

# **Attachment A8**

## **Flooding Assessment**



31 August 2022

Our ref: C1628-WSC-CI-LE-020 Rev E  
Your ref:  
Your email: WYum@cityofsydney.nsw.gov.au

Well Yum  
Project Engineer - Water Assets  
CITY OF SYDNEY  
Sydney NSW 2000  
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Dear Well,

## **Flood assessment of Woolworths Development 923-935 Bourke St. Waterloo**

### **1 Project Description**

This report relates to 923-935 Bourke Street, Waterloo and is submitted to the City of Sydney in support of a request for Planning Proposal seeking amendments to the Sydney Local Environmental Plan 2012. The broad intent of the Planning Proposal is to achieve a mixed-use development outcome, including a supermarket, which facilitates a suitable urban form to support local strategic planning intent for the establishment of a new 'neighbourhood centre' within the site. The Planning Proposal seeks amendment to maximum building height mapping and to introduce a site-specific criteria based exemption to the retail floor area cap outside of Green Square Town Centre and other planned centres. The indicative reference scheme in support of the proposal accommodates a mixed-use development including a subterranean supermarket, retail, commercial, residential apartments on podium and rooftop communal facilities. Basement parking is accommodated for all uses, with ground level loading and 'Direct to Boot' pick up facilities.

Fabcot Pty Ltd has engaged Michael Frost & Associates and Capital Consulting Engineers (CCE) to complete a flood study on the proposed development to be located at 923-935 Bourke Street, Waterloo, with the prime aim being to determine the minimum finished floor level to comply with the council's Interim Floodplain Management Policy (IFMP).

### **2 Background**

The proposed development is situated in a flood-prone area in the Alexandra Canal catchment and requires a site specific flood study to determine the minimum ground floor level for each usage type as listed in Table 3-1 below.

Figure 4-1 shows the location of the development site comprising a basement supermarket, ground level retail, residential apartments raised on a podium above ground, and a commercial



building with community uses, and two levels of basement parking. The current above-ground layout presents as three separate multi-storey buildings connected by a common basement area. There are several accesses to the basement including a vehicle access ramp to underground parking located at the SW corner of the building off Young St., several lift shafts, and an escalator at the NE corner of the site accessing the basement Supermarket. There is dedicated separate loading dock entry/exit off Bourke Street.

### 3 Data Collection

The City of Sydney council has a comprehensive flood model and flood report<sup>1</sup> of the Alexandra Canal catchment, which was purchased by CCE and the results used to evaluate the flood behaviour specific to the project site. CCE collected the data from different sources described in the following sections to have an accurate 3D model to figure out the minimum ground floor level.

**Survey:** CCE used the surveyed data of the site by the LTS Surveying Company for the 6,534m<sup>2</sup> development area. Topographic levels for the area beyond the site perimeter were obtained from government website ELVIS.

**Cadastral Plots:** These were downloaded from the NSW Government spatial data website.

**Stormwater Network:** Details of the pits and pipe network were downloaded from DBYD.

**3D city model and building model:** Provided by the project architect, BATES SMART.

**Flood Study Model:** CCE used the Flood model results of Alexandra Canal Catchment Report, which WMAwater carried out in February 2020. Digital elevation models for a flood water surface elevation were viewed, interrogated, and printed from QGIS, CAD and 12d.

