
1-3 Gondola Ave North
Narrabeen 2101
PROJECT NO.
15/19

DRAWING:
FIRST FLOOR PLAN

DRAWN BY	SCALE:	DRAWING NO.:	ISSUE:
J.E	1:200@A3	A1003	WIP
CHECKED BY D.M			



SK29/02/2024/A1004 1:200@A3
1-3 Gondola Ave North Narrabeen 2101
PRELIMINARY SECOND FLOOR PLAN
FOR CONSULTANT CO-ORDINATION

Pasted Image #1 198151B7.png

736 PACIFIC HWY
Gordon NSW 2072
Phone: (02) 9967 9966
Fax: (02) 9967 9977
www.mainternational.com.au
info@mainternational.com.au
Nominated Architect No.6033
ABN 76 091 107 201
ACN 091107201

LEGEND
DO NOT SCALE DRAWINGS
VERIFY ALL DIMENSIONS ON SITE BEFORE COMMENCING WORK

AMENDMENTS

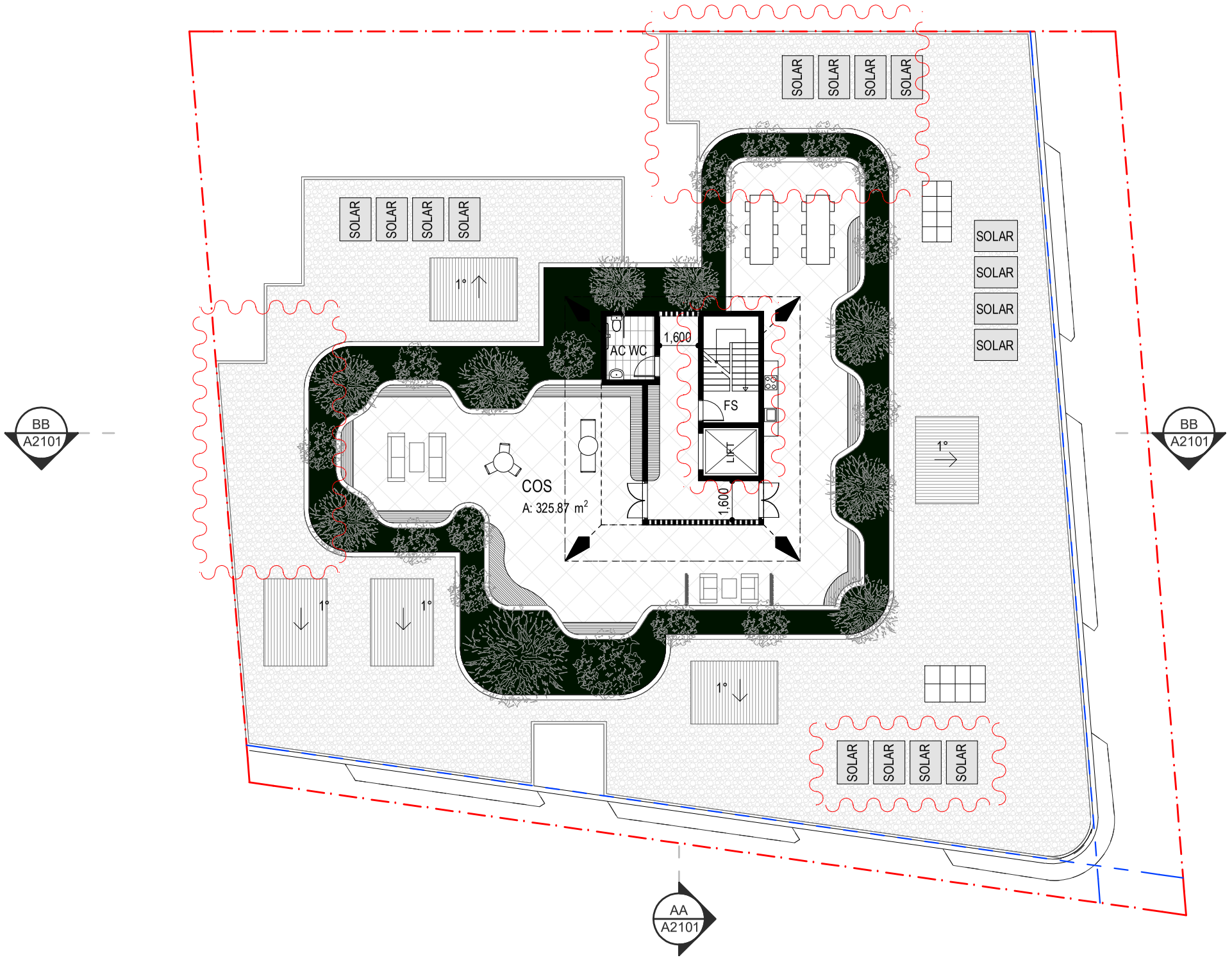
No.	REVISION	BY	DATE

PROJECT NORTH

MULTI RESIDENTIAL DEVELOPMENT
PROJECT
1-3 Gondola Ave North
Narrabeen 2101
PROJECT NO.
15/19

DRAWING:
SECOND FLOOR PLAN

DRAWN BY	SCALE:	DRAWING NO.:	ISSUE:
J.E	1:200@A3	A1004	WIP
CHECKED BY D.M			



SK29/02/2024/A1005 1:200@A3
1-3 Gondola Ave North Narrabeen 2101
PRELIMINARY ROOF PLAN
FOR CONSULTANT CO-ORDINATION

Pasted Image #1 198151B7.png

736 PACIFIC HWY
Gordon NSW 2072
Phone: (02) 9967 9966
Fax: (02) 9967 9977
www.mainternational.com.au
info@mainternational.com.au
Nominated Architect No.6033
ABN 76 091 107 201
ACN 091107201

