FRASERS PROPERTY AUSTRALIA (FPA)
& WINTEN PROPERTY GROUP (WPG)

JULY 2018

MACQUARIE PARK COMMERCE CENTRE

PEDESTRIAN ANALYSIS

wsp

Question today
Imagine tomorrow
Create for the future

Macquarie Park Commerce Centre
Pedestrian Analysis

Frasers Property Australia (FPA) & Winten Property Group (WPG)

WSP
Level 3, Northbank Plaza,
69 Ann Street
Brisbane QLD 4000
GPO Box 2907
Brisbane QLD 4001

Tel: +61 7 3854 6200
Fax: +61 7 3854 6500
wsp.com

REV	DATE	DETAILS
A	10/01/2018	Macquarie Park Commerce Centre, Pedestrian Analysis
B	31/01/2018	Final
C	08/02/2018	Revised with comments
D	10/04/2018	Revision to laneways
E	02/07/2018	Response to Council Request for Information

	NAME	DATE	SIGNATURE
Prepared by:	Michael Oliver	02/07/2018	
Reviewed by:	Daniel Gallagher	02/07/2018	
Approved by:	Daniel Gallagher	02/07/2018	

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF APPENDICES

1 PROJECT BACKGROUND

1.1 INTRODUCTION

WSP was engaged by Frasers Property Australia (FPA) & Winten Property Group (WPG) to undertake pedestrian analysis on the public realm areas associated with the redevelopment of the Macquarie Park Commerce Centre located at 396 Lane Cove Road, Macquarie Park. Subsequently the City of Ryde has provided a number of requests for information (RFI). This is a revised report that aims to respond to the issues raised. Table 1.1 details the RFIs received from Council and corresponding responses.

Table 1.1 - RFI and Responses

RFI – CITY OF RYDE	**RESPONSE**
The survey was conducted on a single day (Tuesday 15min in the am and 15min in the pm). It is based on 1X 15-minute spot survey in each identified 4 locations around the site and could hardly be treated a representative sample.	A Seasonal Variation assessment was undertaken, see Section 3.2 and Section 5.1, updated Table 5.1 and Figure 5.1. This ensures that the survey data is appropriate for this assessment for a typical day.
The Pedestrian Study is only limited to current pedestrian count and projections to 2029 based on a growth rate of 3%. per year. It is not clear whether the projection rate incorporates the residential population and employed population.	WSP assumed a general rate in accordance with the scale of growth experienced across the Sydney transport network.
The Report does not factor in the pull factors that the site will provide in the short term such as the additional retail space, open space and short cuts in the southerly direction and the long-term changes in density and potential residential mix in Macquarie Park.	Within the base pedestrian movements, ‘shortcutting’ over the site has been accounted for, and the trip generation for retail does account for any ‘pull’ for existing employment uses.
The laneway width is only part of the concern, more critical is the need for building separation.	Lane way width and building separation have been increased in the revised plans, see Figure 5.1.

The approved scheme is shown below in Figure 1.1.

Figure 1.1 Approved Scheme (May 2012), Macquarie Park

Details of the proposed scheme are shown in Figure 1.2 together with the future pedestrian connections across the site.