### 4 Investigation

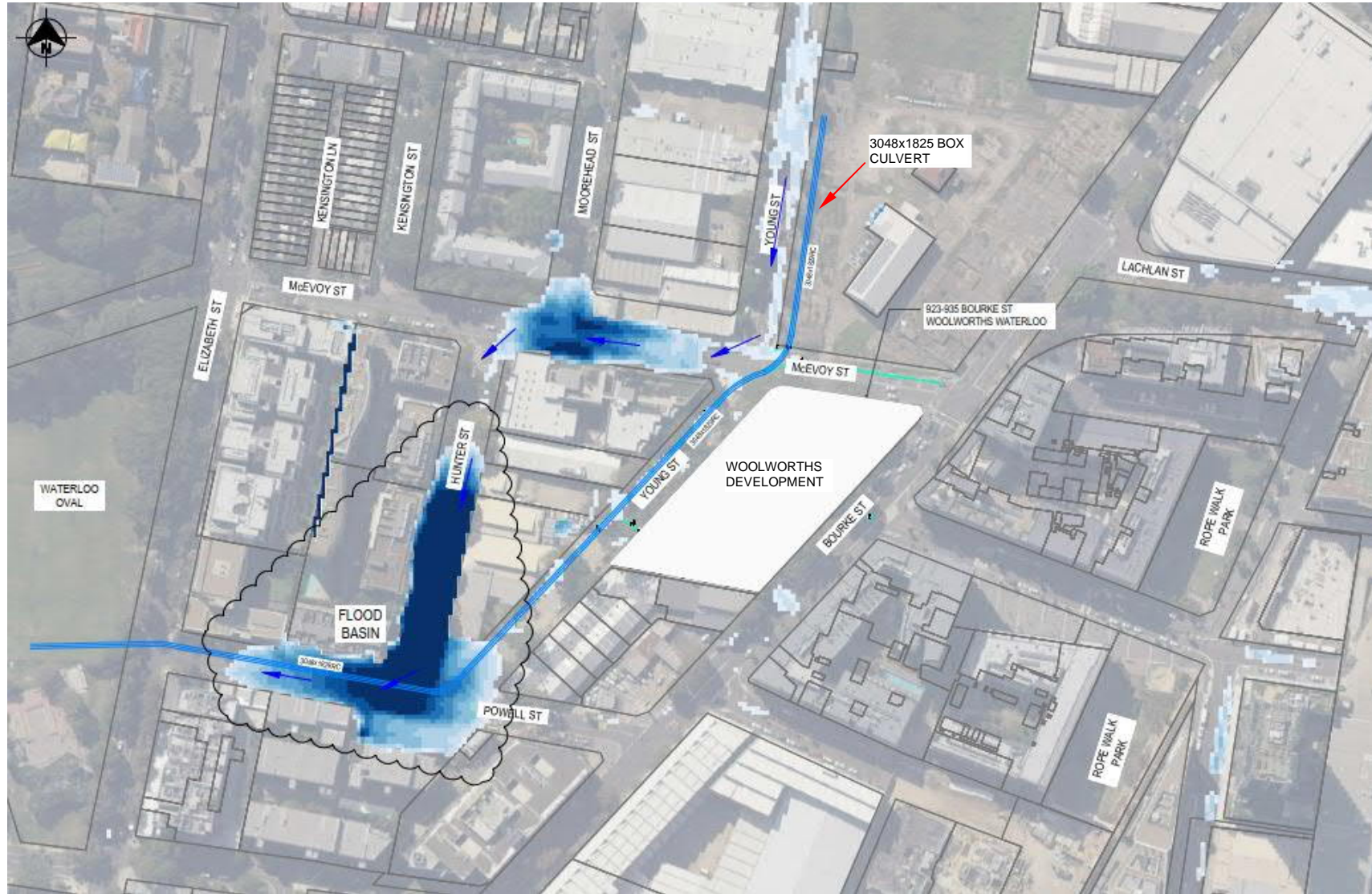
CCE was able to import the 1% and PMF flood surfaces for the area surrounding the development into a 12d model along with the concept 3d architectural model for the development and the topographic survey of the site and immediate surrounds: This enabled the cutting of detailed sections showing building outlines, floor levels, road and kerbs and the 1% & PMP flood levels.

An inspection of the flood model indicates that there is major stormwater box culvert along Young Street bringing flow from the catchment north of the property (See Figure 4-1). The 3048x1825mm box culvert passes along Young St, west boundary of the development before turning West along Powel St and leaving the area. Surface runoff along Young St is intercepted at McEvoy St, away from Young St and down Hunter St further to the west. There is a sag point where Hunter and Young Streets meet with Powel Street to the southwest of the development,

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<sup>1</sup> Alexandra Canal Catchment – Flood Study Model Update to ARR 2019 Hydrology, WMAwater, February 2020.

Figure 4-1: Location Plan showing 1%AEP event and flow path



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and in an extreme event the water backs up into Young Street toward the SW corner of the development, however the water only impacts the site in a PMF event.

Council (Well Yum) has confirmed there are no current Council plans that would negatively affect the flood model results.

According to Table 4-1 from Section 5 of the Interim Floodplain Management Policy (IFMP), each development type has a minimum permissible design floor level.

Table 4-1 has been used to determine the minimum permissible floor (or entry) level based upon the 1% and the PMP flood levels in the street opposite. Entry areas to the ground floor are of

**Table 4-1: IFMP (Flood Planning levels)**

Development		Type of flooding	Flood Planning Level
Residential	Habitable rooms	Mainstream flooding	1% AEP flood level + 0.5 m
		Local drainage flooding (Refer to Note 2)	1% AEP flood level + 0.5 m or Two times the depth of flow with a minimum of 0.3 m above the surrounding surface if the depth of flow in the 1% AEP flood is less than 0.25 m
		Outside floodplain	0.3 m above surrounding ground
	Non-habitable rooms such as a laundry or garage (excluding below-ground car parks)	Mainstream or local drainage flooding	1% AEP flood level
Industrial or Commercial	Business	Mainstream or local drainage flooding	Merits approach presented by the applicant with a minimum of the 1% AEP flood level
	Schools and child care facilities	Mainstream or local drainage flooding	Merits approach presented by the applicant with a minimum of the 1% AEP flood level + 0.5m
	Residential floors within tourist establishments	Mainstream or local drainage flooding	1% AEP flood level + 0.5 m
	Housing for older people or people with disabilities	Mainstream or local drainage flooding	1% AEP flood level + 0.5 m or a the PMF, whichever is the higher
	On-site sewer management (sewer mining)	Mainstream or local drainage flooding	1% AEP flood level
	Retail Floor Levels	Mainstream or local drainage flooding	Merits approach presented by the applicant with a minimum of the 1% AEP flood. The proposal must demonstrate a reasonable balance between flood protection and urban design outcomes for street level activation.
Below-ground garage/ car park	Single property owner with not more than 2 car spaces.	Mainstream or local drainage flooding	1% AEP flood level + 0.5 m
	All other below-ground car parks	Mainstream or local drainage flooding	1% AEP flood level + 0.5 m or the PMF (whichever is the higher) See Note 1
	Below-ground car park outside floodplain	Outside floodplain	0.3 m above the surrounding surface
Above ground car park	Enclosed car parks	Mainstream or local drainage flooding	1% AEP flood level
	Open car parks	Mainstream or local drainage	5% AEP flood level