LEGEND 0 2 5 10
DO NOT SCALE DRAWINGS
VERIFY ALL DIMENSIONS ON SITE BEFORE COMMENCING WORK

AMENDMENTS

No.	REVISION	BY	DATE

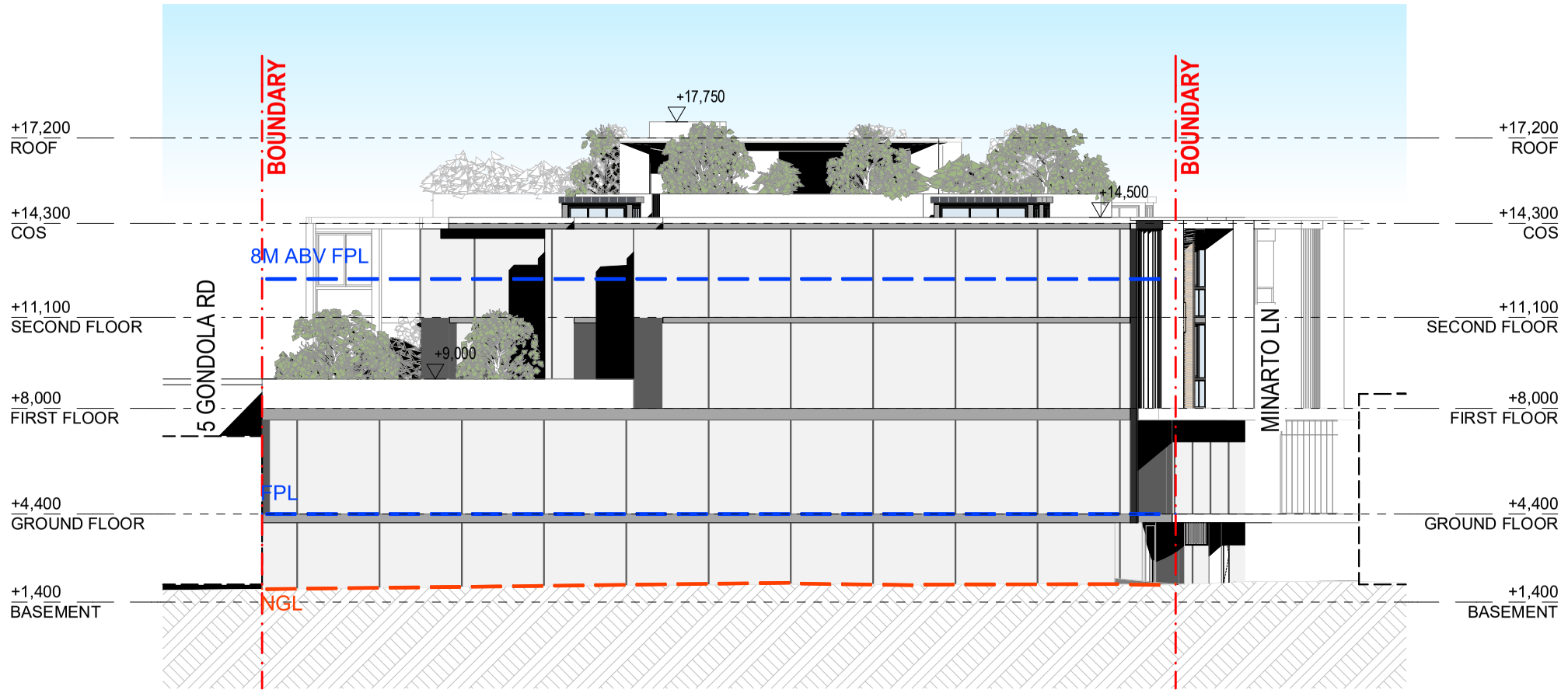
PROJECT NORTH

MULTI RESIDENTIAL DEVELOPMENT
PROJECT
1-3 Gondola Ave North
Narrabeen 2101
PROJECT NO.
15/19

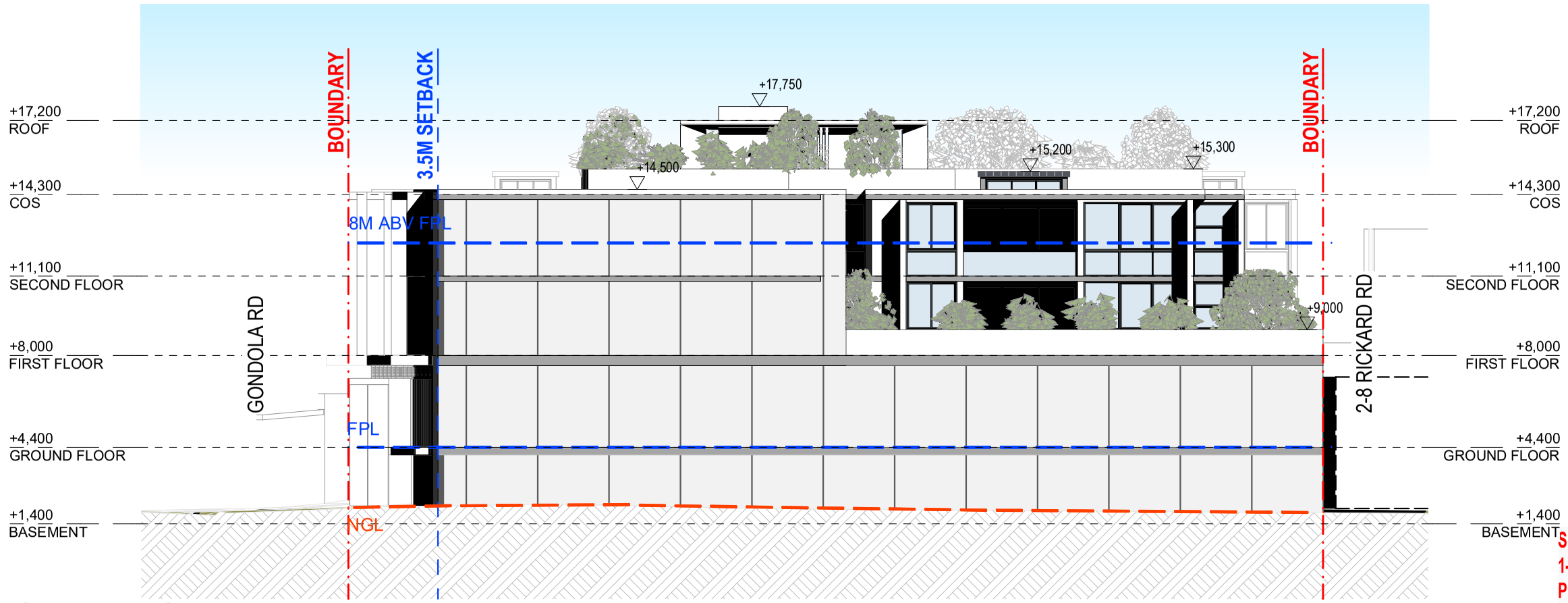
DRAWING:
ROOF PLAN

DRAWN BY	SCALE:	DRAWING NO.:	ISSUE:
J.E	1:200@A3	A1005	WIP
CHECKED BY D.M			

-



SOUTH ELEVATION



WEST ELEVATION

SK29/02/2024/A2002 1:200@A3
1-3 Gondola Ave North Narrabeen 2101
PRELIMINARY SOUTH & WEST ELEVATIONS
FOR CONSULTANT CO-ORDINATION

