Flood Risk Management Report

15a & 15b Moseley Street & 25-31 Donald Street, Carlingford

Issue A

Prepared For Captag Investments Pty Ltd

Date: Wednesday, 6 August 25

File Ref: 20240241-R02_FRMP [A].docx

P: 02 8883 4239

A: Suite 311, Level 3, 480 Pacific Highway, St Leonards NSW 2065

W: www.sgce.com.au

Postal: PO Box 7855, Baulkham Hills, NSW 2153

REVISION TABLE

Revision	Date	Issue Description	Issued by	Approved by	Signed
P01	18.07.2025	Preliminary Issue	SELH	SELH	
A	06.08.2025	Issue for Review	SELH	SELH	

The information given in this document takes into account the particular instructions and requirements of our Client. It is not intended for and should not be relied upon by any third party and no responsibility is undertaken to any third party.

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1 Executive Summary

1.1 Addressing Relevant SEARs

Table 1-1 Relevant SEARS

Item	Description	Section Reference
19. Flood Risk	Identify the flood planning area and level as set out in the relevant EPI and other supporting documents to determine; - The flood extent and velocity up to the Probable Maximum Flood and risk on-site having regard to adopted flood studies and, floodplain risk management studies and plans - The site access and egress routes - the potential effects of climate change, - any relevant provisions of the NSW Flood Risk Management Manual, and any other relevant guidelines	Appendix 1 Section 4.4 N/A (No Mainstream Flooding; Local Minor Overland Flow Only) Section 4.4 N/A (No Mainstream Flooding; Local Minor Overland Flow Only)
	Where the development is occurring on flood prone land a flood impact and risk assessment (FIRA) must be prepared having regard to the Flood Impact and Risk Assessment – Flood Risk Management Guide LU01. When determining the scope and category of the FIRA the requirements outlined in the FIRA guide must be considered	N/A (No Mainstream Flooding; Local Minor Overland Flow Only)
	Detail any flood risk management measures that are to be incorporated as part of the development having regard to relevant guidelines (including any design solutions, flood modification measures, property modification measures, operational procedures or Flood Emergency Response Plan).	N/A (No Mainstream Flooding; Local Minor Overland Flow Only)

1.2 Project Description

This Flood Risk Management Plan (FRMP) has been prepared by S&G Consultants Pty Ltd to accompany a detailed State Significant Development Application (SSDA) for the in-fill affordable housing development at 15A-15B Moseley Street and 25-31 Donald Street, Carlingford. The site made up of six lots. The legal description of the site is outlined in Table 1-2.

Table 1-2 Legal Description

Property Address	Legal Description
15A Moseley Street, Carlingford	Lot 35 DP 536982
15B Moseley Street, Carlingford	Lot 34 DP 536982
25 Donald Street, Carlingford	Lot 5 DP 35555
27 Donald Street, Carlingford	Lot 33 DP 536982
29 Donald Street, Carlingford	Lot 32 DP 536982
31 Donald Street, Carlingford	Lot 2 DP 35555

This report has been prepared to address the Secretary's Environmental Assessment Requirements (SEARs) issued for the project (SSD-83870463).

This report concludes that the proposed in-fill affordable housing development is suitable and warrants approval.

2 Introduction

2.1 The Proposal

S&G Consultants Pty Ltd (SGC) have been engaged by Captag Investments Pty Ltd (The Client) to prepare the flood risk management plan and report in support of the proposed residential development at 15a and 15b Moseley Street & 25-31 Donald Street, Carlingford.

The application seeks development consent for the development of an in-fill affordable housing development at 15A-15B Moseley Street and 25-31 Donald Street, Carlingford. Specifically, the SSDA seeks development consent for:

Table 2-1 Project Details

Item	Details
Project Name	Moseley Street & Donald Street
Landowner(s)	Captag Investments Pty Ltd
Applicant / Principal	Captag Investments Pty Ltd
Client Representative	Fatemah Taghvaei
Site Address	15a & 15b Moseley Street & 25-31 Donald Street, Carlingford
Site Area	5,948 sqm
SSD Number	SSD-83870463
Proposal Description	**SSD-83870463 (Issue date 12/05/2025)** • Demolition of all existing buildings and structures • Staged construction of two residential flat buildings and a child care centre, with a maximum building height of up to 31.7 metres, including: • Stage 1 – Buildings A1 and A2 including a total of 60 apartments. • Stage 2 – Building B including a 76-place childcare centre and 76 apartments.
QTY Apartments	A total of approx. 136 residential apartments, including: • 106 market apartments

Item	Details
Affordable Housing	30 affordable housing apartments to be managed by a CHP for 15 years (equivalent to at least 15% affordable housing based on the total proportion of all floor space)
GFA	• A total gross floor area (**GFA**) of approximately 14,044 m^2 (equating to an FSR of approx. 2.36:1), including: • A childcare centre comprising approx. 413 m^2 GFA • Total residential GFA of approx. 13,631 m^2
Parking	• Excavation for approx. 2-3 shared basement levels providing 181 car parking spaces, comprising: • 164 residential parking spaces • 22 visitor spaces (including one car wash space) • 14 accessible car parking spaces • Motorcycle and bicycle parking spaces Vehicular access from Donald Street for the residential apartments, and access from Moseley Street for the childcare centre (including 27 car parking spaces for the childcare centre)

2.2 The Site

The site is located in Carlingford within the Parramatta Local Government Area (LGA). It comprises a series of irregular lots with a total site area of 5,948 m². The site has a frontage of approx. 79 metres to Moseley Street and a frontage of approx. 45 metres to Donald Street. All existing buildings, structures and trees on site have been demolished or removed, with the exception of a display suite for sales and marketing.

The site is within approximately 300m walking distance of Carlingford Court Shopping Centre and 5.3 km northeast of the Parramatta CBD. The site is well serviced by public transport with regular bus services at Carlingford Court Shopping Centre, land Jenkins Road, approximately 350m west of the site. Stage 1 of the Parramatta Light Rail opened in December 2024 and provides public transport connections from Carlingford to Parramatta CBD via Camellia.

Development surrounding the site comprises a mix of land uses, varying between low and medium density to high density. The immediate area surrounding the site to the east, west and south is zoned R4 High Density Residential. Therefore, the surrounding area is undergoing significant change, particularly to the south of the site, with several residential

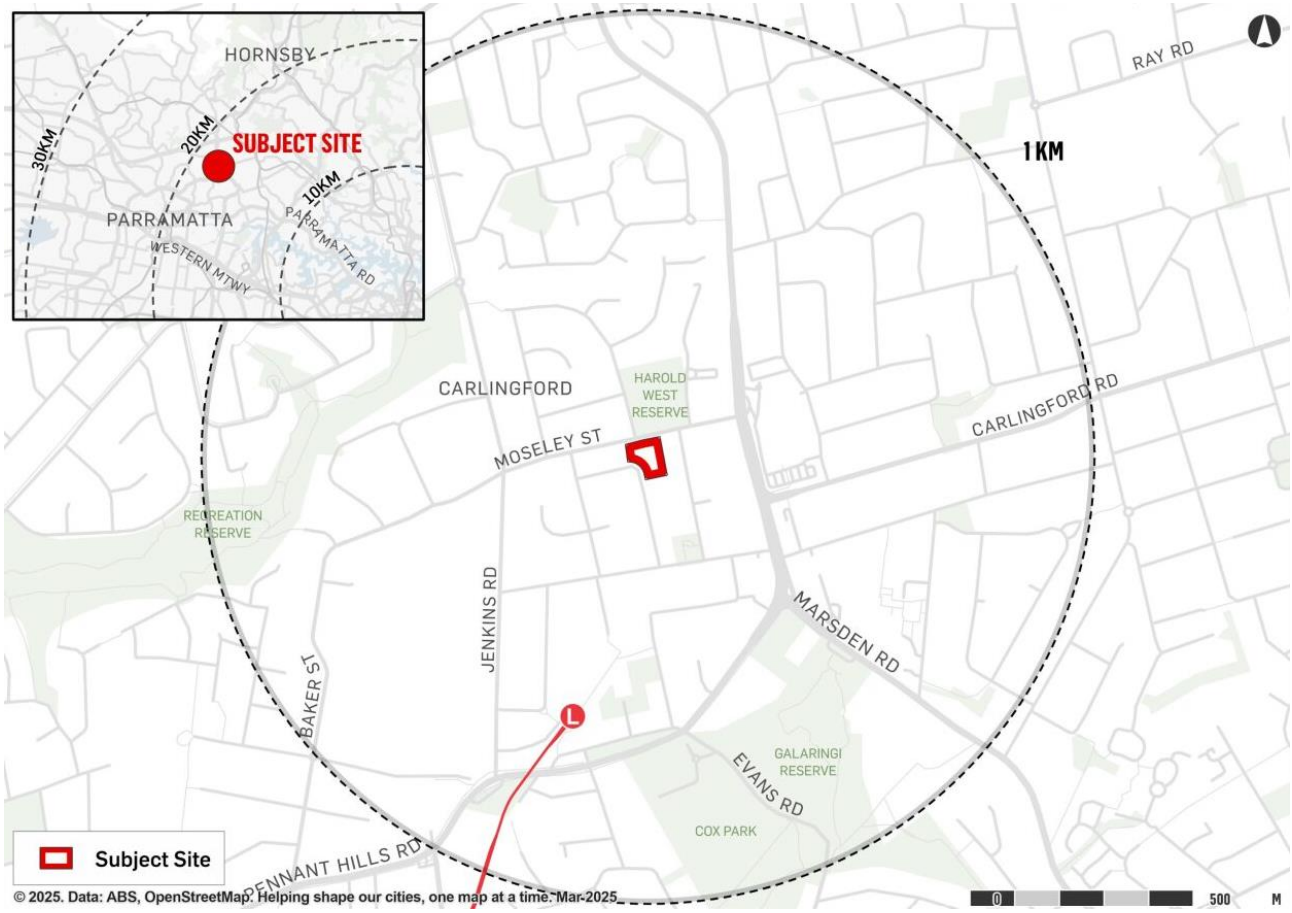
apartment buildings under construction on nearby streets (including Paul Place, Tanderra Avenue, Post Office Street, and Thallon Street).

The area to the north of the site is zoned R2 Low Density Residential and includes The Harold West Reserve and St Paul's Anglican Parish Centre which are surrounded by single residential dwellings.

Figure 2-1 Aerial View

Source: Nearmap 2025 (edited by Urbis)

Figure 2-2 Local Context



Source: Nearmap 2025 (edited by Urbis)

The development is proposed on a residential site on Moseley Street. Captag Investments Pty Ltd is proposing a residential development and Childcare Centre as per the architectural concept plans prepared by Capio. The site plan is illustrated in Figure 2-3 below.

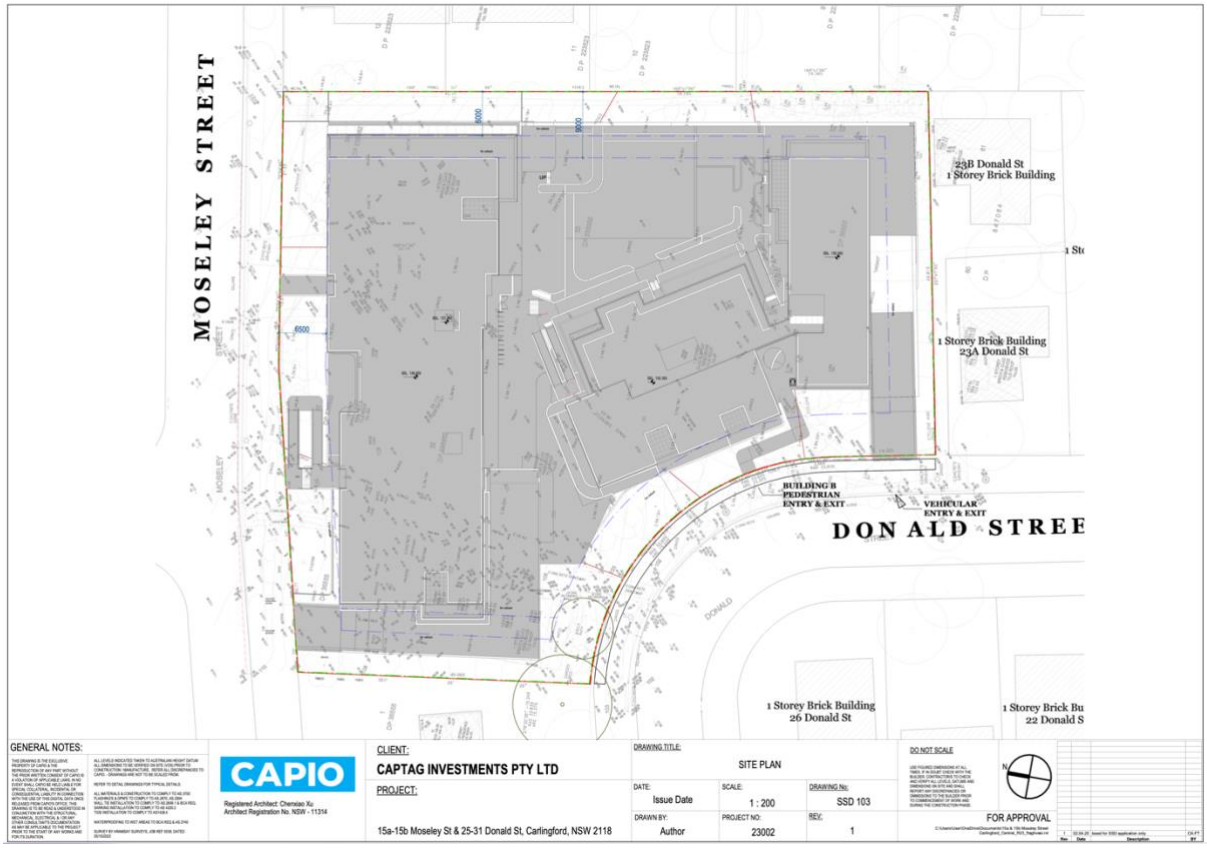


Figure 2-3 Site Plan

2.3 Methodology

This report determines if the site is affected by overland flows. It also provides details on the access routes in and out of the site.

The assessment is based on the flood assessment report prepared by Northrop which details the diversion and the upgrade of the existing stormwater infrastructure through the site.

The diversion and the upgrade of the stormwater infrastructure through the site include:

- New stormwater infrastructure line from Mosely Street;
- New stormwater infrastructure line from the eastern boundary;
- New stormwater infrastructure under Donald Street; and
- New easements and swales on top of the lines.

2.4 Limitations

This report is intended solely for Captag Investments Pty Ltd as the Client of SGC and no liability will be accepted for use of the information contained in this report by other parties than this client.