particular concern for flooding where there is adjoining access to below-ground levels; floor levels around the lifts, stairways, ducts penetrations, escalators is determined based upon the following:

- Floor level to be; greater than the 1%AEP flood level + 0.5m; or
- Greater than the PMF, whichever is higher.

In this case, the PMF is higher.

Drawings R1628-CI-DW-011 to 016 are appended to this report. Drawing No.012 shows the minimum levels to be observed; any void to the basement (stair, escalator, lift, vehicle ramp) is required to be higher than the PMF level whilst ground floor retail areas and lobbies can be at the 1%AEP level.

Drawings 015 & 016 show cross-sections through the building in two directions: North-South & West-East. Section A-A through the access ramp shows the flood surface levels of both the 1% AEP and PMF events both sides of the development; the PMF has determined the floor level on both sides of the building, at top of the vehicle ramp and at the NE entrance where the escalator to the basement is located.

Section B-B through the building to McEvoy St. shows the vehicle access ramp from Young St. to Bourke St. The current building floor level at the NE corner of the site is at approximately 23.7 mAHD, which is lower than the road level opposite, however there is a small brick retaining wall behind the foot path that prevents overland flow from reaching the building. The proposed level of the external footpath around this corner of the site should be at least 150mm higher than the road footpath opposite (approx. 24.20mAHD): Currently there is a low retaining wall at this location that achieves this purpose.

## 5 Conclusion

The minimum FFL of the development areas along Bourke street is 23.60 mAHD, increasing to 24.2mAHD for the building housing the escalator/lift/stair access to the basement at the NE corner of the site. The external footpath, kerb or retaining wall around this corner must be set at 150mm higher than the roadway pedestrian footpath to keep flow away from the building.

The minimum FFL of the Young street side of the development boundary is 22.70mAHD, which is the level of the 1%AEP flood event at the upstream side of that street, however the portal threshold to the lower carpark must be at 23.65 mAHD to prevent flow into the basement carpark of the lower levels.



Entrance points to the basement access from Bourke Street must be higher than 24.2m AHD, from McEvoy Street higher than 23.90m AHD and from Young Street higher than 23.70m AHD.