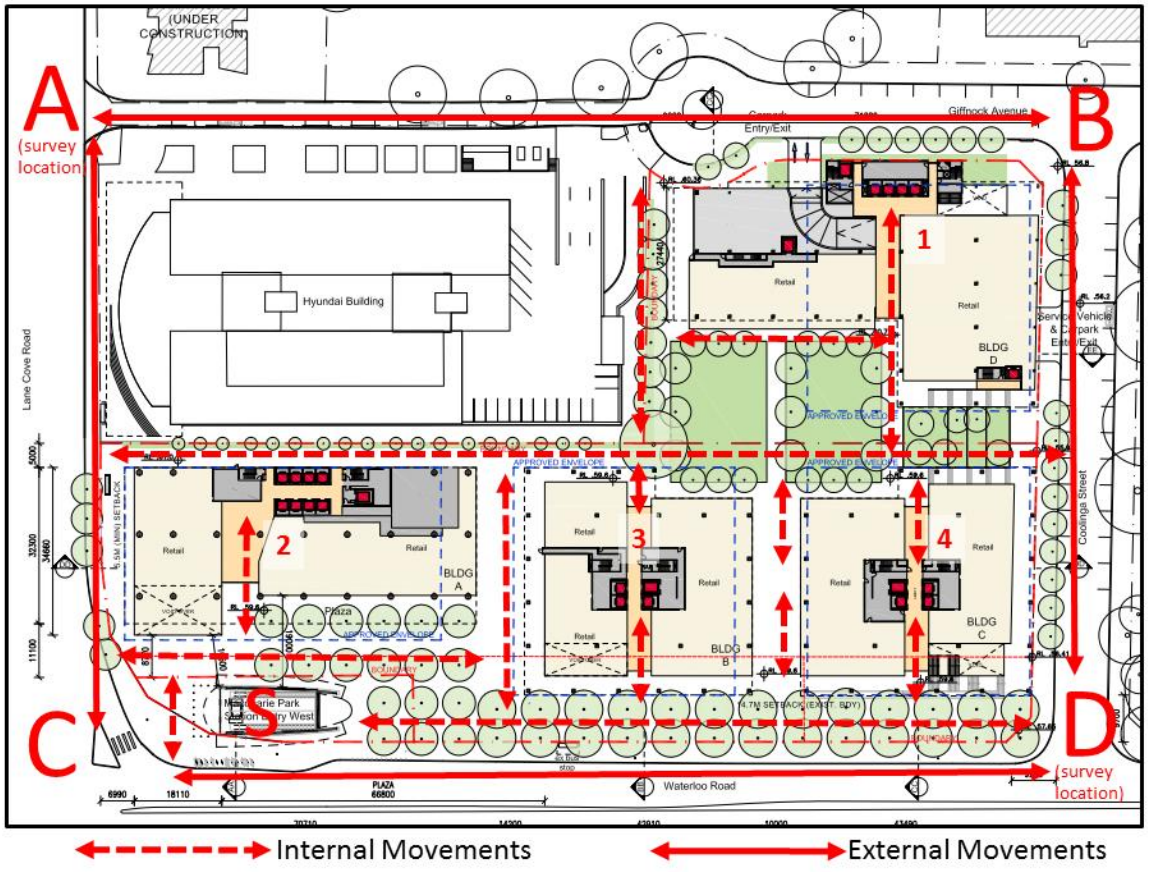


Figure 1.2 Proposed scheme with future pedestrian connections identified

1.2 OBJECTIVES

The objectives of this pedestrian analysis study are to:

1. Assess the pedestrian connections within the site to determine that a suitable level of service is provided.
2. Ensure the proposal aligns with the local DCP in terms of pedestrian connectivity and show that the proposal matches or improves upon the existing approved design in this regard.

2 APPROACH

2.1 METHODOLOGY

The following approach, as shown in Figure 2.1 has been used to undertake pedestrian modelling of the ground floor areas:

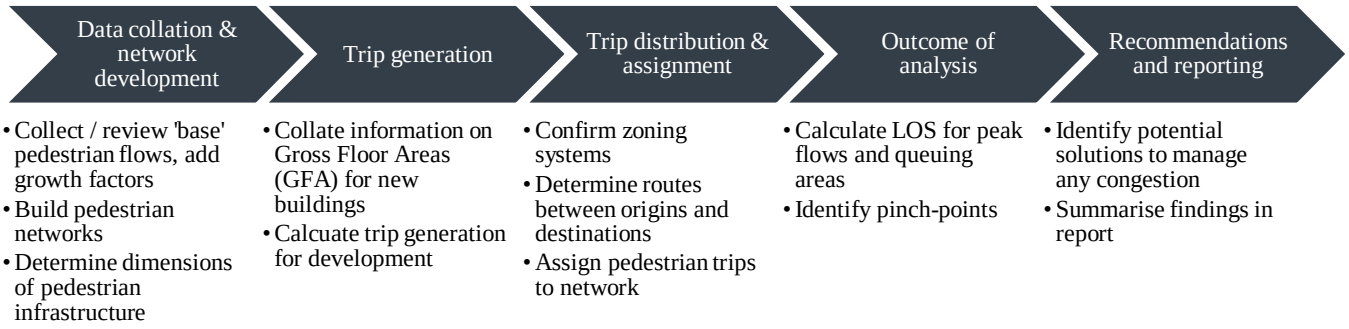


Figure 2.1 Methodology

2.2 LEVEL OF SERVICE (LOS)

Pedestrian crowding is measured in pedestrians per metre of clear footway width per minute. This is calculated from data on pedestrian activity and the street environment. The Fruin scale has been used for the purpose of this assessment to set and define pedestrian Levels of Service (LOS), with LOS A being best and LOS F being worst. Fruin based the thresholds on the ability of pedestrians to move at their desired speed, overtake others, and maintain a comfortable personal space.

The flow analysis compares projected pedestrian flows by link to the flow capacity of that link. The capacity of a link in terms of pedestrian flow is dependent on the width of the link at its narrowest point and the desired Level of Service that the link is expected to achieve. A series of widths have then been measured along each footway zone across the study area to understand the existing useable clear width available. The useable clear width discounts components of the footway that cannot be used for movement, such as street furniture including benches and trees, the kerb edge, and shop facades and their associated buffers.

Figure 2.2 below provides an example of how useable clear width on a footway section is measured.

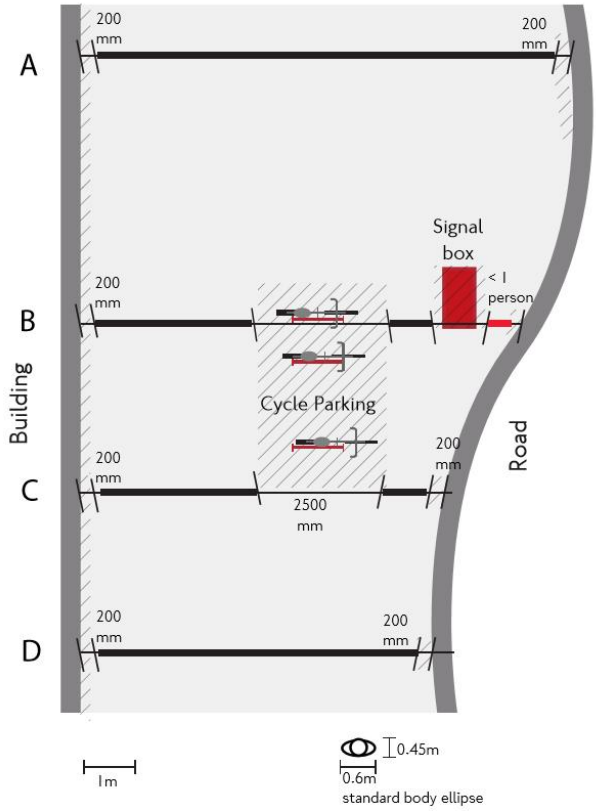


Figure 2.2 Usable clear width on a footway section

Source: Pedestrian Comfort Guidance for London, TfL (2010)

2.2.1 LEVEL OF SERVICE (LOS) TARGETS

For the purpose of this assessment Table 2.1 describes the Level of Service targets that define 'acceptable' performance of pedestrian infrastructure.