This report is limited to visual observations and to the information including the referenced documents made available at the time when this report was written.

2.5 Reference Documents

The following documents have been referenced in this report:-

1. Site survey prepared by H Ramsay & Co ref. 9338 dated 21/04/23;
2. Architectural plans prepared by Capio;
3. Flood Assessment Report prepared by Northrop ref. SY231114 rev C dated 03/04/2024;
4. Engineers Australia, *Australian Rainfall & Runoff* (AR&R 1999);
5. Parramatta City Council LEP 2023;
6. Parramatta City Council DCP 2023 Part 5; and
7. Industry Specific SEARs for application number SSD-83870463.

3 Glossary

Annual Exceedance Probability (AEP)

The chance of a flood of a given or a larger size occurring in any one year, usually expressed as a percentage.

Australian Height Datum (AHD)

A common national surface level datum approximately corresponding to mean sea level.

Average Recurrence Interval (ARI)

The long term average number of years between the occurrence of a flood as big as or larger than the selected event.

Catchment

The land area draining through the main stream, as well as tributary streams, to a particular site. It always relates to an area above a specific location.

Flood

Relatively high stream flow which overtops the natural or artificial banks in any part of a stream, river, estuary, lake or dam, and/or local overland flooding associated with major drainage before entering a watercourse.

Flood Planning Levels (FPLs)

Are the combinations of flood levels and freeboards selected for floodplain risk management purposes.

Freeboard

Is a factor of safety typically used in relation to the setting of floor levels.

Habitable Room

In industrial or commercial situation: an area used for offices or to store valuable possessions susceptible to damage in the event of a flood.

Probable Maximum Flood

PMF is the largest flood that could conceivably occur at a location, usually estimated from probable maximum precipitation.

Probable Maximum Precipitation

PMP is the greatest depth of precipitation for a given duration meteorologically possible over a given size storm area at a particular location at a particular time of the year.

Runoff

The amount of rainfall which actually ends up as stream flow.

4 Assessment & Results

4.1 Addressing Parramatta City Council's LEP Requirements

The stormwater requirements are set out in Part 6 Clause 5.21 of Parramatta City Council LEP 2023 as per below.

5.21 Flood planning

(1) The objectives of this clause are as follows—

(a) to minimise the flood risk to life and property associated with the use of land,

(b) to allow development on land that is compatible with the flood function and behaviour on the land, taking into account projected changes as a result of climate change,

(c) to avoid adverse or cumulative impacts on flood behaviour and the environment,

(d) to enable the safe occupation and efficient evacuation of people in the event of a flood.

(2) Development consent must not be granted to development on land the consent authority considers to be within the flood planning area unless the consent authority is satisfied the development—

(a) is compatible with the flood function and behaviour on the land, and

(b) will not adversely affect flood behaviour in a way that results in detrimental increases in the potential flood affectation of other development or properties, and

(c) will not adversely affect the safe occupation and efficient evacuation of people or exceed the capacity of existing evacuation routes for the surrounding area in the event of a flood, and

(d) incorporates appropriate measures to manage risk to life in the event of a flood, and

(e) will not adversely affect the environment or cause avoidable erosion, siltation, destruction of riparian vegetation or a reduction in the stability of river banks or watercourses.

(3) In deciding whether to grant development consent on land to which this clause applies, the consent authority must consider the following matters—

(a) the impact of the development on projected changes to flood behaviour as a result of climate change,

(b) the intended design and scale of buildings resulting from the development,

(c) whether the development incorporates measures to minimise the risk to life and ensure the safe evacuation of people in the event of a flood,

(d) the potential to modify, relocate or remove buildings resulting from development if the surrounding area is impacted by flooding or coastal erosion.

(4) A word or expression used in this clause has the same meaning as it has in the Considering Flooding in Land Use Planning Guideline unless it is otherwise defined in this clause.

(5) In this clause—

Considering Flooding in Land Use Planning Guideline means the *Considering Flooding in Land Use Planning Guideline* published on the Department's website on 14 July 2021.

flood planning area has the same meaning as it has in the Flood Risk Management Manual.

Flood Risk Management Manual means the *Flood Risk Management Manual,* ISBN 978-1-923076-17-4, published by the NSW Government in June 2023.

The responses to these requirements are noted below.

The flood risk is not applicable for this site because it is not impacted by flooding.

The proposal is compatible with the flood function.

There will not be any adverse impacts caused by the proposal on adjoining properties because the proposal does not displace any overland flows anywhere else.

The proposal can be safely occupied and evacuated in the event of a flooding event via Moseley Street.

The proposal does not have a detrimental impact on the environment as it is a residential development that is within an urban setting. There will not be erosion, siltation or destruction or any riparian corridors, river banks or watercourses.

4.2 Addressing Parramatta City Council's DCP Requirements

The Council's requirements are provided in Part 5 of DCP 2023 "Water Management". This report responds to Section 5.1.1 of the DCP.

For the purposes of the flood controls, the proposal's land use is "residential". The site is located within a "Low Flood Risk" category. The applicable controls and the responses are summarised in the table below.

Table 4-1 Flood Controls

Control	Objective	Requirement
Flood Planning Level	Minimise risk to life	1% AEP flood level + 500mm
Building Components	N/A	N/A
Structural Soundness	N/A	N/A
Flood Affectation	Ensure the development does not change flood behaviour and does not adversely impact on flooding elsewhere	The impact of the development on flooding elsewhere is to be considered having regard to: (i) loss of flood storage; (ii) changes in flood levels, flows and velocities caused by alterations to flood flows; and (iii) the cumulative impact of multiple potential developments in the vicinity
Car Parking & Driveway Access	Protect the basement car parking from flooding	Garages, and other enclosed car parking areas, capable of accommodating more than 3 motor vehicles, must be protected from inundation by floods equal to or greater than the 1% AEP (100 year ARI) flood. Ramp levels to be no lower than 0.5m above the 100 year ARI flood level. Where below ground car parking is proposed additional measures must achieve protection up to the PMF
Evacuation	Safe occupation and evacuation from the site	Reliable access for pedestrians required from the site to an area

Control	Objective	Requirement
		of refuge (including shelter in place) above the PMF level, on site (e.g. second storey) or off site Applicant is to demonstrate the development is consistent with any relevant flood emergency response plan, flood risk management plan or similar plan
Management & Design	N/A	N/A

4.3 Overland Flow

The site is not affected by overland flow from the local upstream catchment. No modelling was undertaken at this conceptual stage of the proposal as the site is not marked as flood control site on the council's reply for the flood application.

4.4 Flood Planning Level

There are no flood planning levels (FPLs) applicable to the proposal.

4.5 Flood Affectation

As the site is not considered flood control or prone, the proposal does not change any flooding behaviour and as such will not have any affectation.

4.6 Flood Risk Management & Evacuation

The flood risk on the site is LOW and is manageable as the buildings are protected. The access to and from the site is available for all the range of storm events up to the PMF via the vehicular and pedestrian accesses off Moseley Street shown on level 2 plan by the architect.

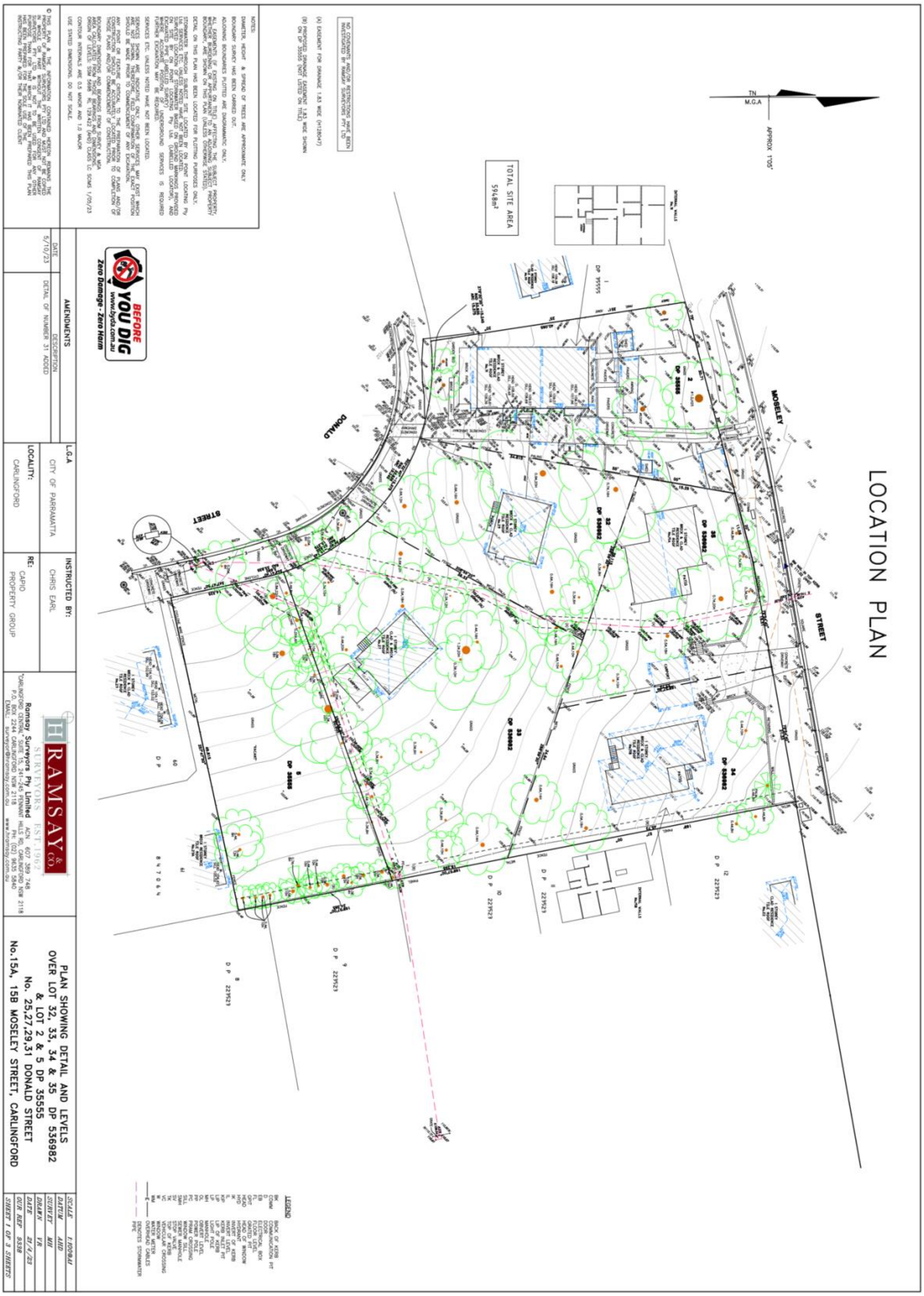
5 Design Statement

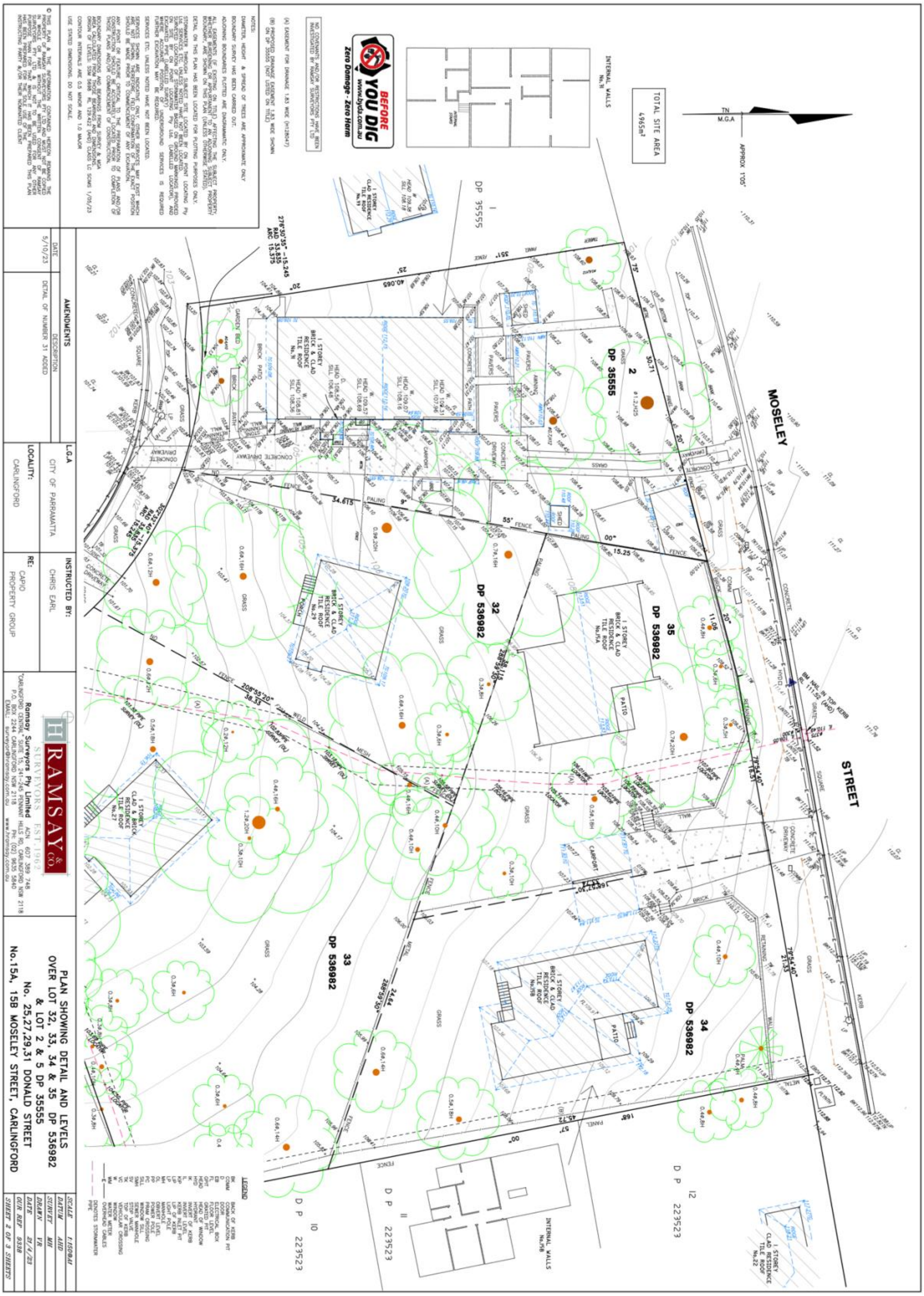
I, Sam Haddad of S&G Consultants P/L, confirm that this report addresses the requirement of SEAR No. 19 “Flood Risk” and relevant State and local legislation, policies and guidelines including DCP of Parramatta City Council. I further confirm that none of the information contained in the SSDA is false or misleading.