Alan Liddle

Signed: \_\_\_\_\_

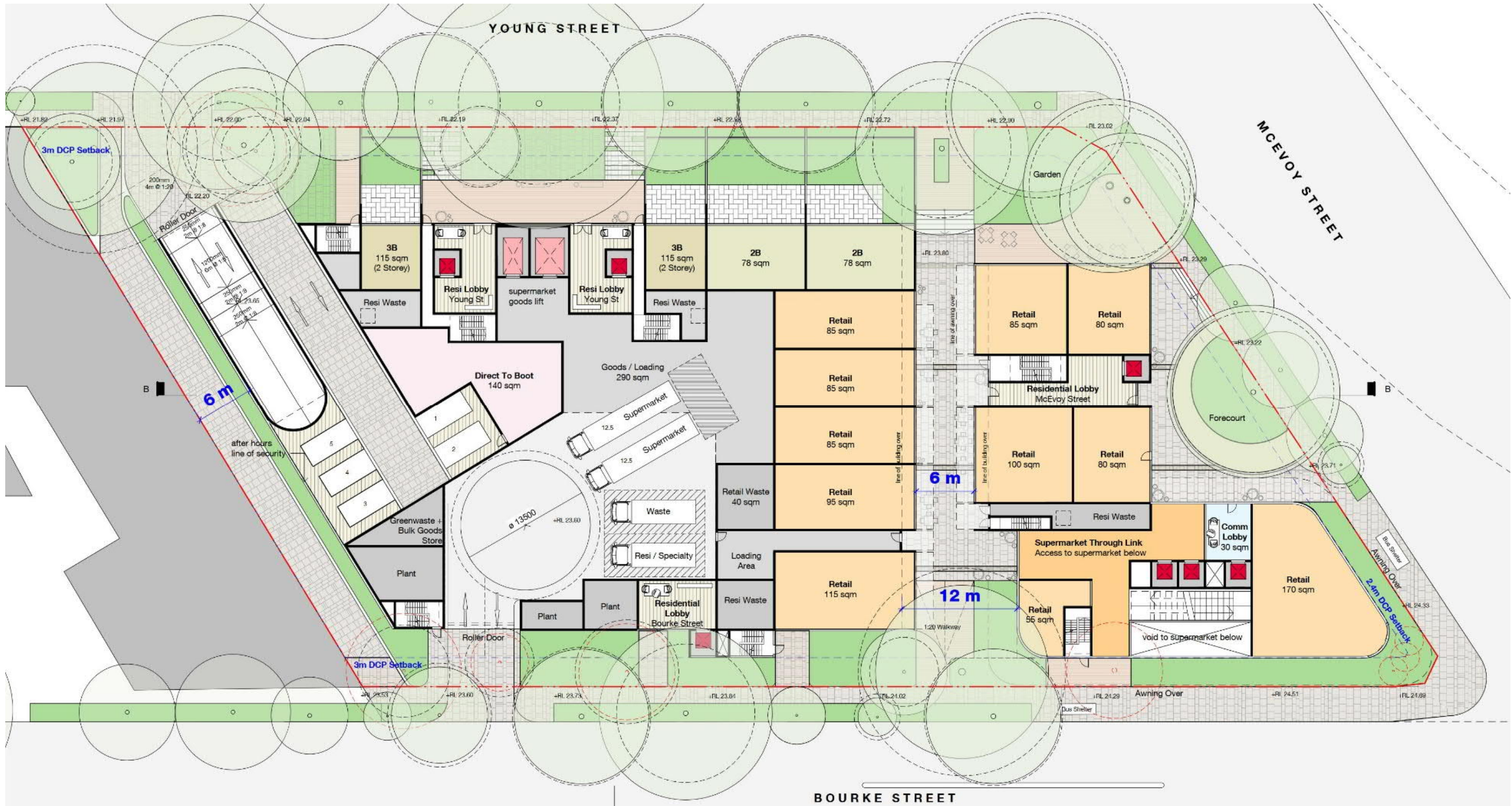
NER Number: 2197820

Date: 30 August 2022

Appendix

Drawings

Figure 5-1: Architectural Ground Floor Plan



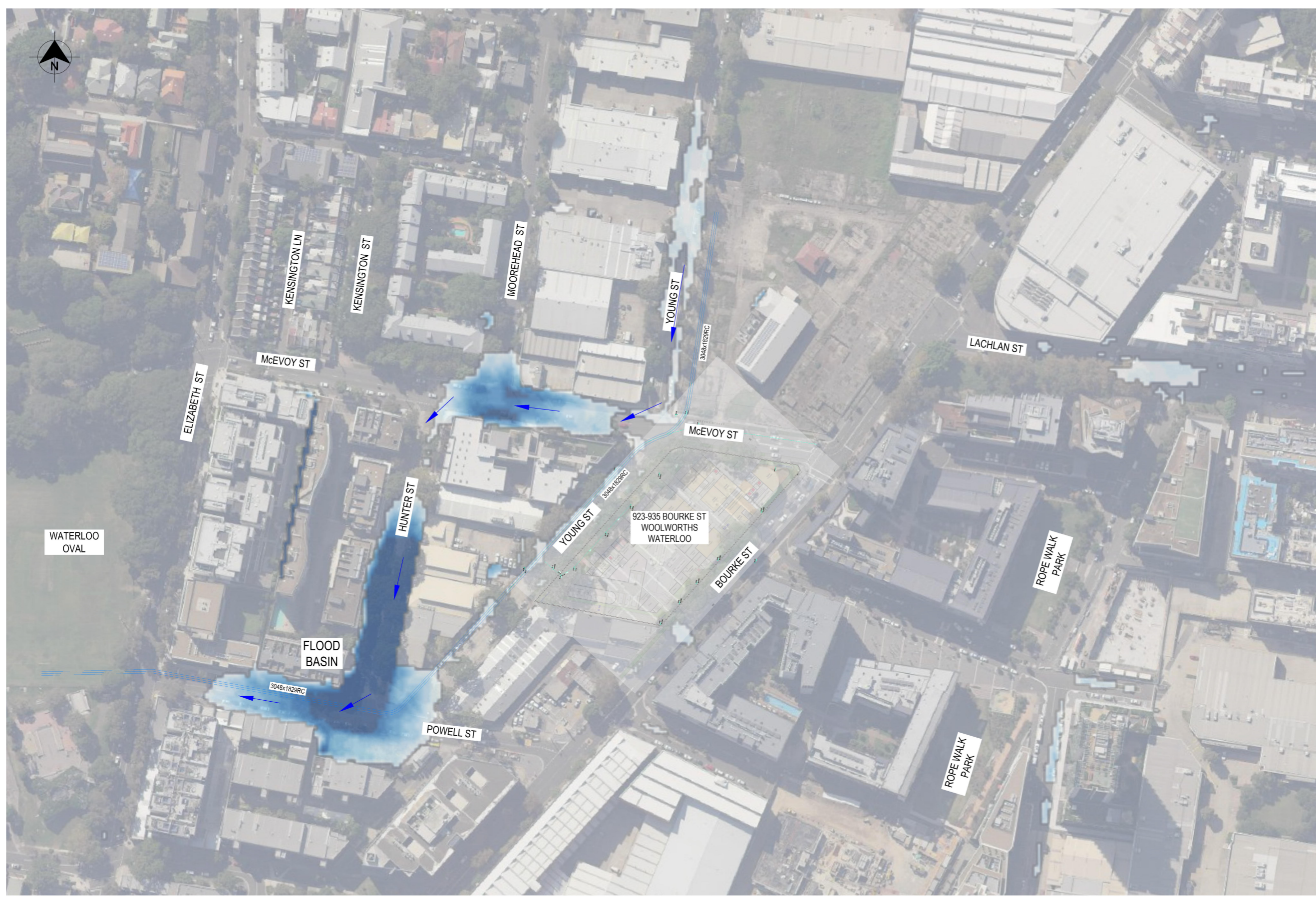
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# Appendix A