Pasted Image #1 198151B7.png

736 PACIFIC HWY
Gordon NSW 2072
Phone: (02) 9967 9966
Fax: (02) 9967 9977
www.mainternational.com.au
info@mainternational.com.au
Nominated Architect No.6033
ABN 76 091 107 201
ACN 091107201

LEGEND
DO NOT SCALE DRAWINGS
VERIFY ALL DIMENSIONS ON SITE BEFORE COMMENCING WORK

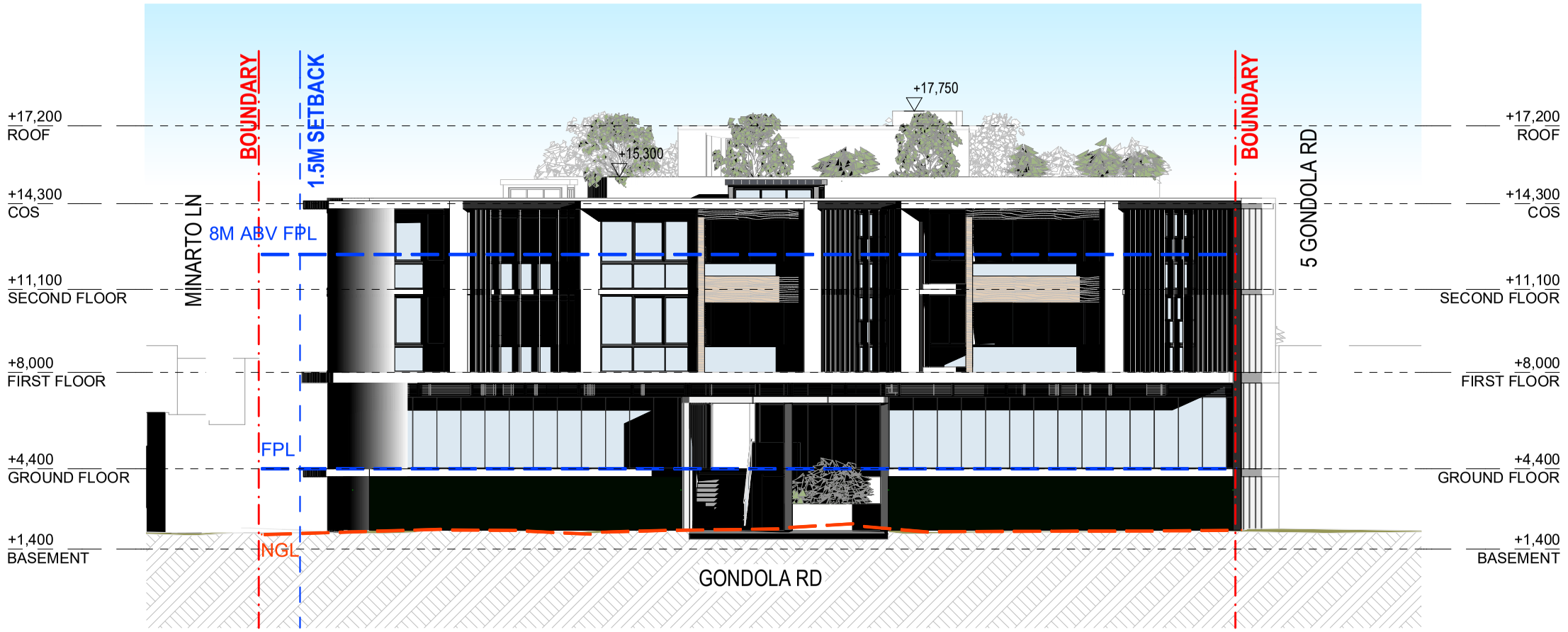
AMENDMENTS

No.	REVISION	BY	DATE

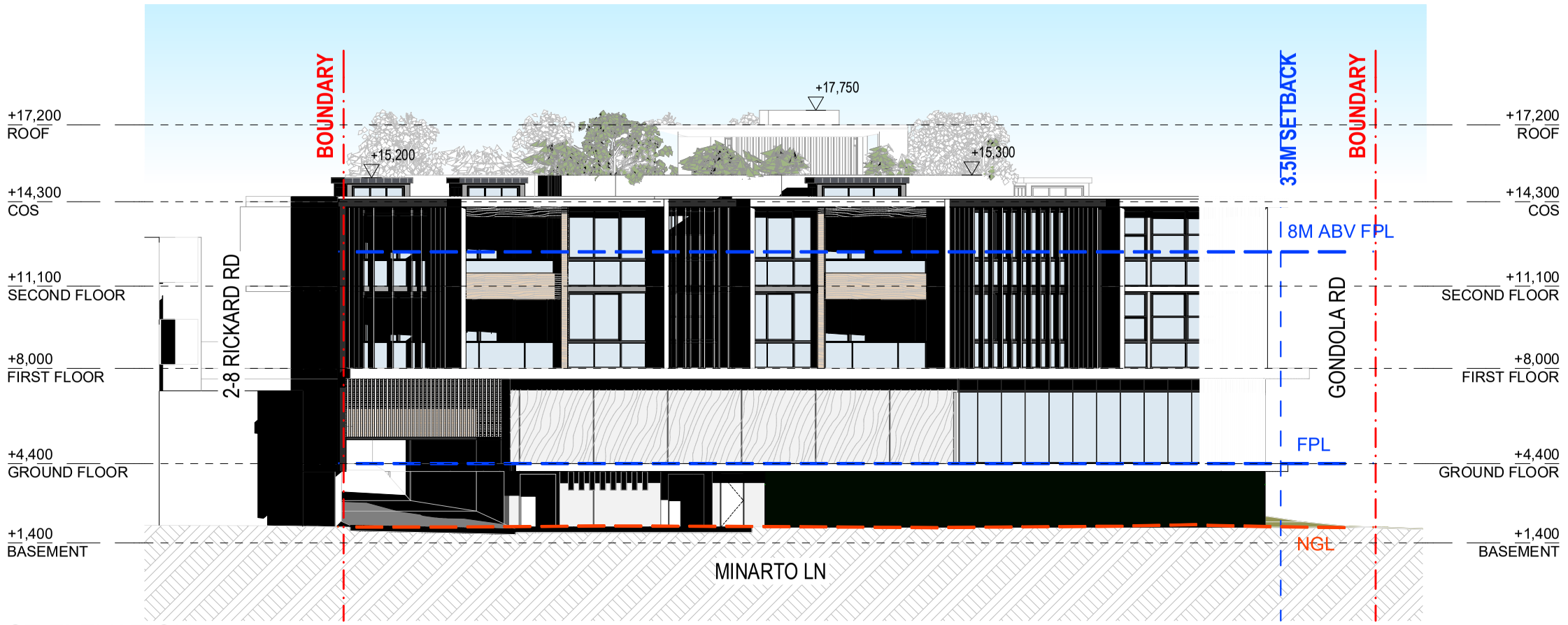
MULTI RESIDENTIAL DEVELOPMENT
PROJECT
1-3 Gondola Ave North
Narrabeen 2101
PROJECT NO.
15/19

DRAWING:
SOUTH & WEST ELEVATIONS

DRAWN BY	SCALE:	DRAWING NO.:	ISSUE:
J.E	1:200@A3	A2002	WIP
CHECKED BY D.M			



NORTH ELEVATION



EAST ELEVATION

SK29/02/2024/A2001 1:200@A3
1-3 Gondola Ave North Narrabeen 2101
PRELIMINARY NORTH & EAST ELEVATIONS
FOR CONSULTANT CO-ORDINATION

Pasted Image #1 198151B7.png

736 PACIFIC HWY
Gordon NSW 2072
Phone: (02) 9967 9966
Fax: (02) 9967 9977
www.mainternational.com.au
info@mainternational.com.au
Nominated Architect No.6033
ABN 76 091 107 201
ACN 091107201