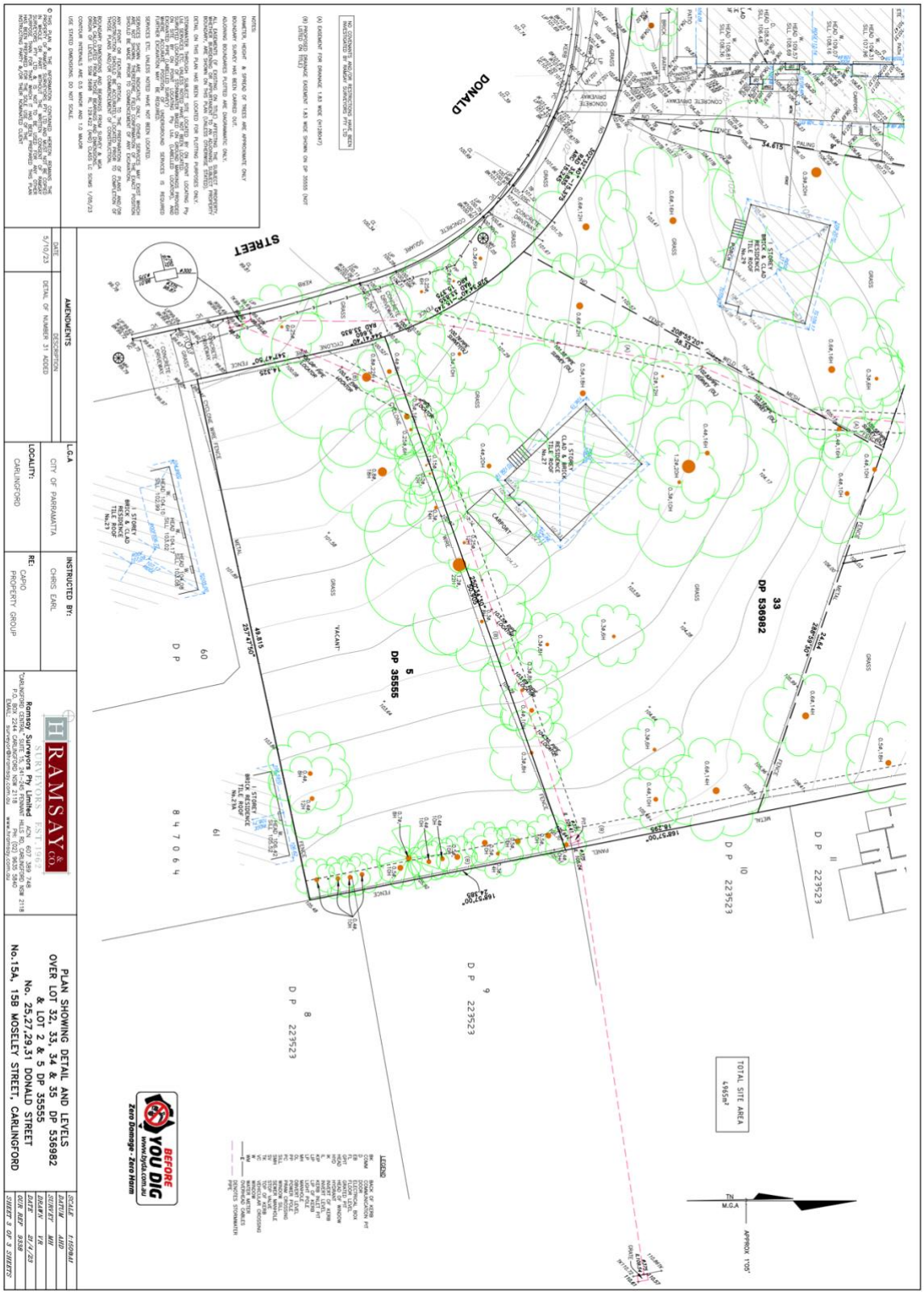
A1 Appendix 1

Survey Plan

P: 02 8883 4239 W: www.sgce.com.au


LOCATION PLAN
MOSELEY STREET
DONALD STREET
TOTAL SITE AREA 5948m²
L.G.A CITY OF PARRAMATTA
LOCALITY: CARLINGFORD
INSTRUCTED BY: CHRIS EARL
RE: CAPIO PROPERTY GROUP
RAMSAY & CO
Ramsay Surveyors Pty Limited
PLAN SHOWING DETAIL AND LEVELS
OVER LOT 32, 33, 34 & 35 DP 536982
& LOT 2 & 5 DP 35555
No. 25,27,29,31 DONALD STREET
No.15A, 15B MOSELEY STREET, CARLINGFORD
AMENDMENTS
5/10/23 DETAIL OF NUMBER 31 ADDED
BEFORE YOU DIG www.byda.com.au Zero Damage - Zero Harm


MOSELEY
STREET
PLAN SHOWING DETAIL AND LEVELS
OVER LOT 32, 33, 34 & 35 DP 536982
& LOT 2 & 5 DP 35555
No. 25,27,29,31 DONALD STREET
No.15A, 15B MOSELEY STREET, CARLINGFORD
Ramsay Surveyors Pty Limited
RAMSAY & CO.
BEFORE YOU DIG
DP 35555
DP 536982
TOTAL SITE AREA
LGA
CITY OF PARRAMATTA
LOCALITY:
CARLINGFORD
INSTRUCTED BY:
CHRIS EARL
RE:
CAPIO PROPERTY GROUP
AMENDMENTS


PLAN SHOWING DETAIL AND LEVELS
OVER LOT 32, 33, 34 & 35 DP 536982
& LOT 2 & 5 DP 35555
No. 25,27,29,31 DONALD STREET
No.15A, 15B MOSELEY STREET, CARLINGFORD
RAMSAY SURVEYS
Ramsay Surveys Pty Limited
DONALD
STREET
MOSELEY
DP 536982
DP 35555
DP 223523
TOTAL SITE AREA
4495m²
BEFORE YOU DIG
Zero Damage - Zero Harm

A2 Appendix 2

Architectural Plans

P: 02 8883 4239 W: www.sgce.com.au


LOWER BASEMENT PLAN
CAPTAG INVESTMENTS PTY LTD
15a-15b Moseley St & 25-31 Donald St, Carlingford, NSW 2118
CAPIO
FOR APPROVAL
DONALD STREET
MOSELEY STREET
3m width Easement Diversion
2.4m width Easement Diversion
RESIDENTIAL PARKING
77 RESIDENTIALS
22 VISITORS (INC.1CARWASH)


2.4m width Easement Diversion
2.1m width Easement Diversion
3m width Easement Diversion
DONALD STREET
MOSELEY STREET
RESIDENTIAL PARKING
43 RESIDENTIALS
3m SETBACK
GENERAL NOTES:
CAPIO
Registered Architect: Chenxiao Xu
Architect Registration No. NSW - 11314
CLIENT:
CAPTAG INVESTMENTS PTY LTD
PROJECT:
15a-15b Moseley St & 25-31 Donald St, Carlingford, NSW 2118
DRAWING TITLE:
UPPER BASEMENT PLAN
DATE:
Issue Date
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SSD 201
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Author
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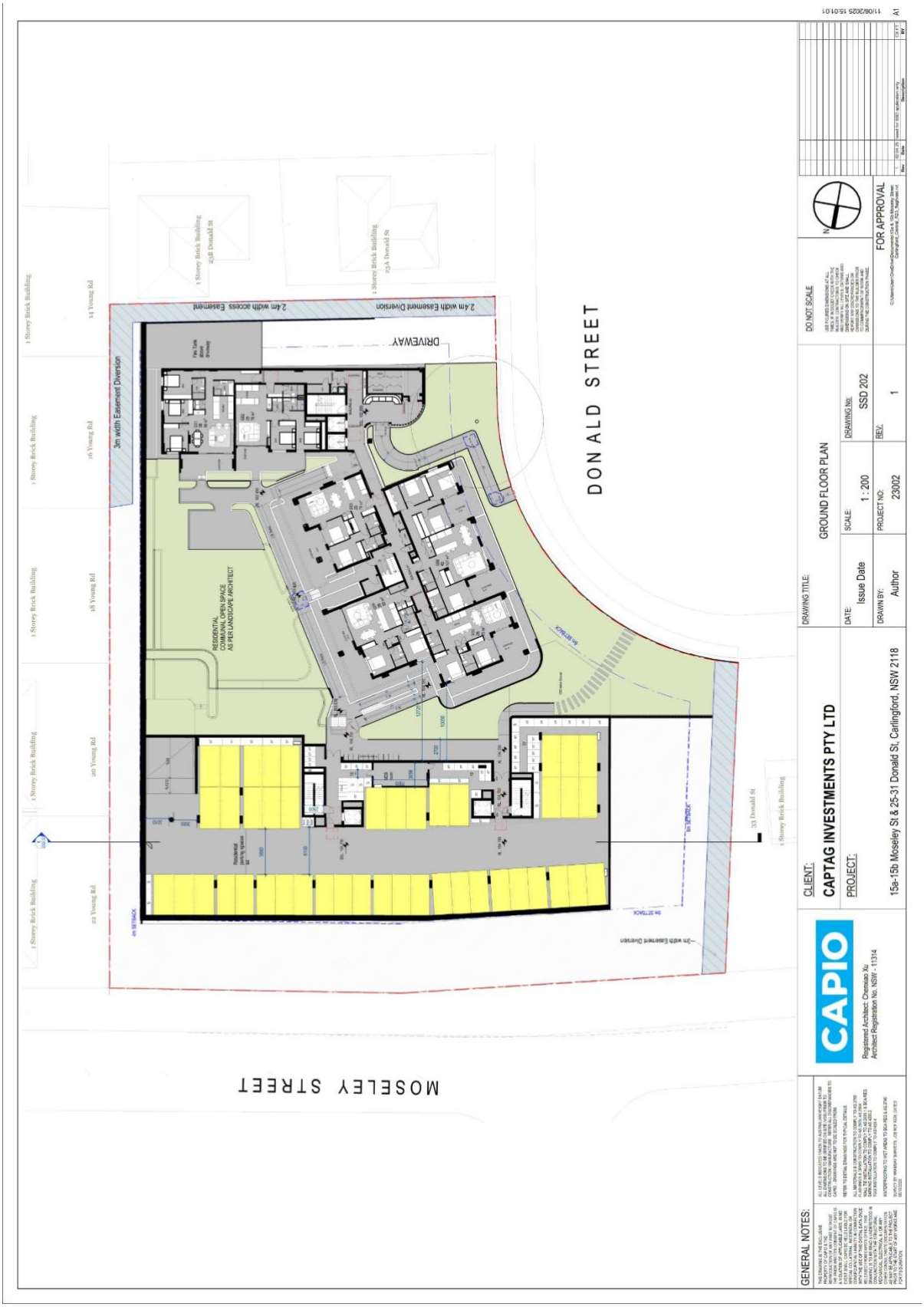
DONALD STREET
MOSELEY STREET
DRIVEWAY
2.4m width Easement Diversion
3m width Easement Diversion
RESIDENTIAL COMMUNAL OPEN SPACE AS PER LANDSCAPE ARCHITECT
GENERAL NOTES:
CAPIO
CLIENT:
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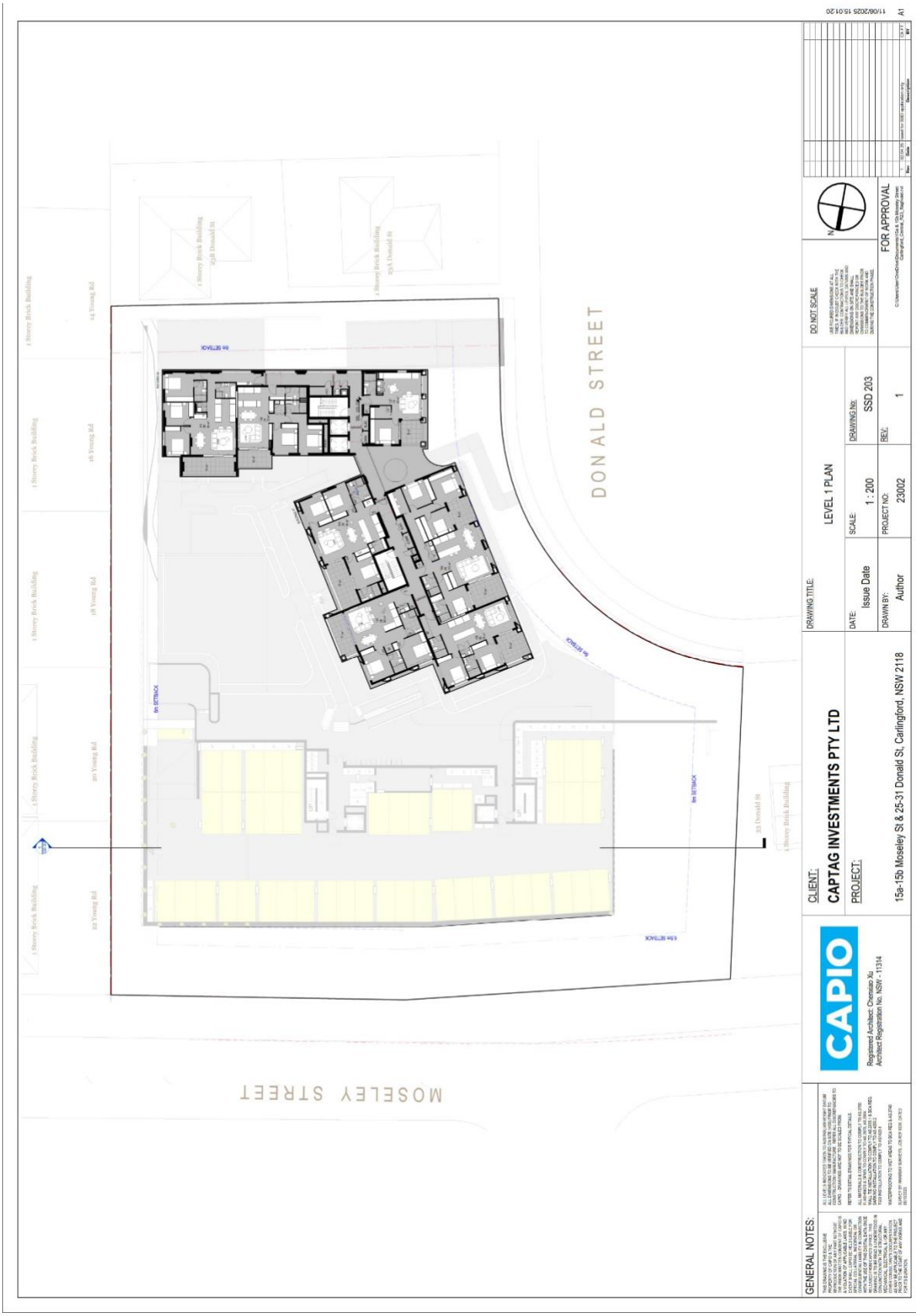
DONALD STREET
MOSELEY STREET
CAPTAG INVESTMENTS PTY LTD
15a-15b Moseley St & 25-31 Donald St, Carlingford, NSW 2118
LEVEL 1 PLAN
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23002
Issue Date
Author
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FOR APPROVAL
CAPIO
GENERAL NOTES:


DONALD STREET
MOSELEY STREET
LEVEL 2 PLAN
CAPTAG INVESTMENTS PTY LTD
15a-15b Moseley St & 25-31 Donald St, Carlingford, NSW 2118
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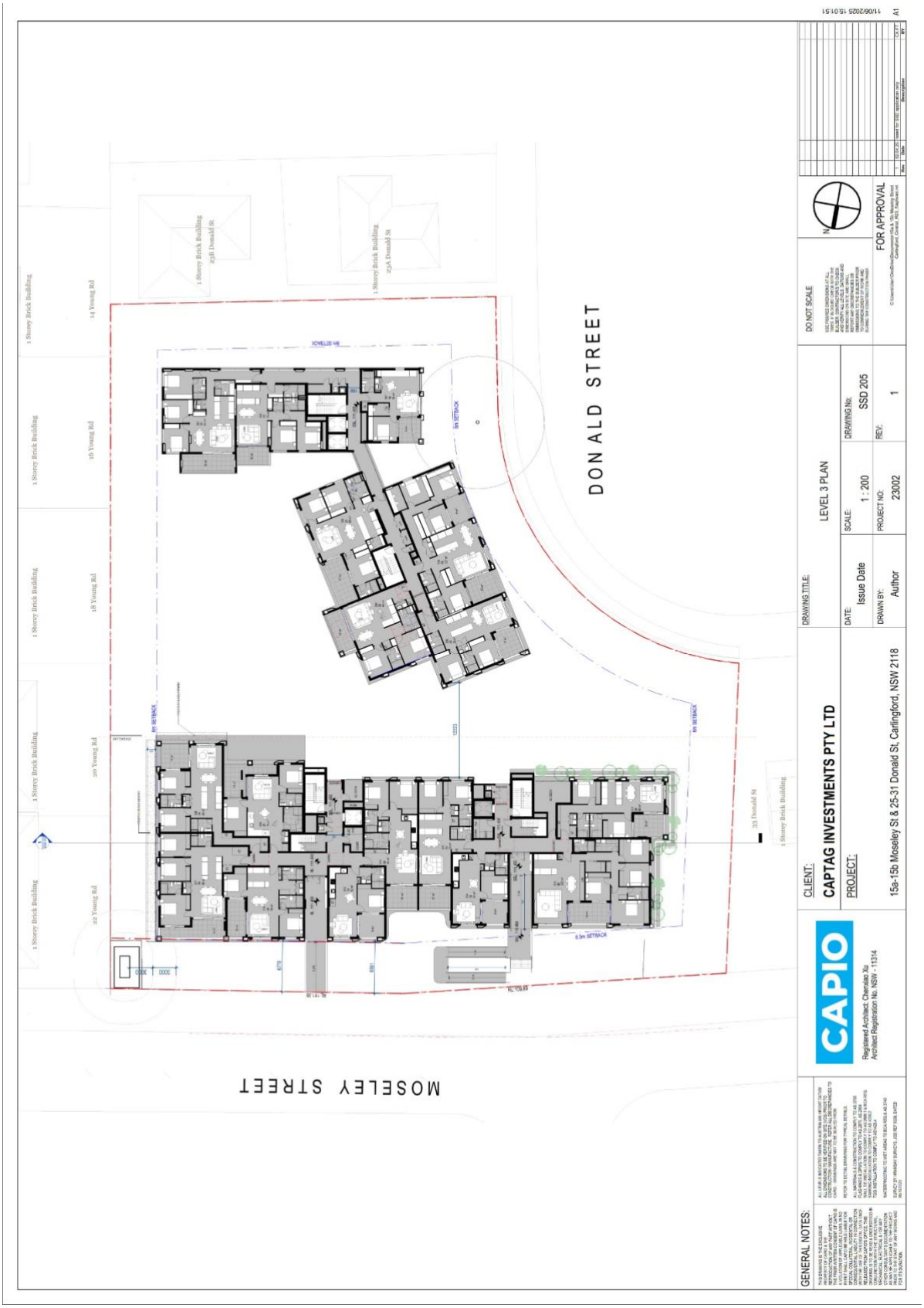
DONALD STREET
MOSELEY STREET
1 Storey Brick Building
14 Young Rd
16 Young Rd
18 Young Rd
20 Young Rd
22 Young Rd
33 Donald St
6m SETBACK
6.5m SETBACK
GENERAL NOTES:
CLIENT:
CAPTAG INVESTMENTS PTY LTD
PROJECT:
15a-15b Moseley St & 25-31 Donald St, Carlingford, NSW 2118
CAPIO
Registered Architect: Chenxiao Xu
Architect Registration No: NSW - 11314
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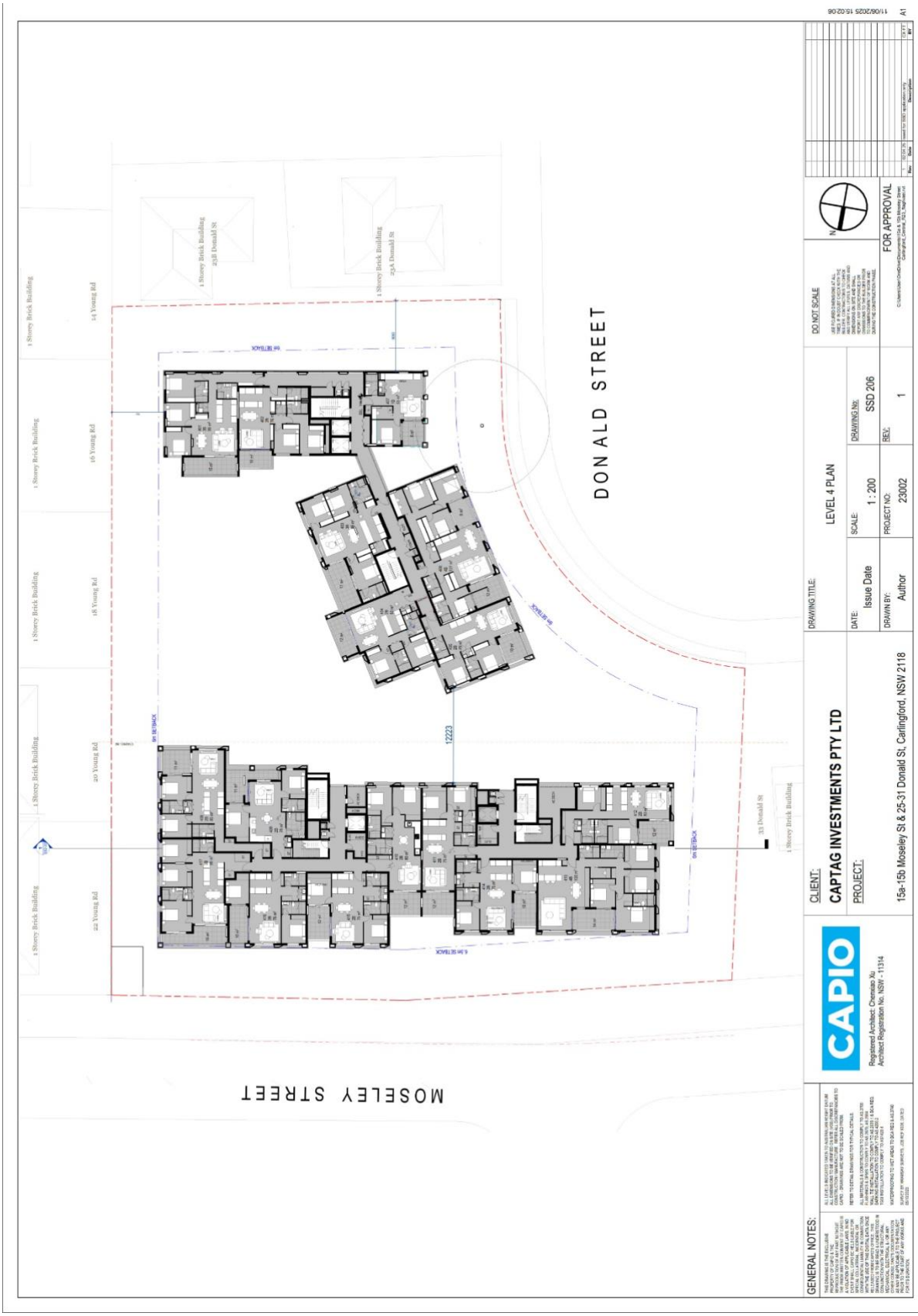
DONALD STREET
MOSELEY STREET
1 Storey Brick Building
29B Donald St
29A Donald St
14 Young Rd
16 Young Rd
18 Young Rd
20 Young Rd
22 Young Rd
33 Donald St
12223
6m SETBACK
GENERAL NOTES:
CAPIO
Registered Architect: Chenxiao Xu
Architect Registration No: NSW - 11314
CLIENT:
CAPTAG INVESTMENTS PTY LTD
PROJECT:
15a-15b Moseley St & 25-31 Donald St, Carlingford, NSW 2118
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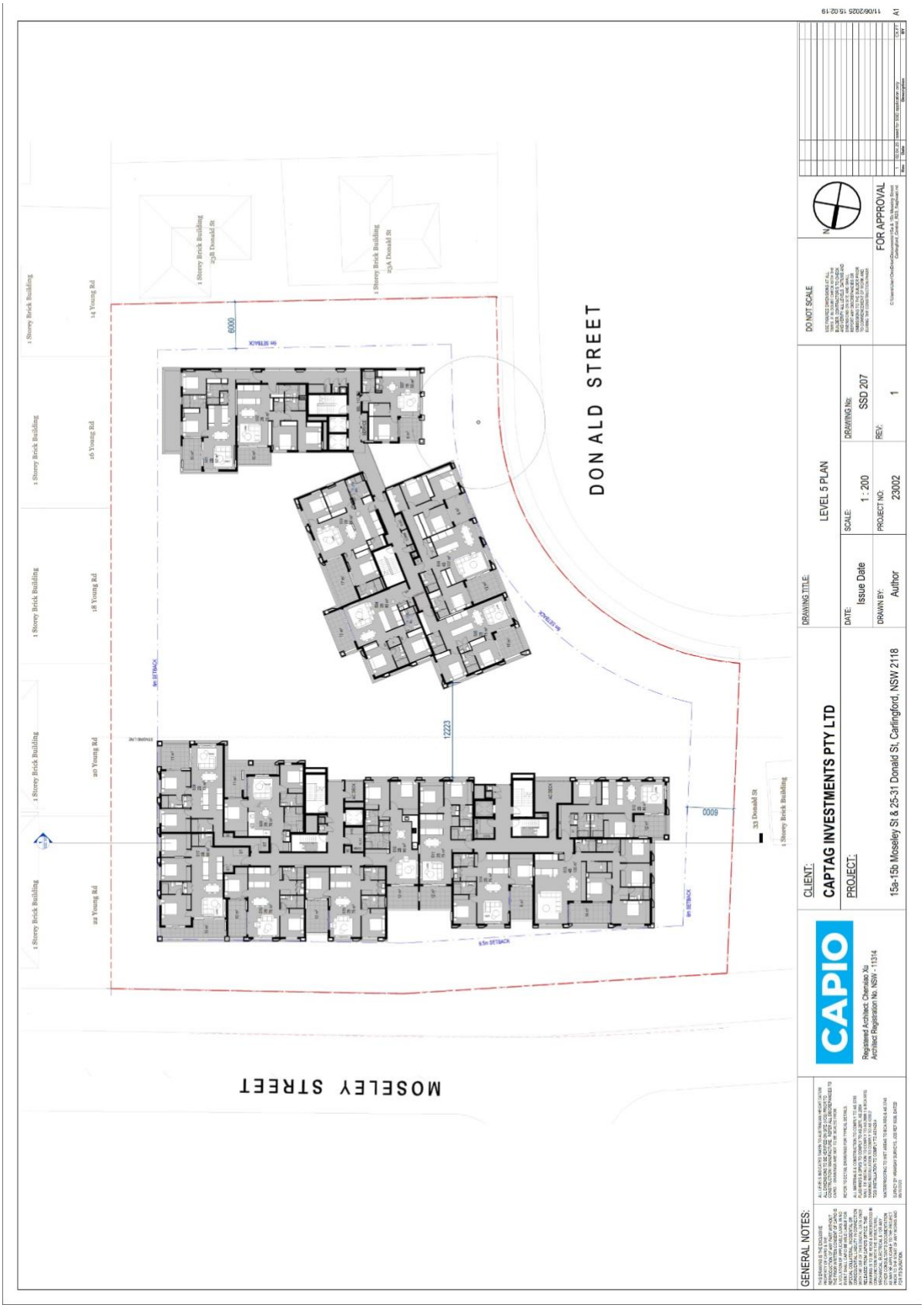