## Drawings



REV.	BY	DATE	DESCRIPTION	APPD	REF. DRG. NO	REFERENCE DRG TITLE
E	GK	29/08/2022	FOR COUNCIL SUBMISSION	AML		
D	GK	10/11/2021	FOR COUNCIL SUBMISSION	AML		
C	GK	10/10/2021	FOR COUNCIL SUBMISSION	AML		
B	GK	04/04/2021	FOR CLIENT REVIEW	AML		
A	GK	30/03/2021	FOR INTERNAL REVIEW	AML		

**WOOLWORTHS GROUP**

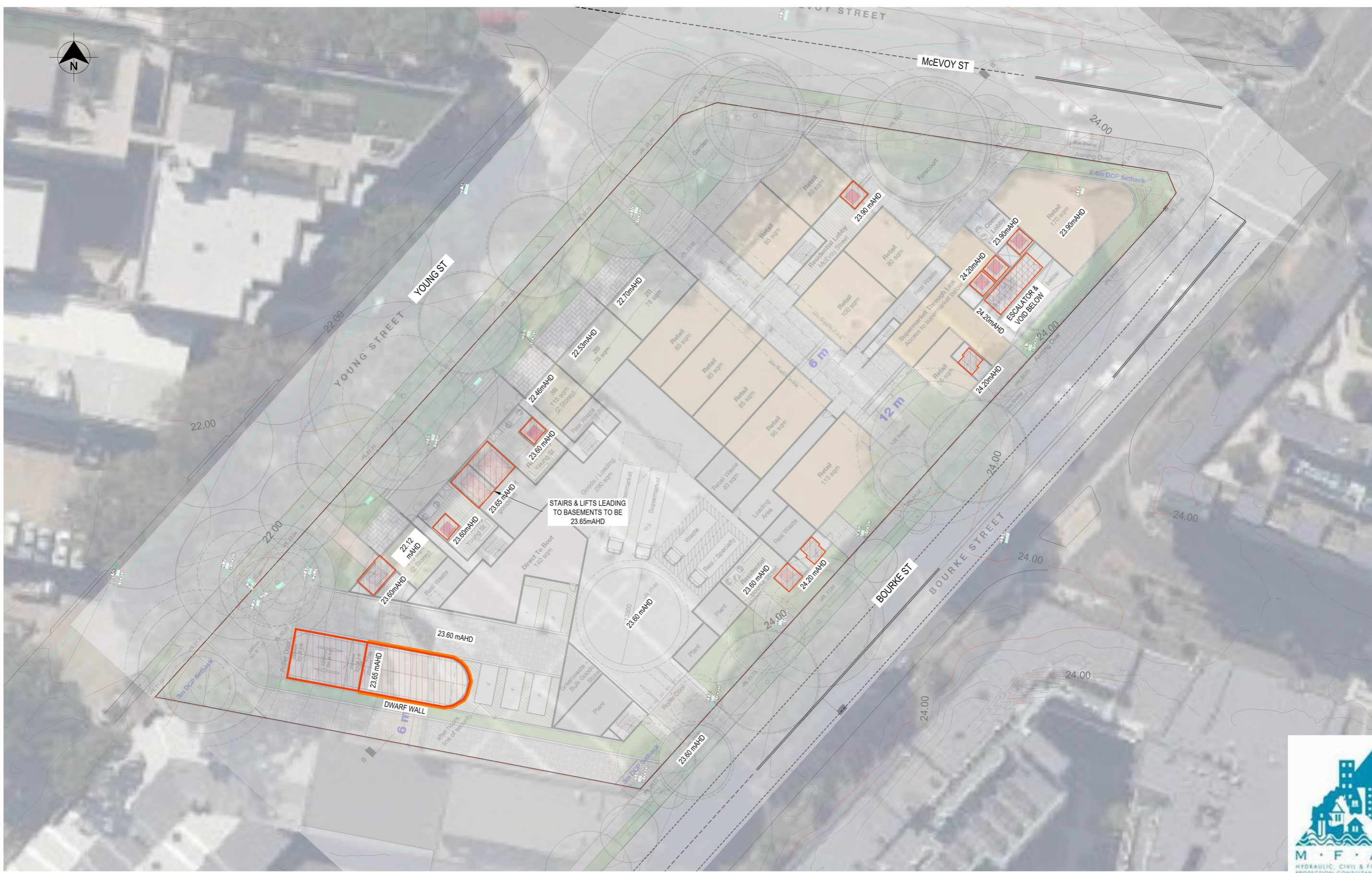
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 Project Managers  
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 Suite 1, 11-15 Florence Street, Hornsby NSW 2079  
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DESIGNED	GK	30/03/2021	
DESIGN REVIEW	AML	30/03/2021	
APPROVAL	AML	30/03/2021	