LEGEND
DO NOT SCALE DRAWINGS
VERIFY ALL DIMENSIONS ON SITE BEFORE COMMENCING WORK

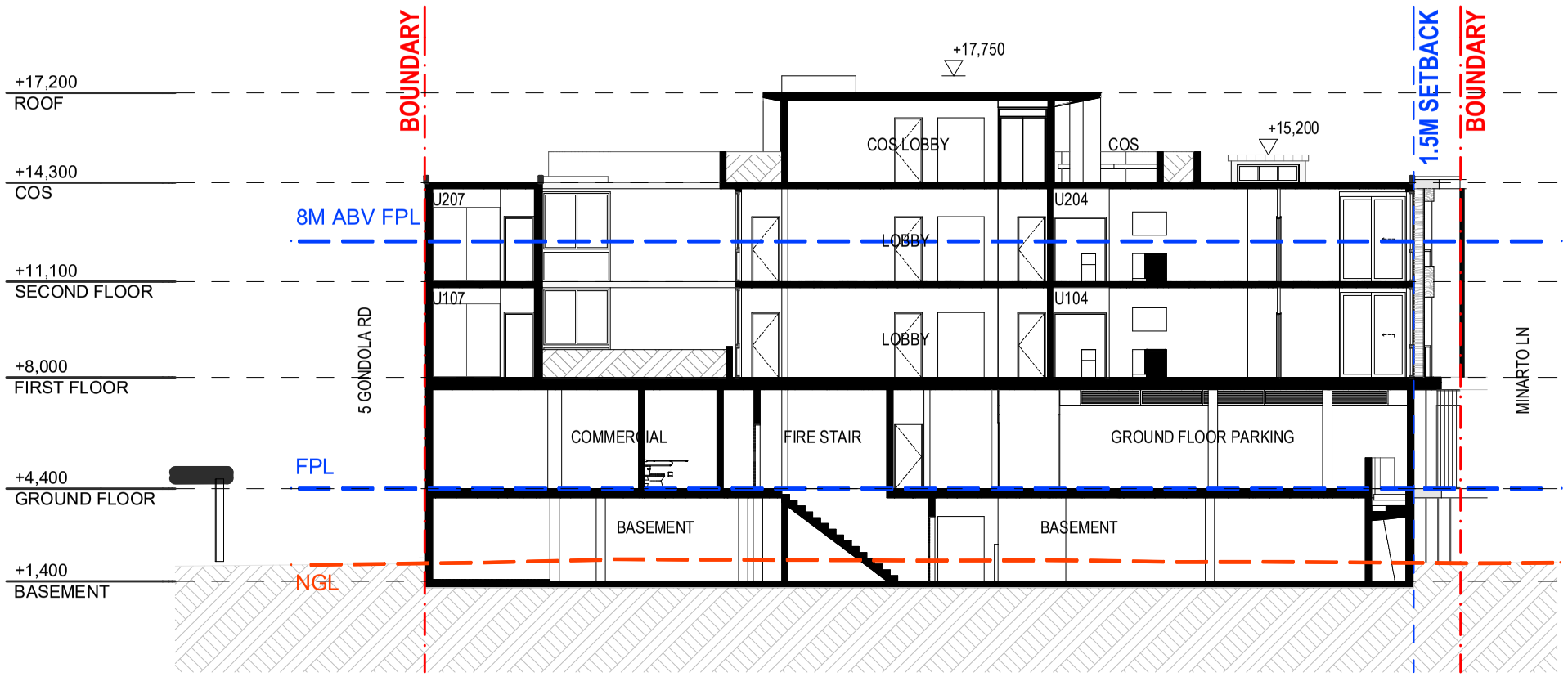
AMENDMENTS

No.	REVISION	BY	DATE

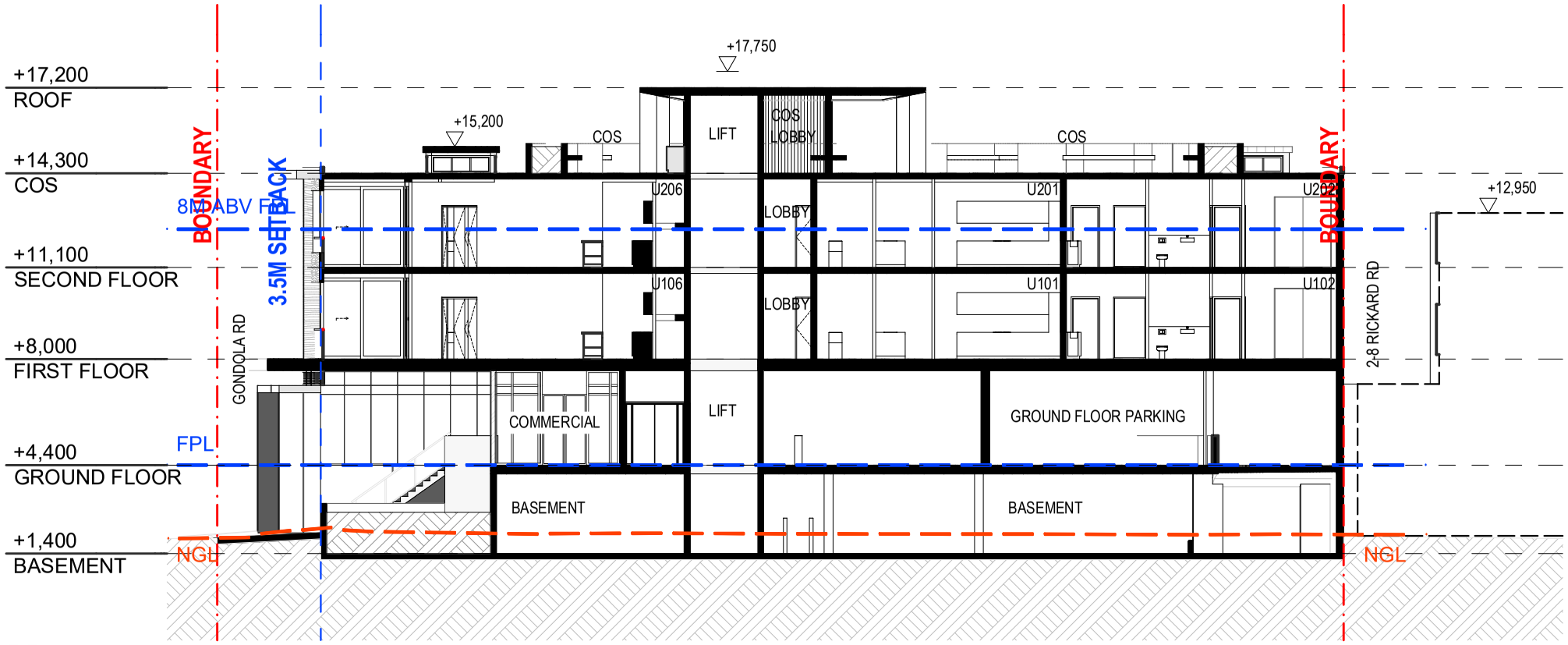
MULTI RESIDENTIAL DEVELOPMENT
PROJECT
1-3 Gondola Ave North
Narrabeen 2101
PROJECT NO.
15/19

DRAWING:
NORTH & EAST ELEVATIONS

DRAWN BY	SCALE:	DRAWING NO.:	ISSUE:
J.E	1:200@A3	A2001	WIP
CHECKED BY D.M			



SECTION AA



SECTION BB

SK29/02/2024/A2101 1:200@A3
1-3 Gondola Ave North Narrabeen 2101
PRELIMINARY SECTIONS
FOR CONSULTANT CO-ORDINATION

Pasted Image #1 198151B7.png

736 PACIFIC HWY
Gordon NSW 2072
Phone: (02) 9967 9966
Fax: (02) 9967 9977
www.mainternational.com.au
info@mainternational.com.au
Nominated Architect No.6033
ABN 76 091 107 201
ACN 091107201

0 1 2 3 4 5 10

LEGEND
DO NOT SCALE DRAWINGS
VERIFY ALL DIMENSIONS ON SITE BEFORE COMMENCING WORK

AMENDMENTS

No.	REVISION	BY	DATE

MULTI RESIDENTIAL DEVELOPMENT
PROJECT
1-3 Gondola Ave North
Narrabeen 2101
PROJECT NO.
15/19

DRAWING:
SECTIONS

DRAWN BY	SCALE:	DRAWING NO.:	ISSUE:
J.E	1:200@A3	A2101	WIP
CHECKED BY D.M			

-

10 Attachment C: Northern Beaches Council Flood Information Report

FLOOD INFORMATION REPORT – COMPREHENSIVE

Property: 3 Gondola Road NORTH NARRABEEN NSW 2101
Lot DP: Lot 188 DP 16719
Issue Date: 29/03/2022
Flood Study Reference: Narrabeen Lagoon Flood Study 2013, BMT WBM, Ingleside, Elanora and Warriewood Overland Flow Flood Study 2019, WMAwater

---

Flood Information for lot [1]:

Flood Risk Precinct – See Map A

Flood Planning Area – See Map A

Maximum Flood Planning Level (FPL) [2, 3, 4]: 3.53 m AHD

1% AEP Flood – See Flood Map B

1% AEP Maximum Water Level [2, 3]: 3.03 mAHD

1% AEP Maximum Depth from natural ground level[3]: 1.10 m

1% AEP Maximum Velocity: 0.20 m/s

1% AEP Hydraulic Categorisation: N/A **See Flood Map D**

Probable Maximum Flood (PMF) – See Flood Map C

PMF Maximum Water Level [4]: 4.89 m AHD

PMF Maximum Depth from natural ground level: 2.96 m

PMF Maximum Velocity: 0.98 m/s

PMF Hydraulic Categorisation: N/A **See Flood Map E**

Flooding with Climate Change (See Flood Map F)