DONALD STREET
MOSELEY STREET
1 Storey Brick Building
29B Donald St
29A Donald St
14 Young Rd
16 Young Rd
18 Young Rd
20 Young Rd
22 Young Rd
33 Donald St
6000
12223
6009
9m SETBACK
6m SETBACK
8m SETBACK
6.5m SETBACK
GENERAL NOTES:
CAPIO
Registered Architect: Chenxiao Xu
Architect Registration No. NSW - 11314
CLIENT:
CAPTAG INVESTMENTS PTY LTD
PROJECT:
15a-15b Moseley St & 25-31 Donald St, Carlingford, NSW 2118
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LEVEL 5 PLAN
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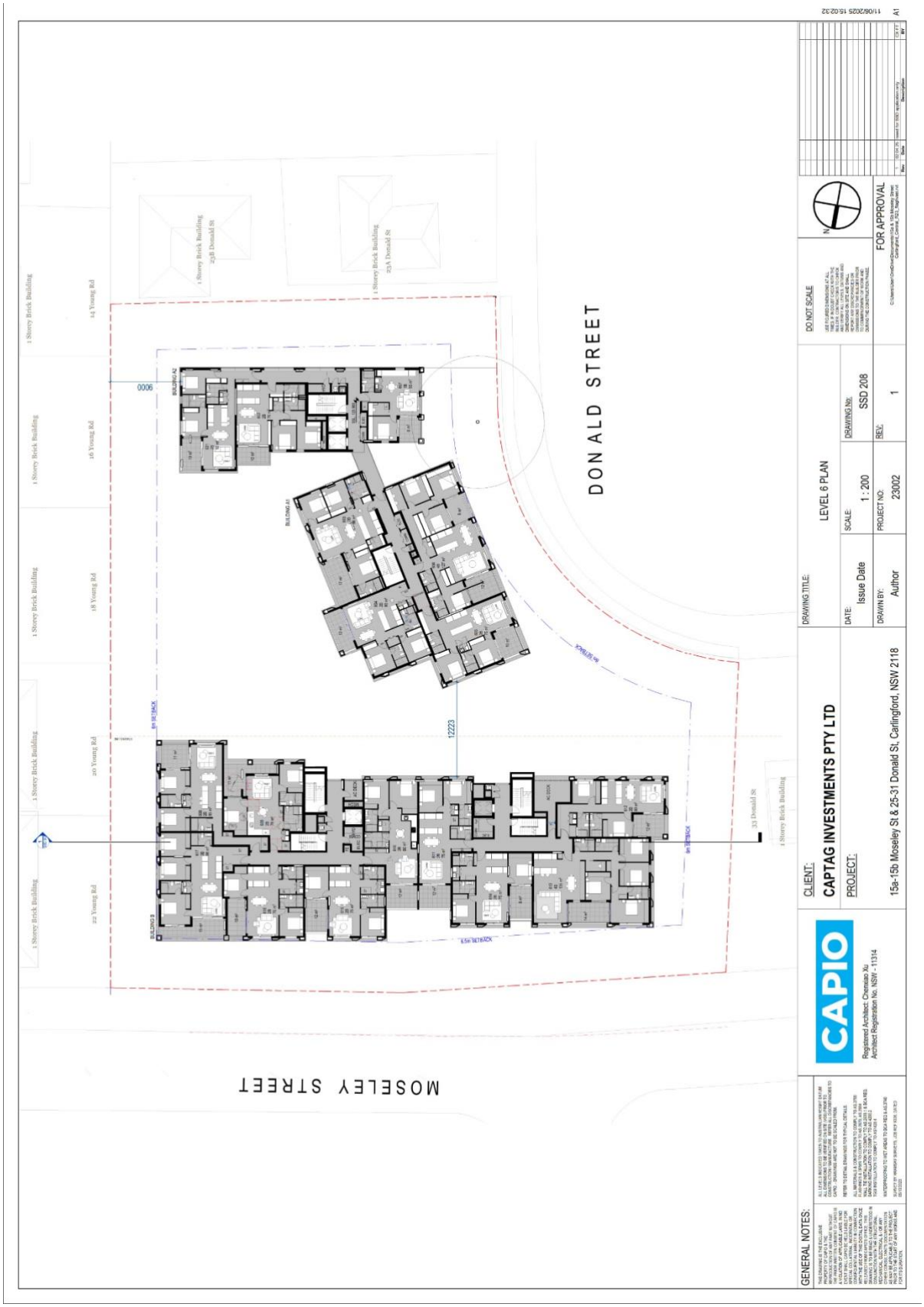
DONALD STREET
MOSELEY STREET
LEVEL 6 PLAN
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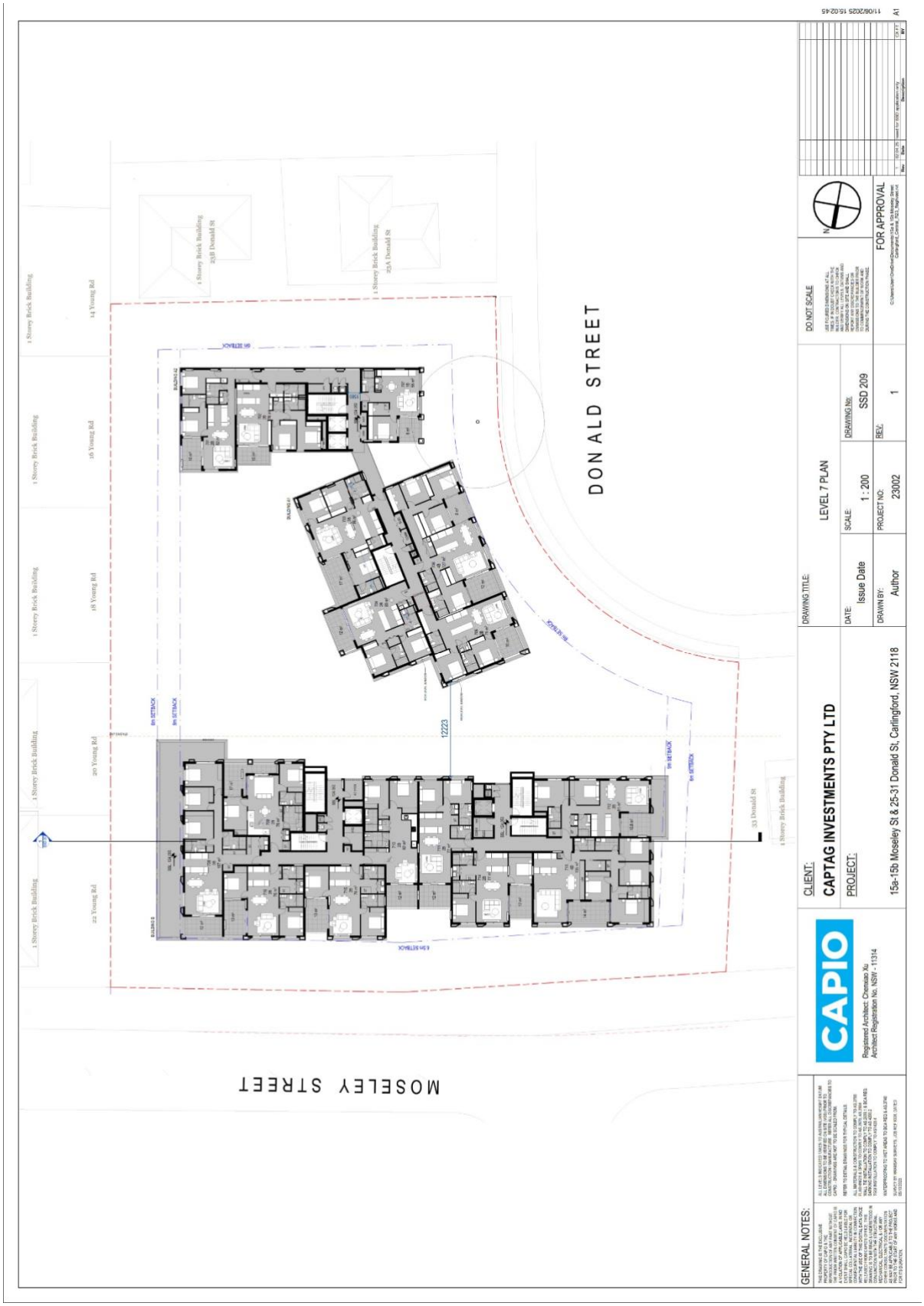
DONALD STREET
MOSELEY STREET
LEVEL 7 PLAN
CAPTAG INVESTMENTS PTY LTD
15a-15b Moseley St & 25-31 Donald St, Carlingford, NSW 2118
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FOR APPROVAL
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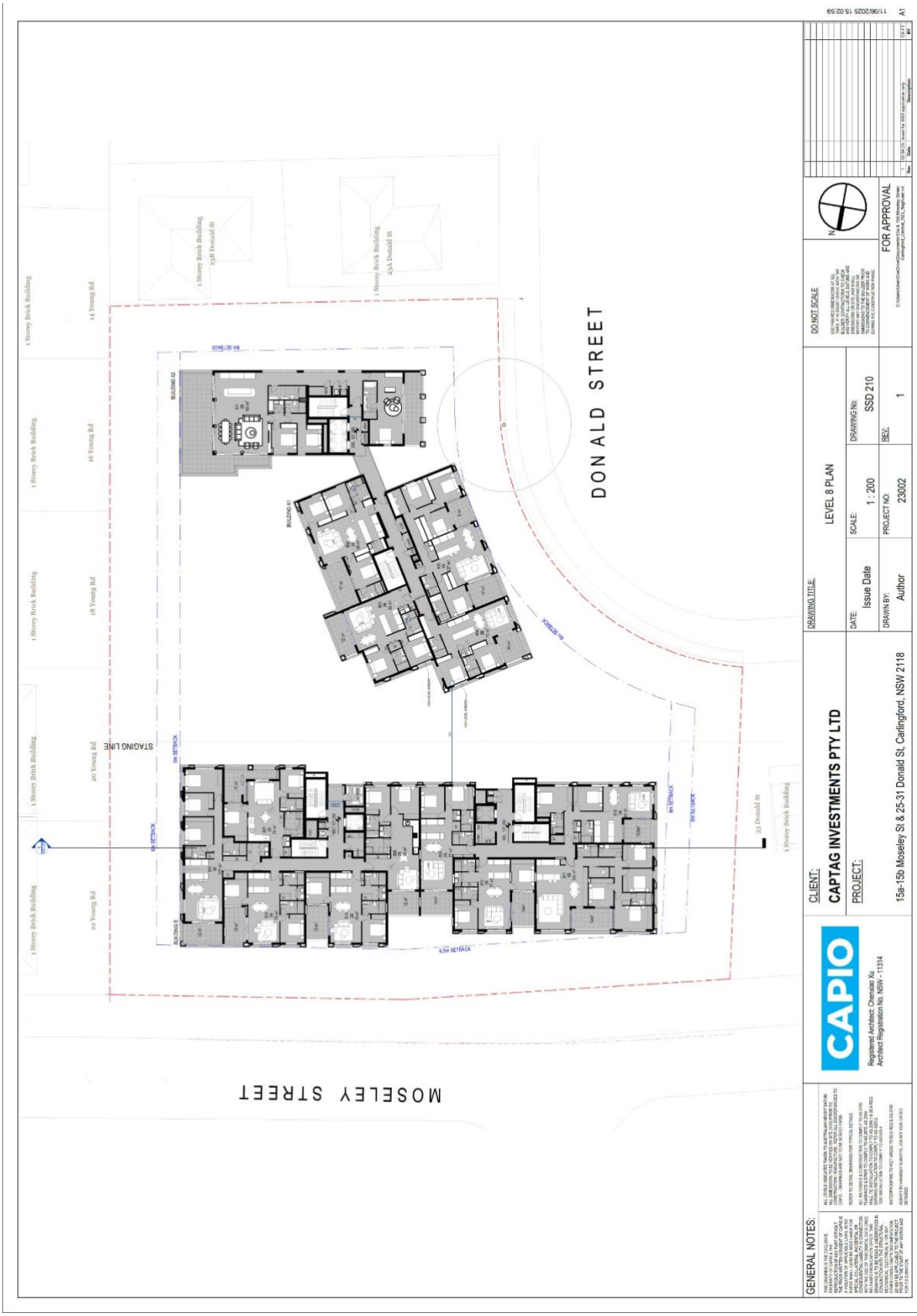
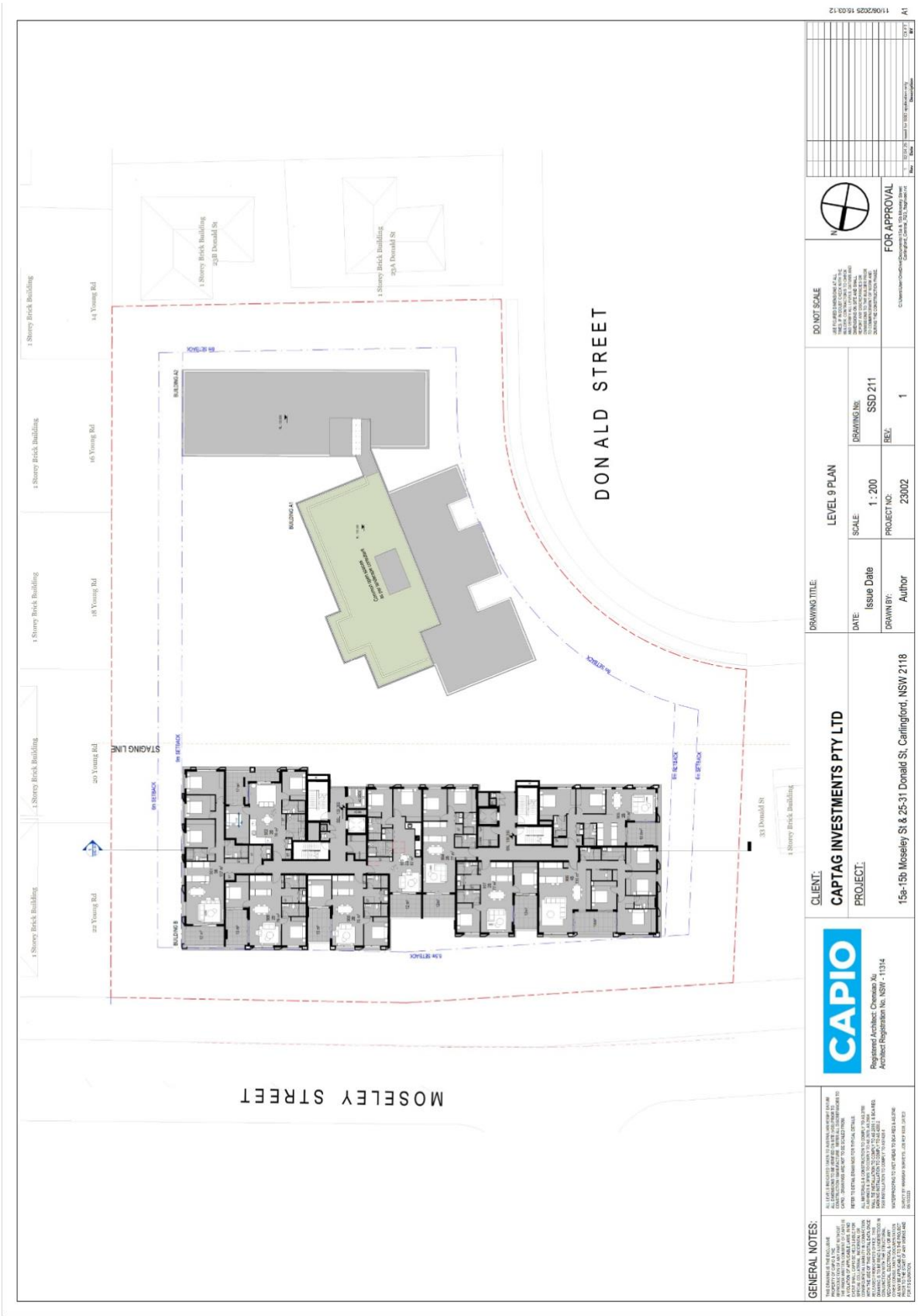