923-935 BOURKE St, WATERLOO		
WOOLWORTHS DEVELOPEMENT		
FLOOD ASSESSMENT		
PLAN OVERVIEW SHOWING 1%AEP EVENT		
A3	DRG No. R1628-WSC-CI-DW-011	REV E



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923-935 BOURKE St, WATERLOO		
WOOLWORTHS DEVELOPEMENT		
FLOOD ASSESSMENT		
MINIMUM FLOOR LEVELS PLAN		
A3	DRG No. R1628-WSC-CI-DW-012	REV E



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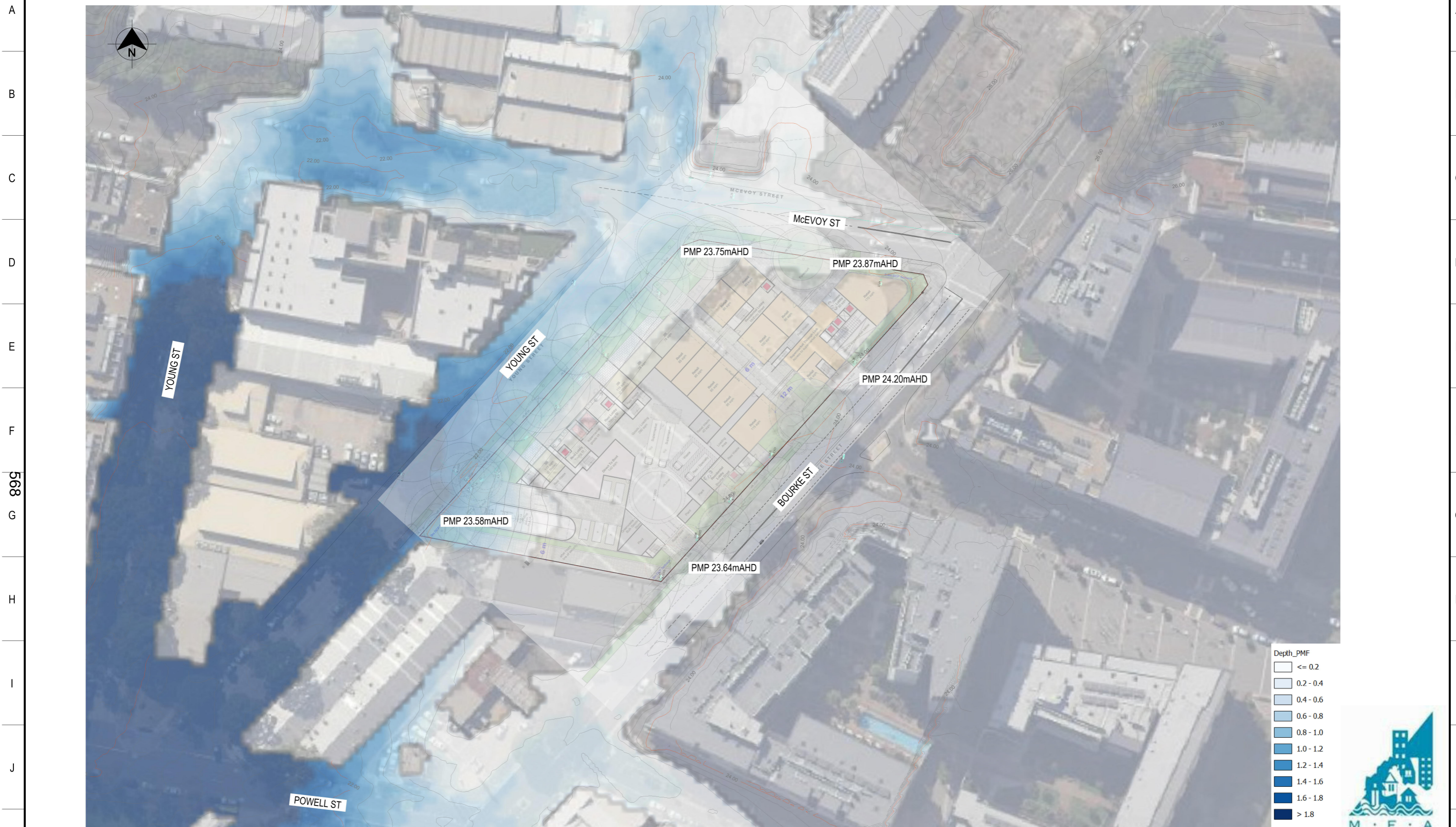
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<b>923-935 BOURKE St, WATERLOO</b>	
<b>WOOLWORTHS DEVELOPEMENT</b>	
<b>FLOOD ASSESSMENT</b>	
<b>1%AEP EVENT FLOOD - DEPTH PLAN</b>	
A3	DRG No. <b>R1628-WSC-CI-DW-013</b>
REV	<b>E</b>