The following is for the 30% Rainfall intensity increase and 0.9m Sea Level Rise Scenario:

1% AEP Maximum Water Level with Climate change [3]: 3.90 m AHD

1% AEP Maximum Depth with Climate Change[3]: 1.97 m

1% AEP Maximum Velocity with Climate Change[3]: m/s

Flood Life Hazard Category – See Map G

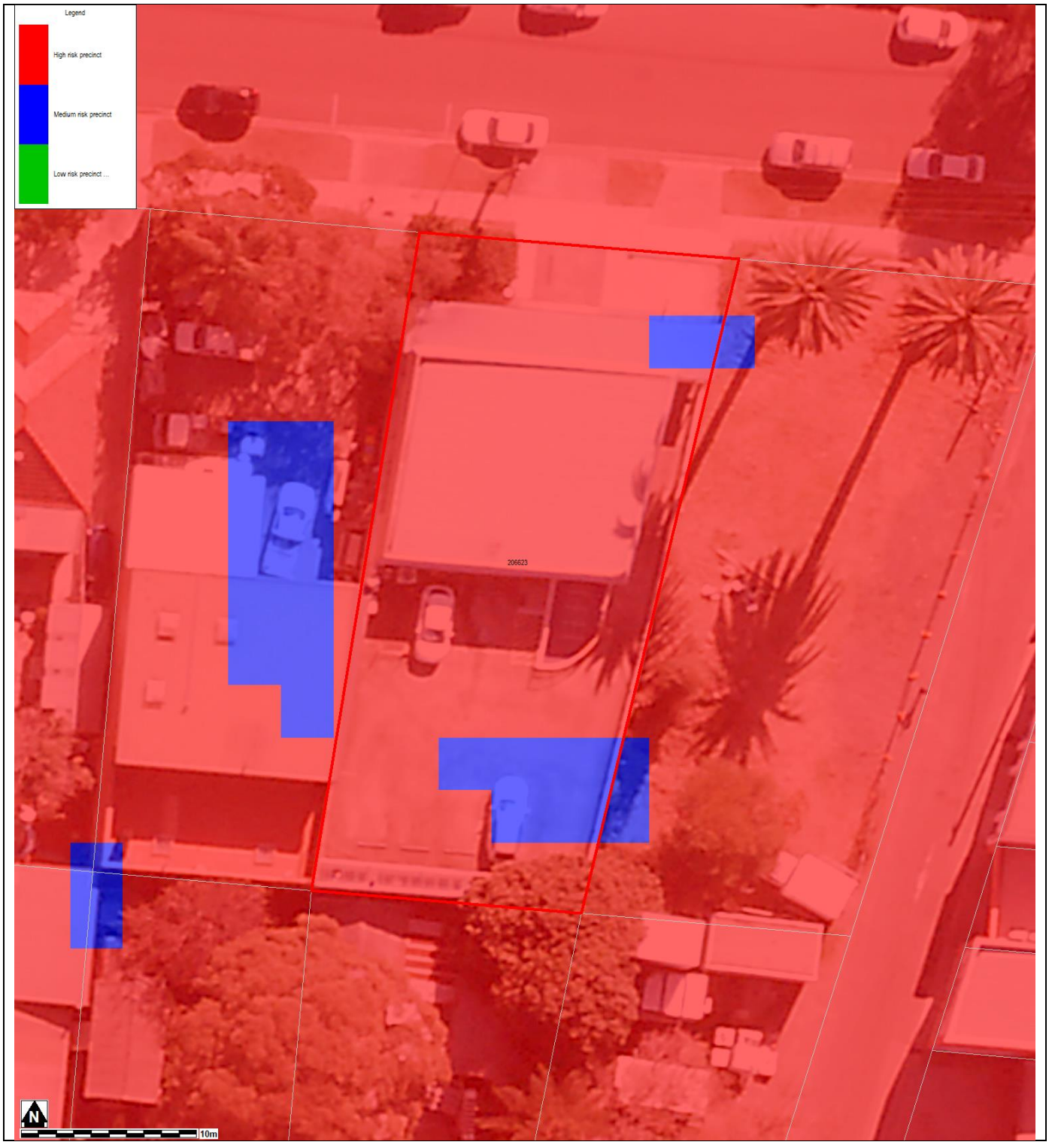
Indicative Ground Surface Spot Heights – See Map H

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

General Notes:

- All levels are based on Australian Height Datum (AHD) unless otherwise noted.
- This is currently the best available information on flooding; it may be subject to change in the future.
- Council recommends that you obtain a detailed survey of the above property and surrounds to AHD by a registered surveyor to determine any features that may influence the predicted extent or frequency of flooding. It is recommended you compare the flood level to the ground and floor levels to determine the level of risk the property may experience should flooding occur.
- Development approval is dependent on a range of issues, including compliance with all relevant provisions of Northern Beaches Council's Local Environmental Plans and Development Control Plans.
- Please note that the information contained within this letter is general advice only as a detail survey of the property as well as other information is not available. Council recommends that you engage a suitably experienced consultant to provide site specific flooding advice prior to making any decisions relating to the purchase or development of this property.
- The Flood Studies on which Council's flood information is based are available on Council's website.

FLOOD MAP A: FLOOD RISK PRECINCT MAP



Notes:

- **Low Flood Risk precinct** means all flood prone land not identified within the High or Medium flood risk precincts.
- **Medium Flood Risk precinct** means all flood prone land that is (a) within the 1% AEP Flood Planning Area; and (b) is not within the high flood risk precinct.
- **High Flood Risk precinct** means all flood prone land (a) within the 1% AEP Flood Planning Area; and (b) is either subject to a high hydraulic hazard, within the floodway or subject to significant evacuation difficulties (H5 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.