DONALD STREET
MOSELEY STREET
STAGING LINE
LEVEL 8 PLAN
CAPTAG INVESTMENTS PTY LTD
15a-15b Moseley St & 25-31 Donald St, Carlingford, NSW 2118
CAPIO
FOR APPROVAL
DO NOT SCALE
GENERAL NOTES:


DONALD STREET
MOSELEY STREET
STAGING LINE
1 Storey Brick Building
25B Donald St
25A Donald St
14 Young Rd
16 Young Rd
18 Young Rd
20 Young Rd
22 Young Rd
33 Donald St
BUILDING A1
BUILDING B
9m SETBACK
6m SETBACK
CLIENT:
CAPTAG INVESTMENTS PTY LTD
PROJECT:
15a-15b Moseley St & 25-31 Donald St, Carlingford, NSW 2118
DRAWING TITLE:
LEVEL 9 PLAN
DATE:
Issue Date
SCALE:
1 : 200
DRAWING No:
SSD 211
DRAWN BY:
Author
PROJECT NO:
23002
REV:
1
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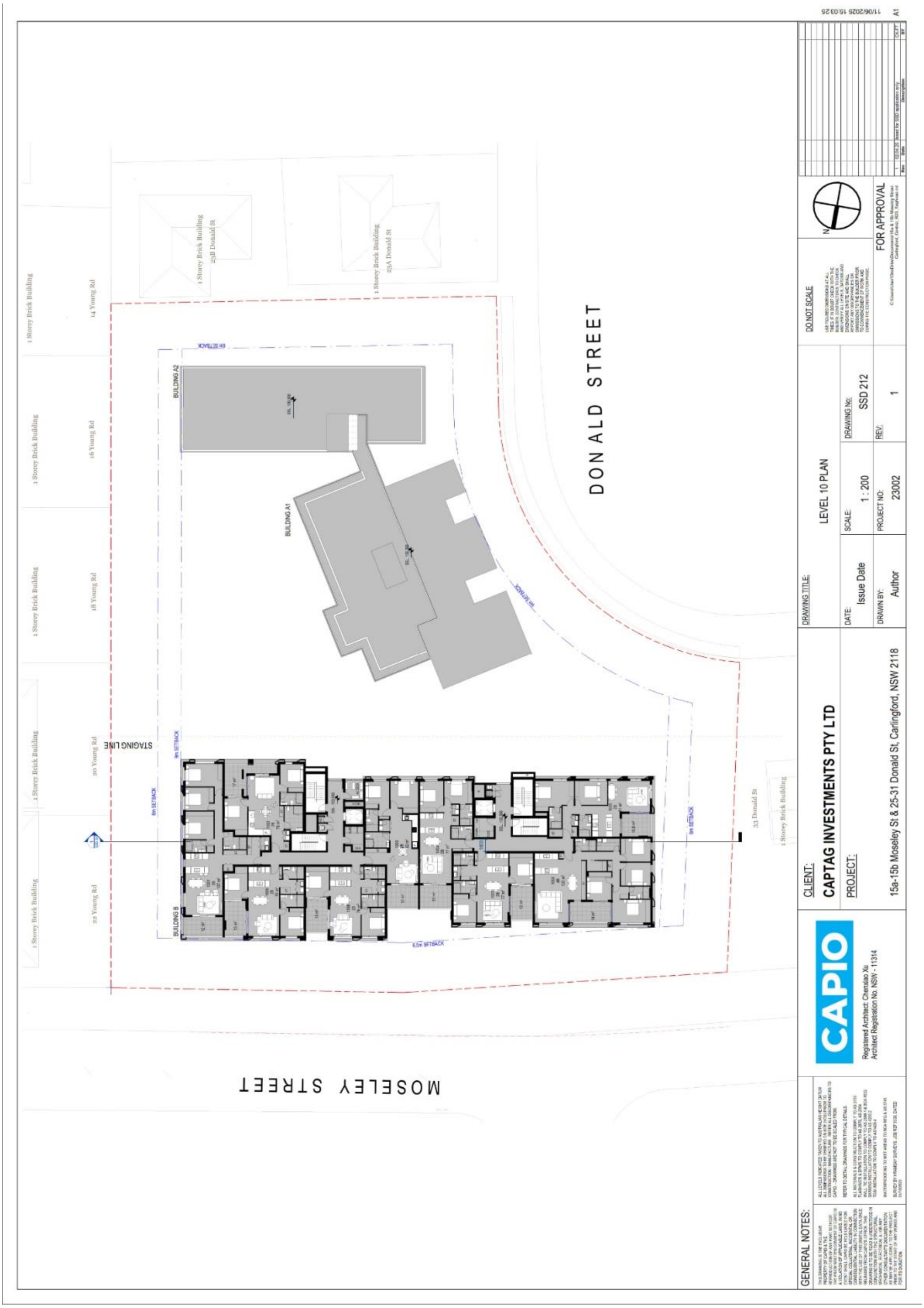
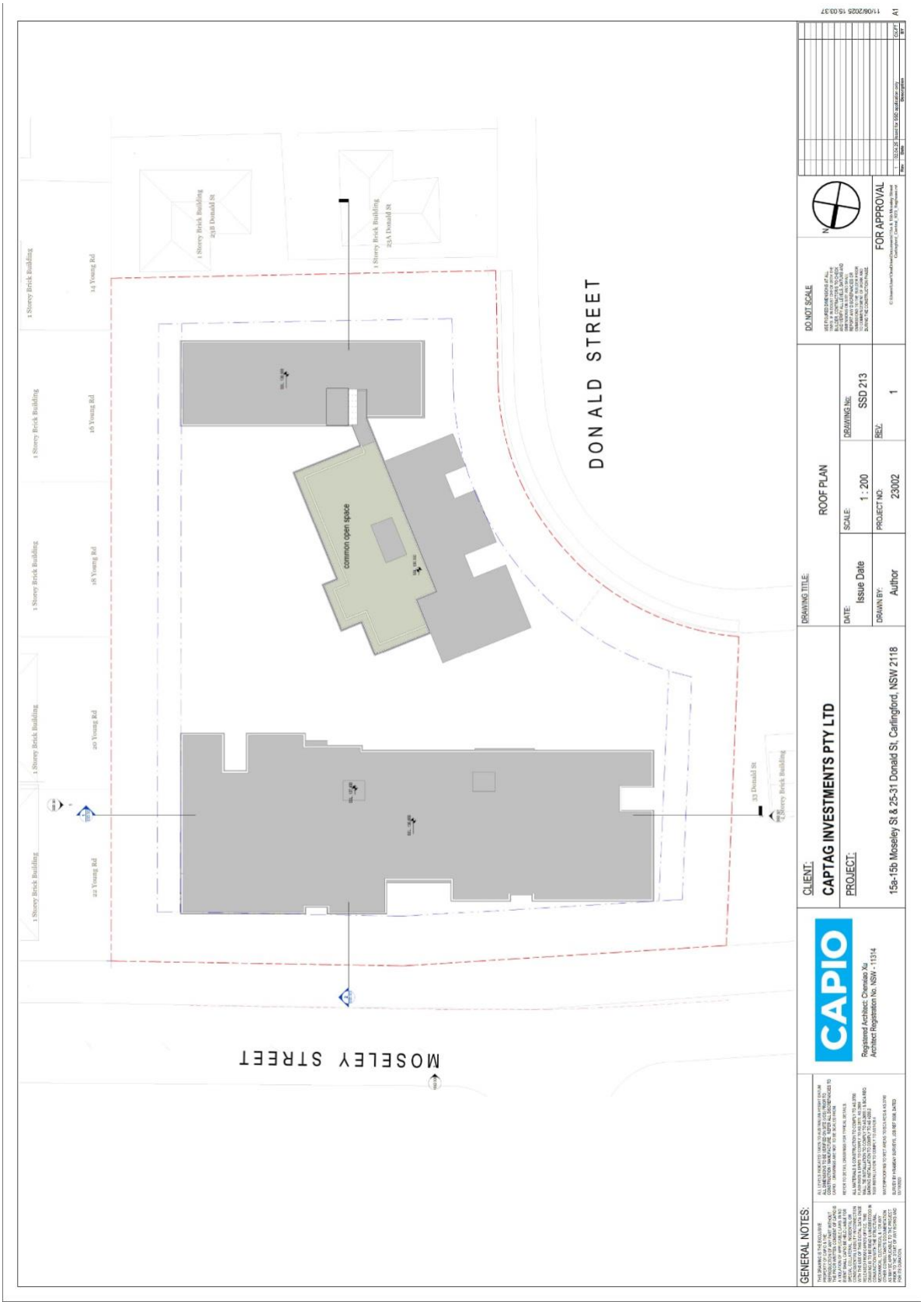
FOR APPROVAL
CAPIO
Registered Architect: Chenxiao Xu
Architect Registration No: NSW - 11314
GENERAL NOTES:



DONALD STREET
MOSELEY STREET
BUILDING A1
BUILDING A2
BUILDING B
STAGING LINE
GENERAL NOTES:
CAPIO
Registered Architect: Chenxiao Xu
Architect Registration No. NSW - 11314
CLIENT:
CAPTAG INVESTMENTS PTY LTD
PROJECT:
15a-15b Moseley St & 25-31 Donald St, Carlingford, NSW 2118
DRAWING TITLE:
LEVEL 10 PLAN
DATE:
Issue Date
SCALE:
1 : 200
DRAWING No:
SSD 212
DRAWN BY:
Author
PROJECT NO:
23002
REV:
1
DO NOT SCALE
FOR APPROVAL


DONALD STREET
MOSELEY STREET
common open space
1 Storey Brick Building
218 Donald St
253 Donald St
14 Young Rd
16 Young Rd
18 Young Rd
20 Young Rd
22 Young Rd
33 Donald St
GENERAL NOTES:
CAPIO
Registered Architect: Chenxiao Ye
Architect Registration No. NSW - 11514
CLIENT:
CAPTAG INVESTMENTS PTY LTD
PROJECT:
15a-15b Moseley St & 25-31 Donald St, Carlingford, NSW 2118
DRAWING TITLE:
ROOF PLAN
DATE:
Issue Date
DRAWN BY:
Author
SCALE:
1 : 200
PROJECT NO:
23002
DRAWING No:
SSD 213
REV:
1
DO NOT SCALE
FOR APPROVAL
11/08/2025 15:03:37
A1

A3 Appendix 3

Flood Application (Parramatta City Council)

P: 02 8883 4239 W: www.sgce.com.au

Our Reference: FL/116/2023
Contact: Peter Sirianni
Telephone: 02 9806 8250
Fax: 02 9806 5906

Captag Investments Pty Ltd
1002 189 Kent St
SYDNEY NSW 2000

16 June 2023

FLOOD ENQUIRY APPLICATION

Property Details

Address	25, 27, 29 Donald Street & 15A, 15B Moseley Street, CARLINGFORD NSW 2118.
	This form applies for up to three adjoining sites relating to the same development. A separate Flood Enquiry form and fee will be required for more than 3 or separate lots.

Delivery Preference

cearle@capioproperty.com.au

Reason for Enquiry

Property Type

***** GST not applicable from 1 July 2013*****

Flooding Application – Development Duplex	$325.00

Disclaimer: Flood levels and flood extent lines are based on current information held by Council. Council does not accept responsibility for the accuracy of this information. Any pipe sizes and location of pits and pipe lines should be confirmed by site investigation.
The flood levels shown on the back of this form are only an approximate guide and have been derived using the current computer simulated model.
The information provided in this document is presented in good faith to assist the public in understanding Council's drainage requirements that apply within the Parramatta Local Government Area. It is the responsibility of each individual using this information to undertake their own checks and confirm this information prior to its use.
City of Parramatta Council, its agents and employees are not liable (whether by reason of negligence, lack of care or otherwise) to any person for any damage or loss whatsoever which has occurred or may occur in relation to that person taking or not taking (as the case may be) action in respect of any representation, statement, or advice referred to above.

Refer to back of this form for level information issued

Flood Enquiry Information Issued - 16 June 2023

Flooding

Is this property affected by flooding? **25, 27, 29 Donald Street & 15A, 15B Moseley Street, CARLINGFORD**		Not affected up to 1% AEP flood. May be affected by larger floods.
Flood Levels	Closest Cross Sections: *(Please refer to Flood Study)*:	
5% AEP	m AHD	**Comments**:
1% AEP	m AHD	**See Note on Flood Maps**
PMF	m AHD	
☒ Refer to flood maps provided for detailed flood levels.		
Flood information is obtained from the following flood study report: **The Hills Shire Council Draft Urban Overland Flow Study, 2015 (Catchment Simulation Solutions)**		

Note: Flood inundation can be verified by detail survey to AHD undertaken by a Registered Surveyor.

Local Flooding

Is the property located within a Hatched Grey Area? *Properties located within a **Hatched Grey Area** are subjected to flooding from the local catchment.*	☐ Yes ☒ No
Is the property located within a Grey Area? *Properties located within a **Grey Area** are subjected to additional site drainage controls to manage flooding in the local catchment.*	☐ Yes ☒ No
Is the property likely to be affected by overland stormwater run-off from the local catchment?	☒ Subject to Detailed Investigation
***Note:** You are required to contact Council's Development Service Engineer for any details and requirements relating to development that is affected by local flooding.*	

Additional Recommended Actions

☒	The Applicant needs to discuss the proposal to re-develop this site with Council's Town Planner and Development Services Engineer.
☒	The Applicant needs to contact Council's Town Planner and organise a pre-lodgement meeting to discuss any proposal to redevelop this property.
☒	The Applicant needs to refer to Council's Local Floodplain Risk Management policy for details relating to developing a land affected by flooding.

Definitions: (As per NSW Floodplain Development Manual dated April 2005)

1. **AHD** – a common national surface level datum approximately corresponding to mean sea level.
2. **ARI** – the long term average number of years between the occurrences of a flood as big as or larger than, the selected event.
3. **PMF** – is the largest flood that could conceivably occur at a particular location, usually estimated from probable maximum precipitation.
4. **AEP** – Annual Exceedance Probability is the chance of a flood of a given or larger size occurring in any one year, usually expressed as a percentage.