Depth\_PMF

<= 0.2
0.2 - 0.4
0.4 - 0.6
0.6 - 0.8
0.8 - 1.0
1.0 - 1.2
1.2 - 1.4
1.4 - 1.6
1.6 - 1.8
> 1.8



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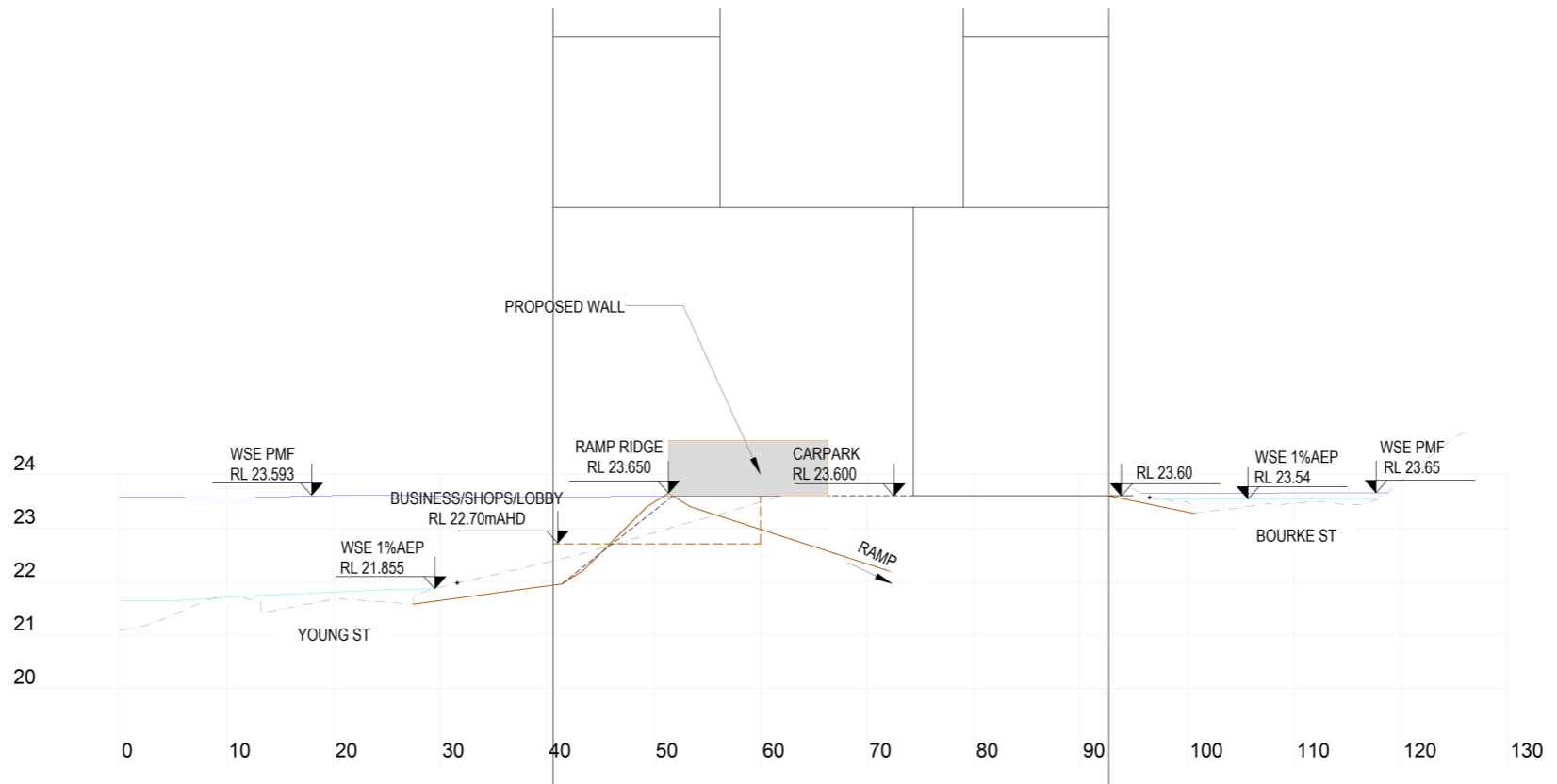
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<b>923-935 BOURKE St, WATERLOO</b>		
<b>WOOLWORTHS DEVELOPEMENT</b>		
<b>FLOOD ASSESSMENT</b>		
<b>PMF FLOOD - DEPTH PLAN</b>		
A3	DRG No. <b>R1628-WSC-CI-DW-014</b>	REV <b>E</b>