FLOOD LEVEL POINTS

Note: Cadastre Lines (Source: NSW Government Land and Property Information), flood levels/extents (Source: Narrabeen Lagoon Flood Study 2013, BMT WBM, Ingleside, Elanora and Warriewood Overland Flow Flood Study 2019, WMAwater) and aerial photography (Source: NearMap 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	2.68	0.63	3.03	0.98	0.18	3.53	4.89	2.84	0.32
2	2.68	0.55	3.03	0.91	0.04	3.53	4.89	2.77	0.17
3	2.68	0.61	3.03	0.96	0.14	3.53	4.89	2.82	0.28
4	2.68	0.56	3.03	0.92	0.19	3.53	4.89	2.78	0.22
5	2.68	0.46	3.03	0.81	0.14	3.53	4.89	2.67	0.36
6	2.68	0.51	3.03	0.86	0.13	3.53	4.89	2.72	0.28
7	2.68	0.46	3.03	0.81	0.15	3.53	4.89	2.67	0.48
8	2.68	0.56	3.03	0.91	0.14	3.53	4.89	2.77	0.33
9	2.68	0.61	3.03	0.96	0.15	3.53	4.89	2.83	0.35

WL – Water Level
PMF – Probable Maximum Flood
N/A = no peak water level/depth/velocity available in flood event

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	3.90	1.85
2	3.90	1.78
3	3.90	1.83
4	3.90	1.79
5	3.90	1.68
6	3.90	1.73
7	3.90	1.68
8	3.90	1.78
9	3.90	1.84

WL – Water Level
PMF – Probable Maximum Flood
N/A = no peak water level/depth/velocity available in flood event.

A variable Flood Planning Level might apply. Freeboard is generally 0.5m above the maximum 1% AEP water level. However for overland flow with a depth less than 0.3m and a VelocityxDepth product less than $0.3m^2/s$, a freeboard of 0.3m may be able to be justified.

FLOOD MAP B: FLOODING - 1% AEP EXTENT

Notes:

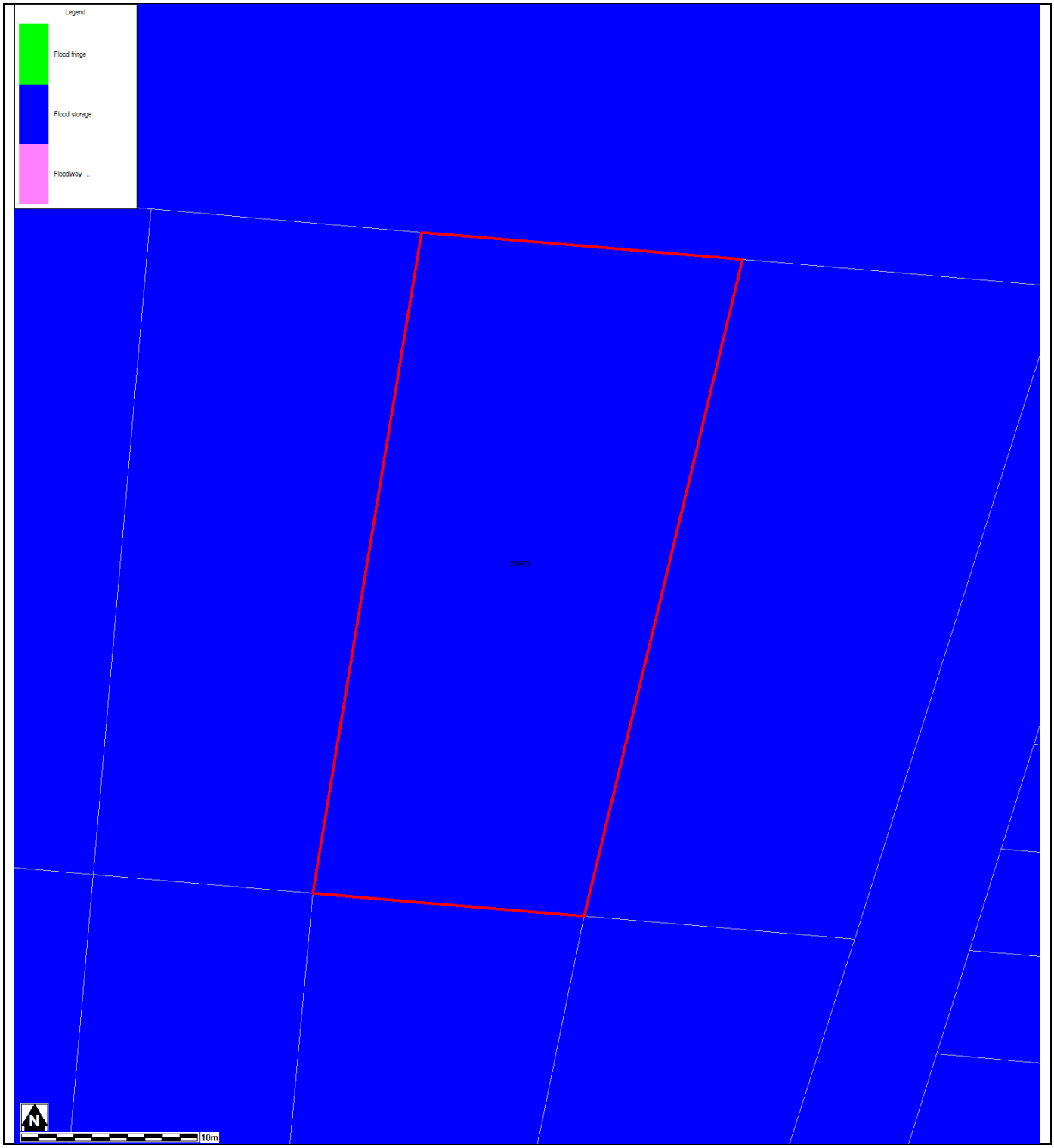
- Extent represents the 1% annual Exceedance Probability (AEP) flood event.
- Flood events exceeding the 1% AEP can occur on this site.
- Extent does not include climate change.
- Cadastre Lines (Source: NSW Government Land and Property Information), flood levels/extents (Source: Narrabeen Lagoon Flood Study 2013, BMT WBM, Ingleside, Elanora and Warriewood Overland Flow Flood Study 2019, WMAwater) and aerial photography (Source Near Map 2014) are indicative only.