NOTE:
1. 5% AEP Overland Flow area indicates flow depths > 0.17 metre. Refer to flow surface contours.
2. 5% AEP Overland Flow Fringe area indicates flow depths between 0.1 metre and 0.17 metre.
3. Council is in the process of updating flood/overland flow information. Levels may change.
4. Cadastral information east of Pennant Hills Road and north of Carlingford Road is INDICATIVE ONLY. It may not be current as at date of this map.
Legend
Ground Contour (metre AHD)
Stormwater Pit
Stormwater Pipe
5% AEP Overland Flow Surface Contour (m AHD)
5% AEP Overland Flow - See Note 1
5% AEP Overland Flow Fringe - See Note 2
City of Parramatta Council Flood Map - 5% AEP
1:4,000
N
Printed 16/06/2023
DISCLAIMER: Flood levels and flood extent lines are based on current information held by Council. Council does not accept responsibility for the accuracy of this Information. Any pipe sizes and location of pits and pipe lines should be confirmed by site investigation.
The flood levels provided are only an approximate guide and have been derived using the current computer simulated model.
The information provided on this document is presented in good faith. It is the responsibility of each individual using this information to undertake their own checks and confirm this information prior to its use.
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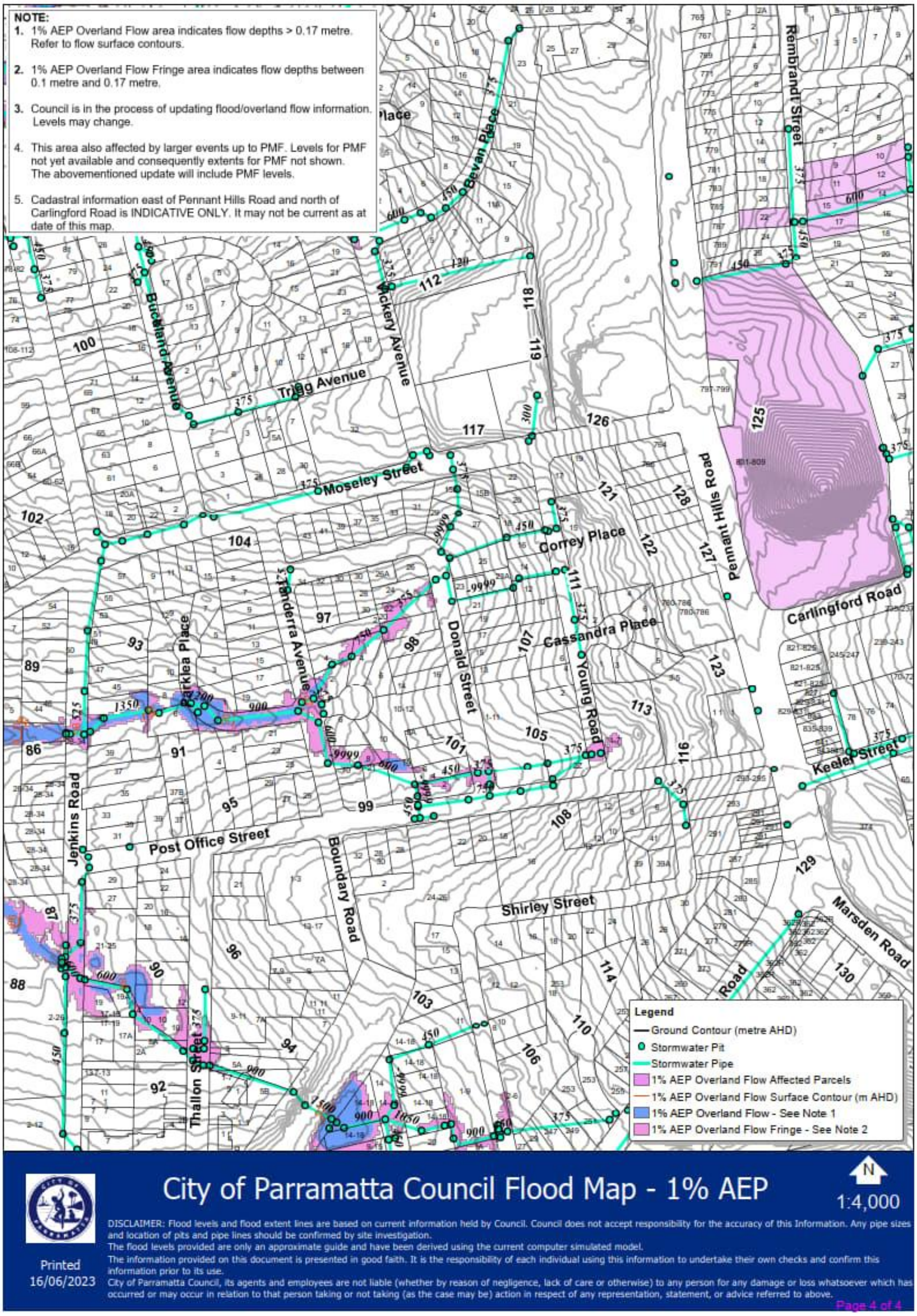
Page 3 of 4


NOTE:
1. 1% AEP Overland Flow area indicates flow depths > 0.17 metre. Refer to flow surface contours.
2. 1% AEP Overland Flow Fringe area indicates flow depths between 0.1 metre and 0.17 metre.
3. Council is in the process of updating flood/overland flow information. Levels may change.
4. This area also affected by larger events up to PMF. Levels for PMF not yet available and consequently extents for PMF not shown. The abovementioned update will include PMF levels.
5. Cadastral information east of Pennant Hills Road and north of Carlingford Road is INDICATIVE ONLY. It may not be current as at date of this map.
Rembrandt Street
Bevan Place
Buckland Avenue
Wickery Avenue
Trigg Avenue
Moseley Street
Correy Place
Pennant Hills Road
Carlingford Road
Cassandra Place
Young Road
Donald Street
Tanderra Avenue
Parklea Place
Jenkins Road
Post Office Street
Boundary Road
Shirley Street
Keeler Street
Marsden Road
Thallon Street
Legend
Ground Contour (metre AHD)
Stormwater Pit
Stormwater Pipe
1% AEP Overland Flow Affected Parcels
1% AEP Overland Flow Surface Contour (m AHD)
1% AEP Overland Flow - See Note 1
1% AEP Overland Flow Fringe - See Note 2
City of Parramatta Council Flood Map - 1% AEP
N
1:4,000
Printed 16/06/2023
DISCLAIMER: Flood levels and flood extent lines are based on current information held by Council. Council does not accept responsibility for the accuracy of this Information. Any pipe sizes and location of pits and pipe lines should be confirmed by site investigation.
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A4 Appendix 4

Flood Assessment Report (Northrop)

P: 02 8883 4239 W: www.sgce.com.au

Flood Assessment Report

for

15A,15B Moseley Street and 25-31 Donald Street, Carlingford

for Captag Investments Pty Ltd

SY231114 / 3 April 2024 / Revision C

Page 1

P: 02 8883 4239 W: www.sgce.com.au

NORTHROP
Level 1, 215 Pacific Highway
Charlestown NSW 2290
02 4943 1777
newcastle@northrop.com.au
ABN 81 094 433 100

Contents

Acronyms

AEP	Annual Exceedance Probability
AHD	Australian Height Datum
ALS	Airborne Laser Survey (LiDAR)
ARI	Average Recurrence Interval
ARR	Australian Rainfall and Runoff 2019
BoM	Bureau of Meteorology
DCP	Development Control Plan
DRAINS	One dimensional rainfall runoff and hydraulic modelling software
DTM	Digital Elevation Model
FPL	Flood Planning Level
LGA	Local Government Area
LiDAR	Light Detection and Ranging (also see ALS)
m	Measure of length / height / distance (metres)
m AHD	Meters above Australian High Datum
m/s	Measure of velocity (metres per second)
m^3/s	Measure of flow rate (cubic metres per second)
PMF	Probable Maximum Flood
PMP	Probable Maximum Precipitation

Introduction

Northrop Consulting Engineers have been engaged by Captag Investments Pty Ltd to prepare a Flood Assessment Report for the proposed development at 15A, 15B Moseley Street and 25-31 Donald Street, Carlingford, herein referred to as the subject site or the site. The subject site locality is presented in **Figure 1** overleaf.

This flood impact assessment aims to review the impact the proposed development has on existing flood behaviour within the subject site and adjacent properties.

This assessment has been prepared with the consideration of the following guidelines and documents:

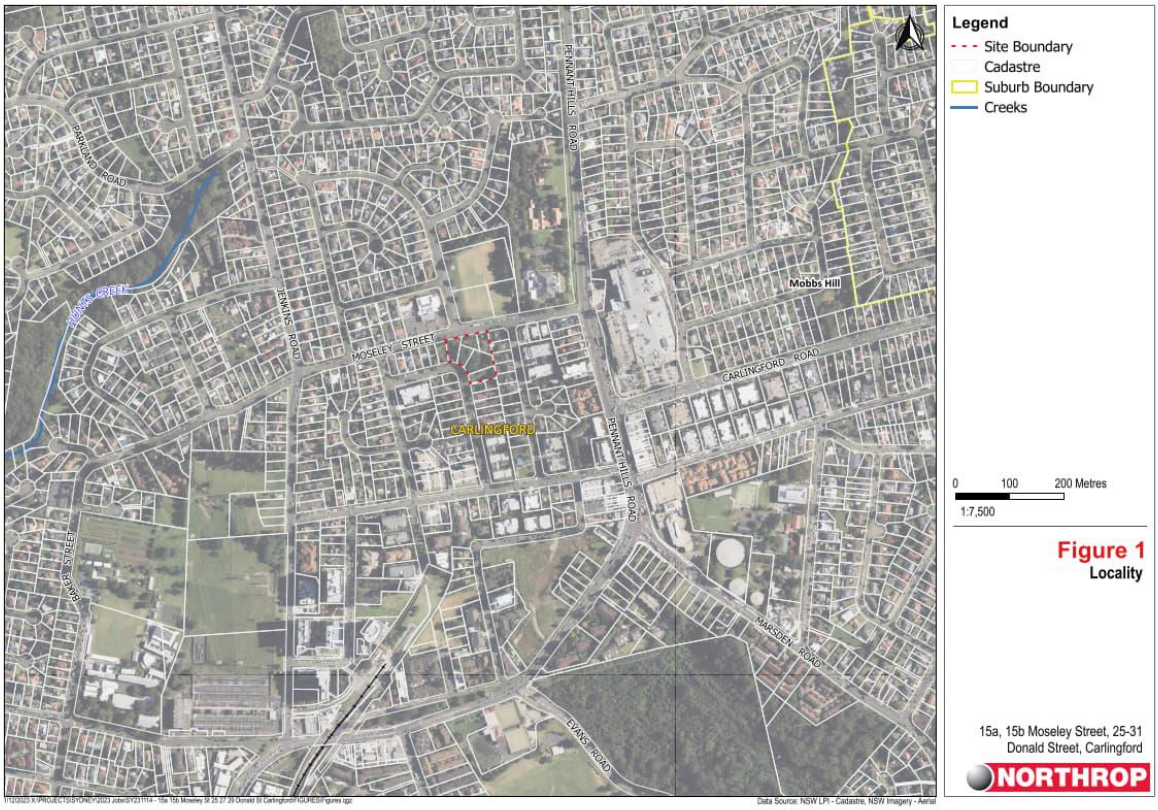
- Parramatta Development Control Plan 2023.
- Flood Information Certificate (Parramatta Council, June 2023)
- Australian Rainfall and Runoff 2019 (ARR 2019).
- NSW Flood Risk Management Manual (NSW Government 2023).
- Architectural Drawings prepared by DKO and dated by November 2023.

This report has been prepared for Development Application submission to City of Parramatta Council.

		Date
Prepared by	RB	3/04/2024
Checked by	GB	3/04/2024
Admin	GB	3/04/2024

SY231114 / 3 April 2024 / Revision C
Y:\SYDNEY 2023\SY231114 - 15a, 15b Moseley St & 25, 27, 29 Donald St, Carlingford\E - Reports\SY231114 - Capio Carlingford Flood Assessment Report_240403.docx

Page 4


Legend
Site Boundary
Cadastre
Suburb Boundary
Creeks
0 100 200 Metres
1:7,500
Figure 1
Locality
15a, 15b Moseley Street, 25-31 Donald Street, Carlingford
NORTHROP
PARKLAND ROAD
HORSE CREEK
JENKINS ROAD
MOSELEY STREET
CARLINGFORD
PENNANT HILLS ROAD
Mobbs Hill
CARLINGFORD ROAD
DONALD STREET
MARSDEN ROAD
EVANS ROAD
Data Source: NSW LPI - Cadastre, NSW Imagery - Aerial

Methodology

This flood impact assessment has been undertaken using the following procedure:

- Desktop review of all available information including design plans and latest survey data.
- Setup a 1D DRAINS model to assess the peak flows reaching the subject site, and ponding elevation downstream in Donald Street.
- Comparison of the existing and developed case results for the 1% AEP to review the impact the proposed development has on the existing flood behaviour on-site and in adjacent properties.

Subject Site and Proposed Development

Subject Site

The subject site is located at Carlingford and occupies the parcels of land at 15A, 15B Moseley Street, and 25-31 Donald Street. These are otherwise known as Lot 2 and 5 DP 35555 and Lots 32, 33, 34, and 35 DCP 536982. The site area is approximately 5950m^2 with elevations ranging from approximately 99.9 to 112.6 m AHD. The site contains easements to drain water from piped drainage systems originating in Moseley Street to the north and Young Road to the east.

The site has two frontages, one along Moseley Street to the north, and the other along Donald Street to the south. The site currently contains four single storey dwellings between a number of mature trees.

The existing site frontages are presented in **Photo 1 to 3** below:

Photo 1 – Moseley Street frontage (Google Maps 2021), Looking to west

Photo 2 – Donald Street Frontage (Google Maps 2020), Looking to east

Photo 3 – Donald Street Frontage (Google Maps 2020), Looking to north

Proposed Development

The proposed development includes construction of three multi-storey buildings with residential units and a childcare centre. Vehicular access is to be from Donald Street.

Architectural plans describing the development are provided in Appendix 2 – Architectural Drawings.

DRAINS Model Setup

DRAINS model parameters are summarised below, and a catchment plan and existing drainage arrangement is presented overleaf in Figure 2. The developed pipe arrangement is presented in the civil drawings in Appendix 3.

Hydrology

ILSAX hydrology with an initial and continuity loss model has been used for this assessment. As per the latest ARR 2019 guidelines, initial loss, continuing loss, burst rainfall have been considered as part of this study. The hydrology input data used are summarised below in **Tables 1 to 2**.