PLAN



A SECTION THROUGH DRIVEWAY  
SCALE 1VERT. TO 5 HORIZ.

- NOTE:**
1. THE LOADING DOCK IS AN 'ENCLOSED CAR PARK' BUT IS FREE DRAINING, SO THE ENTRANCE LEVEL MUST BE > 1%AEP ( 23.54 FROM BOURKE STREET & 22.70 FROM YOUNG STREET)
  2. ENTRANCE TO BASEMENT PARKING MUST BE > 1%AEP+500mm OR PMF (WHICHEVER IS THE HIGHER)
  3. BUSINESSES/SHOPS/ LOBBIES FFL OFF YOUNG STREET MUST BE 22.70m AHD > 1%AEP )



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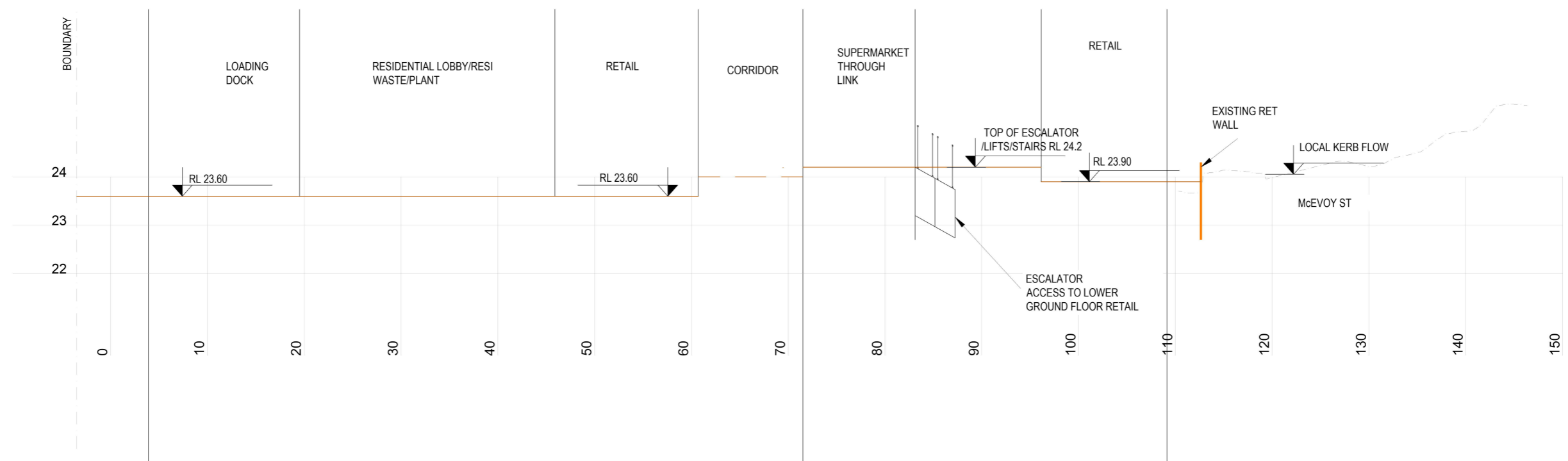
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<b>923-935 BOURKE St, WATERLOO</b>	
<b>WOOLWORTHS DEVELOPEMENT</b>	
<b>FLOOD ASSESSMENT</b>	
<b>PLAN AND SECTION THROUGH DRIVEWAY (E-W)</b>	
A3	DRG No. <b>R1628-WSC-CI-DW-015</b>
REV	<b>E</b>



PLAN



B NORTH-SOUTH SECTION  
SCALE 1 VERT. TO 5 HORIZ.



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923-935 BOURKE St, WATERLOO	
WOOLWORTHS DEVELOPEMENT FLOOD ASSESSMENT	
PLAN AND NORTH-SOUTH SECTION	
A3	DRG No. R1628-WSC-CI-DW-016
	REV E



# Appendix B

## Architectural Drawings

Refer to BatesSmart Urban Design Report  
Indicative Concept Scheme (September  
2022)