FLOOD MAP C: 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: Narrabeen Lagoon Flood Study 2013, BMT WBM, Ingleside, Elanora and Warriewood Overland Flow Flood Study 2019, WMAwater) and aerial photography (Source: NearMap 2014) are indicative only

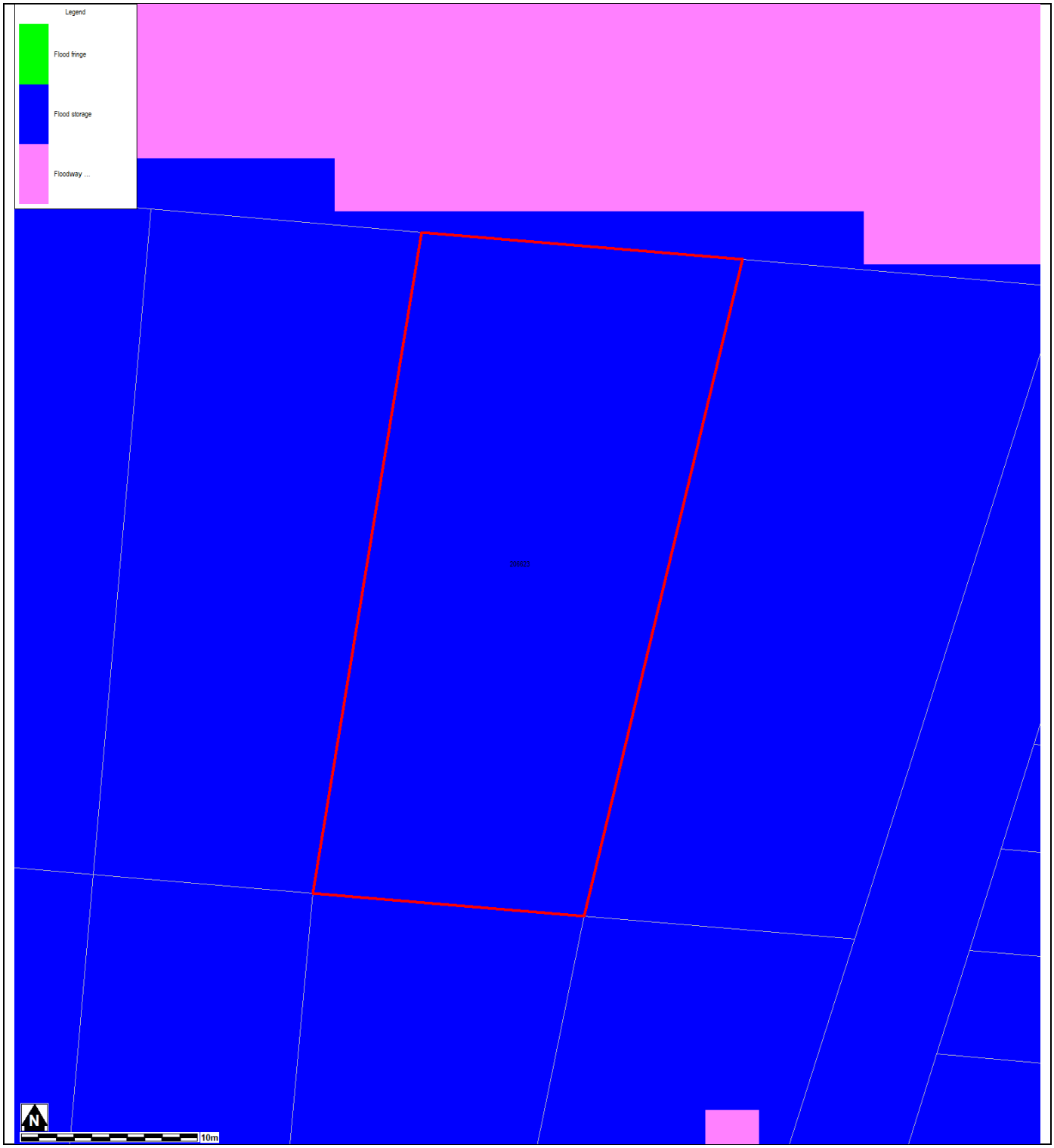
FLOOD MAP D: 1% AEP FLOOD HYDRAULIC CATEGORY EXTENT MAP



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: Narrabeen Lagoon Flood Study 2013, BMT WBM, Ingleside, Elanora and Warriewood Overland Flow Flood Study 2019, WMAwater) and aerial photography (Source: NearMap 2014) are indicative only

FLOOD MAP E: PMF FLOOD HYDRAULIC CATEGORY EXTENT MAP



Notes:

- Extent represents the Probable Maximum Flood (PMF) event
- Extent does not include climate change
- Cadastre Lines (Source: NSW Government Land and Property Information), flood levels/extents (Source: Narrabeen Lagoon Flood Study 2013, BMT WBM, Ingleside, Elanora and Warriewood Overland Flow Flood Study 2019, WMAwater) and aerial photography (Source: NearMap 2014) are indicative only

FLOOD MAP F: FLOODING – 1% AEP EXTENT PLUS CLIMATE CHANGE

Note:

- 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: Narrabeen Lagoon Flood Study 2013, BMT WBM, Ingleside, Elanora and Warriewood Overland Flow Flood Study 2019, WMAwater) and aerial photography (Source: NearMap 2014) are indicative only

FLOOD MAP G: FLOOD LIFE HAZARD CATEGORY

Notes:

- Cadastre Lines (Source: NSW Government Land and Property Information), flood levels/extents (Source: Narrabeen Lagoon Flood Study 2013, BMT WBM, Ingleside, Elanora and Warriewood Overland Flow Flood Study 2019, WMAwater) and aerial photography (Source Near Map 2014) are indicative only.

MAP H: INDICATIVE GROUND SURFACE SPOT HEIGHTS

Notes:

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

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) – 6.3 Flood Planning	Manly DCP (2013) – 5.4.3 Flood Prone Land
Warringah LEP (2011) – 6.3 Flood Planning Warringah LEP (2000) – 47 Flood Affected Land *	Warringah DCP (2011) – E11 Flood Prone Land
Pittwater LEP (2014) – 7.3 Flood Planning Pittwater LEP (2014) – 7.4 Flood Risk Management	Pittwater 21 DCP (2014) – B3.11 Flood Prone Land Pittwater 21 DCP (2014) – B3.12 Climate Change

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

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

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

When is a Flood Management Report required?

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

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

- If all proposed works are located outside the relevant Flood Risk Precinct extent
- First floor addition only, where the floor level is above the Probable Maximum Flood level
- 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 .