Table 1 - Loss parameters

Parameter	Value
Pervious initial loss (mm)	28.0
Pervious continuing loss (mm/hr)	0.76
Impervious initial loss (mm)	1.5
Impervious continuing loss (mm/hr)	0.0

Table 2 - IFD Rainfall Depths (mm)

Duration (min)	5%AEP	1%AEP	PMP
10	23.6	30.4	-
15	29.5	37.9	170
20	33.6	43.2	-
25	36.8	47.3	-
30	39.3	50.6	250
45	44.9	58	310
60	49.2	63.7	360
90	55.9	72.9	410
120	61.7	80.8	460
180	71.9	95.1	
270	85.8	114	
360	98.4	132	

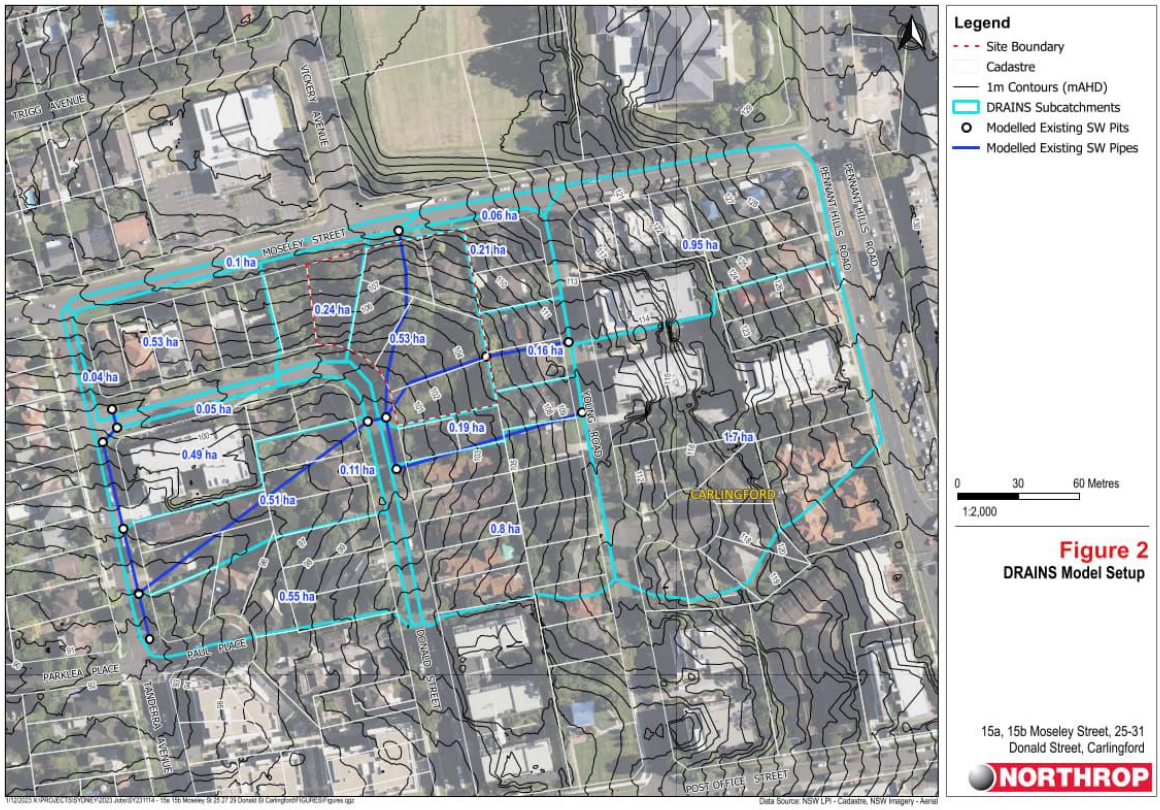


Figure 2
DRAINS Model Setup

15a, 15b Moseley Street, 25-31 Donald Street, Carlingford

NORTHROP

Modelled Scenarios

The flood model has considered the following scenarios.

- The existing condition with pipes included in the model.
- The developed condition with redirected pipes included in the model.

Modelled Events

The flood model has considered the 5% AEP, and 1% AEP.

Flood Behaviour

Flood Levels

Flood levels are presented below in Table 3.

Table 3 - Flood levels

Location	1% AEP Existing (m AHD)	1% AEP Developed (m AHD)
Donald Street Sag	99.92	99.89

Floor Level Analysis

Floor level and flood protection analysis with respect to the developed 1% AEP flood levels are presented in Table 4.

Table 4 - Floor level assessment

Item	1% AEP Level (m AHD)	Floor level (m AHD)	Freeboard (mm)	Compliant
Building A	99.89	102.00	2110	**Yes**
Building B	99.89	104.55	4660	**Yes**
Basement Driveway Crest	99.89	100.46	570	**Yes**

Flood Effects

The proposed development results in a reduction in peak flow from Donald Street due to the provision of on-site detention. There is also a minor reduction in flood levels in Donald Street due to the revised arrangement.

Flood Risk Assessment

Flood Hazard

The flood hazard has been quantified in the modelling exercise reported above.

The flood hazard is generally low in the vicinity of the site due to the small upstream catchment. The diversion of the stormwater system around the proposed development is expected to reduce the overland flow experienced by the buildings on-site.

Existing Risk

The following potential risks from the flood hazard were identified in the existing condition - presented below in Table 5.

Table 5 - Existing flood risk analysis

Item	Likelihood	Consequence	Risk Rating
Structural damage causing economic loss	Rare to very rare	Major	High
Loss of life	Extremely rare	Major	Low

Developed and Residual Risk

Mitigation measures proposed in the design, and potential mitigation measures that could be implemented during operation are presented below in Table 6.

Table 6 - Mitigation Measures

Item	Mitigation Measures
Structural damage causing economic loss	Structures on-site will consider the forces due to floodwater and debris impact using a robust construction typology will reduce the likelihood and consequence of structural damage in the developed case.
Loss of life	The likelihood of loss of life has the potential to be reduced through implementation of a Flood Emergency Response Plan. Principles of the emergency response measures are included in the Discussion and Compliance with Council Policies section of this report.

Following implementation of the proposed mitigation measures, the residual developed risk analysis is presented below in Table 7. A risk matrix showing the existing and residual risk comparison is presented in Table 8.

Table 7 – Developed residual risk analysis

Item	Likelihood	Consequence	Risk Rating
Structural damage causing economic loss	Extremely rare	Moderate	Low
Loss of life	Extremely rare	Major	Low

Table 8 - Risk matrix

Likelihood	AEP Range	Consequence				
	(%)	Insignifcant	Minor	Moderate	Major	Catastrophic
Likely	>10					
Unlikely	1 to 10					
Rare to very rare	0.01 to 1				Structural damage (E)	
Extremely rare	<0.01			**Structural damage (D)**	**Loss of life (E + D)**	

Note: Developed risk bo

Risk: Very low | Low | Medium | High | Extreme

Discussion and Compliance with Council Policies

Suitability of Flood Impacts

The proposed development determines a small improvement in the ponded depth in Donald Street due to the OSD. We believe this is appropriate.

Emergency Response Measures

The subject site is located within a small catchment which has a quick response time to flood peak and short duration of inundation. We believe that refuge on-site is appropriate in this instance, and it would be feasible for residents, staff, and visitors to the site to shelter in place until the flood hazard has passed. We expect a Flood Emergency Response Plan can be prepared prior to occupation to outline the following.

- Flood awareness and education.
- Available flood warning products from the BoM and SES.
- Flood preparedness measures including knowing your flood risk and having essential items on-hand for on-site refuge.
- Flood response measures including changing plans and closing the childcare centre in the event of imminent forecast extreme weather and seeking refuge on-site once rainfall has begun.
- Undertaking appropriate inspections and checks once the event has passed.

LEP and DCP Compliance

Commentary with respect to Council's LEP and DCP are presented below in Table 9 and Table 10.

Table 9 – LEP Compliance

Requirement	Comment
Clause 5.21 (1) The objectives of this clause are as follows	
(a) to minimise the flood risk to life and property associated with the use of land,	The site is in an area of low magnitude overland flow. The development incorporates measures to minimise risk to property and life.
(b) to allow development on land that is compatible with the flood function and behaviour on the land, taking into account projected changes as a result of climate change,	We believe the development is compatible with the flood function of the land.
(c) to avoid adverse or cumulative impacts on flood behaviour and the environment,	The development does not significantly alter the flood behaviour of the site or reduce flood storage. On this basis we do not believe it will contribute to cumulative impacts.
(d) to enable the safe occupation and efficient evacuation of people in the event of a flood.	The site is subject to quick peaking and receding flash flooding. On-site refuge is provided to wait out these events.

Requirement	Comment
(2) Development consent must not be granted to development on land the consent authority considers to be within the flood planning area unless the consent authority is satisfied the development	
(a) is compatible with the flood function and behaviour on the land, and	The site is subject to low hazard overland flow and we believe the development is compatible with the flood function of the site.
(b) will not adversely affect flood behaviour in a way that results in detrimental increases in the potential flood affectation of other development or properties, and	The provision of on-site detention reduces the peak flow leaving the site and stormwater diversions direct more runoff into the downstream network, resulting in no significant adverse impacts to adjoining properties.
(c) will not adversely affect the safe occupation and efficient evacuation of people or exceed the capacity of existing evacuation routes for the surrounding area in the event of a flood, and	The site is subject to quick peaking and receding flash flooding. On-site refuge is provided to wait out these events.
(d) incorporates appropriate measures to manage risk to life in the event of a flood, and	On-site refuge is provided. We recommend preparing a Flood Emergency Response Plan to further minimise the risk to life, prior to occupation.
(e) will not adversely affect the environment or cause avoidable erosion, siltation, destruction of riparian vegetation or a reduction in the stability of riverbanks or watercourses.	The site is currently developed, and water quality and quantity management devices have been provided. We do not believe this development will contribute to erosion, siltation or destabilising of riparian vegetation and riverbanks.
(3) In deciding whether to grant development consent on land to which this clause applies, the consent authority must consider the following matters	
(a) the impact of the development on projected changes to flood behaviour as a result of climate change,	We do not believe the development will have a significant impact on flood behaviour changes due to climate change.
(b) the intended design and scale of buildings resulting from the development,	By others.
(c) whether the development incorporates measures to minimise the risk to life and ensure the safe evacuation of people in the event of a flood,	On-site refuge is provided. We recommend preparing a Flood Emergency Response Plan to further minimise the risk to life, prior to occupation.
(d) the potential to modify, relocate or remove buildings resulting from development if the surrounding area is impacted by flooding or coastal erosion.	This is not applicable to this case.

Table 10 - DCP Compliance

Requirement	Comment
Parramatta DCP Clause 5.11 C.24	
Development has been assessed as residential in a Medium Flood Risk Precinct. Whilst the development contains a childcare, this is located well above the flood hazard.	
Floor Level Floor levels set at the 1% AEP plus 500mm freeboard	Compliant per the above.
Building Components Building components and compatible material below the 1% AEP plus 500mm freeboard.	The building is expected to be of robust construction and incorporate flood compatible building materials adjacent to overland flow paths.
Structural Soundness An engineers report is required to certify that the structure can withstand the forces of floodwater, debris and buoyancy up to the 1% AEP plus 500mm freeboard.	The building is expected to be of robust construction, and this would be considered post development consent.
Flood Affectation A hydraulic engineers report is required to certify that the development will not increase flood affectation elsewhere, having regard to (i) loss of storage, (ii) changes in flood levels, flows and velocities caused by alterations to flood flows; and (iii) the cumulative impact of multiple potential developments in the vicnity.	The site is subject to overland flow and we do not believe the development will cause impact to adjoining properties.
Carparking and Driveway Access The minimum surface level of open spaces or carports shall be as high as practical, but no lower than 0.1m below the 1% AEP flood level. In the case of garages, the minimum surface level shall be as high as practical, but no lower than the 1% AEP flood level plus 150mm.	The driveway crest is set at the 1% AEP plus 500mm freeboard.
Carparking and Driveway Access Garages capable of accommodating more than 3 motor vehicles on land zones for urban purposes, or enclosed car parking, must be protected from inundation by floods equal to or greater than the 1% AEP flood. Ramp levels to be no lower than 0.5m above the 1% AEP flood level. Where below ground carparking is proposed additional measures must achieve protection up to the PMF.	The driveway crest is set at the 1% AEP plus 500mm freeboard. Protection to the PMF may be provided as a condition of consent.

Requirement	Comment
Carparking and Driveway Access The level of the driveway providing access between the road and parking spaces shall be no lower than 0.2m below the 1% AEP flood level.	The driveway crest is set at the 1% AEP plus 500mm freeboard. The existing road is subject to approximately 300mm deep water in the 1% AEP.
Carparking and Driveway Access Enclosed car parking and car parking areas accommodating more than 3 vehicles, with a floor below the 1% AEP flood level, shall have adequate warning systems, signage, exits and evacuation routes.	To be considered post consent. We believe the access to the first floor will provide a sufficient evacuation arrangement, particularly given the minimal risk of inundation.
Carparking and Driveway Access Restraints or vehicle barriers to be provided to prevent floating vehicles leaving the site during a 1% AEP.	The parking is provided in a basement which will have the desired effect.
Evacuation Reliable access for pedestrians is required from the site to an area of refuge (including shelter in place) above the PMF level, onsite or offsite.	On-site refuge will be provided above the PMF.
Evacuation Applicant is to demonstrate the development is consistent with any relevant flood evacuation strategy or similar plan.	Vertical evacuation or on-site refuge is consistent with the Parramatta CBD Evacuation Strategy.
Evacuation Adequate flood warning is available to allow safe and orderly evacuation without increased reliance upon SES or other authorised emergency services personnel.	On-site refuge is the proposed emergency management response in this instance due to the location of the site within the catchment and likely low warning and flood duration.
Management and Design Site Emergency Response Flood plan required where the site is affected by the 1% AEP flood level, (except for single dwelling-houses).	To be provided post consent.
Management and Design Applicant is to demonstrate that area is available to store goods above the 1% AEP flood level plus freeboard	Storage areas are noted in the basement which is protected to the 1% AEP plus 500mm freeboard.
Management and Design No storage of materials below the 1% AEP flood level plus 500mm that may cause pollution.	Storage areas are noted in the basement which is protected to the 1% AEP plus 500mm freeboard.

Conclusions

A Flood Impact and Risk Assessment Report has been prepared for the proposed development at 15A, 15B Moseley Street, and 25-31 Donald Street, Carlingford NSW.

It was concluded that the proposed development will not create any significant adverse impacts to flood behaviour on the subject site and on the properties surrounding the subject site during 1% AEP flood event.

Furthermore, flood risk in the developed case has been adequately managed through the selection of flood levels, implementation of flood protection measures and provision of vertical evacuation opportunities.

We commend our findings to Council for their review.

Limitation Statement

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Document Register

Rev	Status	Prepared	Approved	Date
1	Draft for Client Review	RB	GB	9 August 2023
A	For Approval	RB	GB	25 August 2023
B	For Approval	GB	GB	1 December 2023
C	For Approval	GB	GB	3 April 2024

P: 02 8883 4239

W: www.sgce.com.au

A: Suite 311, Level 3,
480 Pacific Highway,
St Leonards, NSW 2065

SGC