Table 2.1 Target Level of Service

	WALKWAYS	CROSSINGS	QUEUING	STAIRWAYS
Target Level of Service (LOS)	B	D*	D	B
Description	Allows pedestrians to move at 'normal speed' through the area. Contraflow will cause minor conflicts and slightly lowered speed and flow	People walk in platoons upon green signal	Circulation is severely restricted. There is enough space for people to stand without touching each other. It is not recommended for long term waiting	It may be difficult to overtake slower movers

** - Note Crossing LOS is based on D as a safe outcome, LOS B provides the same level of comfort as walkways*

3 BASE TRAFFIC

3.1 SURVEYS

In total, four 15-minute spot surveys were conducted at two locations at the Macquarie Park project site. These locations are the corners of Coolinga St and Waterloo Rd, and Hyundai Dr and Lane Cove Rd. At each location, one 15-minute spot survey was taken for each peak period, where pedestrian counts were conducted in the North-South and East-West directions. Figure 3.1 below illustrates survey locations and associated pedestrian movements. Pedestrian movements A & B are in the North-South and East-West directions respectively, on the corner of Coolinga St and Waterloo Rd. Pedestrian movements D & C are in the North-South and East-West directions respectively, on the corner of Hyundai Dr and Lane Cove Rd.

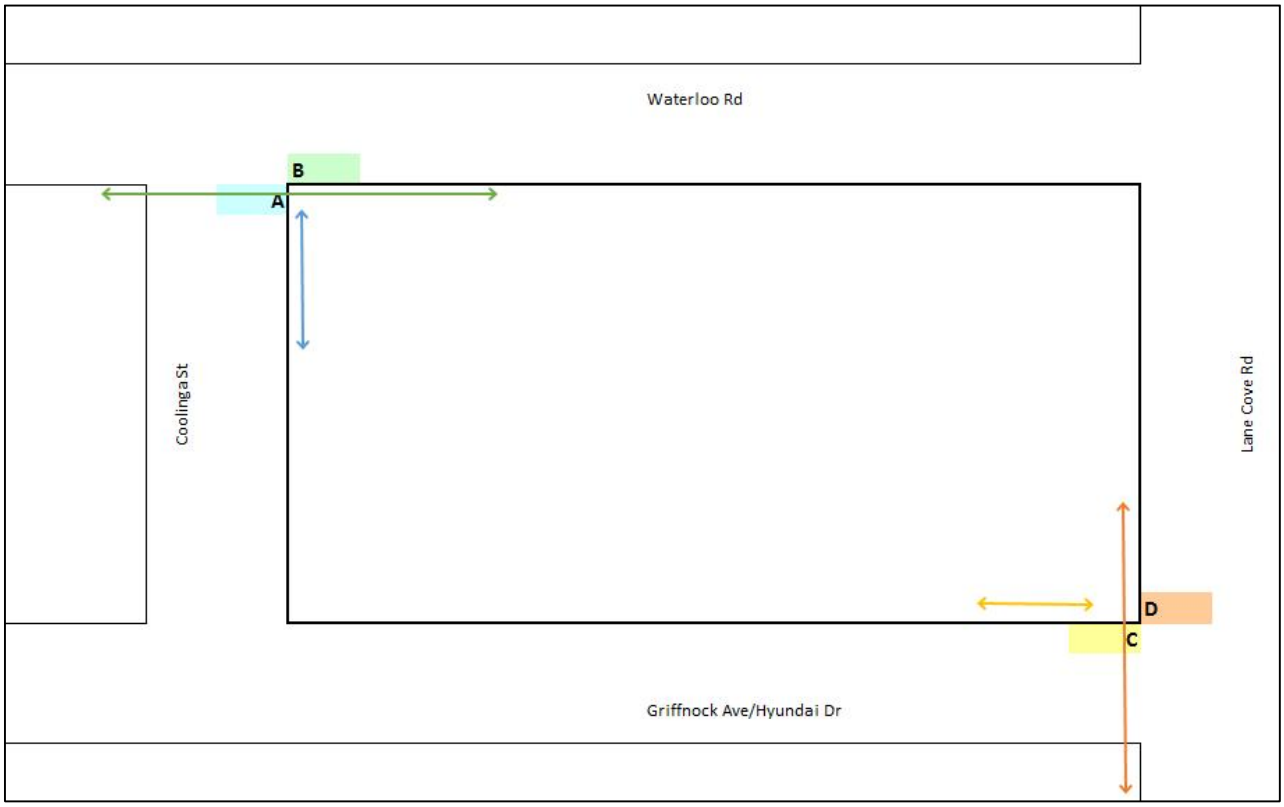


Figure 3.1 Survey Locations and Pedestrian Movements

All surveys were conducted on the same day – Tuesday 19 December 2017. The methodology was as follows:

- Survey 1 captured pedestrian movements A & B during the Tuesday AM Peak, from 8:23 AM to 8:38 AM. This corresponded to trains from the city arriving at Macquarie Park station depositing passengers at 8:20 AM, 8:26 AM and 8:35 AM.
- Survey 2 captured pedestrian movements C & D during the Tuesday AM Peak, from 8:52 AM to 9:07 AM. This corresponded to trains from the city arriving at Macquarie Park station depositing passengers at 8:50 AM, 8:56 AM and 9:05 AM.
- Survey 3 captured pedestrian movements A & B during the Tuesday PM Peak, from 5:10 PM to 5:25 PM. This corresponded to a number of trains arriving and departing Macquarie Park station.
- Survey 4 captured pedestrian movements C & D during the Tuesday PM Peak, from 5:35 PM to 5:50 PM. This corresponded to a number of trains arriving and departing Macquarie Park station.

3.2 SEASONAL VARIATION

To provide a high degree of robustness relating to pedestrian volume movements associated with the Macquarie Park Commerce Centre development, a seasonal variation analysis was undertaken. The Macquarie Park rail station was used as the key pedestrian generator. Opal card data, related to rail passengers, was accessed from the Transport for NSW website to assess variations in train patronage per month by operator and by line. Macquarie Park train station is located on the T1 North Shore, Northern & Western Line.

Table 3.1 details the analysis undertaken. The December 2016 patronage volume was utilised as the base month, and the difference calculated for each proceeding month for 2017. The average seasonal variation for the 2017 year was calculated as 14.9%. This seasonal variation can be utilised as a general rate in accordance with the T1 rail line.

Table 3.1 - Seasonal Variation

MONTH	SELECT MONTH	BASE MONTH	DIFFERENCE	DIFFERENCE %
Dec-16	10,406,725	10,406,725		0%
Jan-17	9,910,322	10,406,725	-496,403	-4.8
Feb-17	11,014,755	10,406,725	608,030	5.8
Mar-17	13,428,535	10,406,725	3,021,810	29.0
Apr-17	10,730,621	10,406,725	323,896	3.1
May-17	13,511,637	10,406,725	3,104,912	29.8
Jun-17	12,196,021	10,406,725	1,789,296	17.2
Jul-17	11,920,498	10,406,725	1,513,773	14.5
Aug-17	13,286,443	10,406,725	2,879,718	27.7
Sep-17	12,408,368	10,406,725	2,001,643	19.2
Oct-17	12,583,538	10,406,725	2,176,813	20.9
Nov-17	10,504,339	10,406,725	97,614	0.9
Average Seasonal Variation				14.9

The 14.9% seasonal variation was then used to factor up the AM and PM Peak development distribution (2029) to understand the consequences of the variation, see Section 5.

3.3 GROWTH AND REDISTRIBUTION

In order to assess the 10-year design horizon of the development (2029) a compounding growth rate of 3% per year has been used to growth the surveyed background pedestrian flows.

The factored (2029) background pedestrian flows have been redistributed through the proposed site layout to account for new routes between origin and destination points created by the development.

The redistributed background flows (between B-C and C-B) through the proposed site layout (key internal movements) can be seen in Figure 3.2 below. The redistribution of background flows assumes a 50/50 split across the two key internal movement routes shown.

It should be noted that routes include ‘stop off’ trips to the area between Buildings 3 and 4 accounting for 5% of total pedestrians through this area in the AM and PM peaks. This is to account for those stopping in the area for retail, food and beverages.

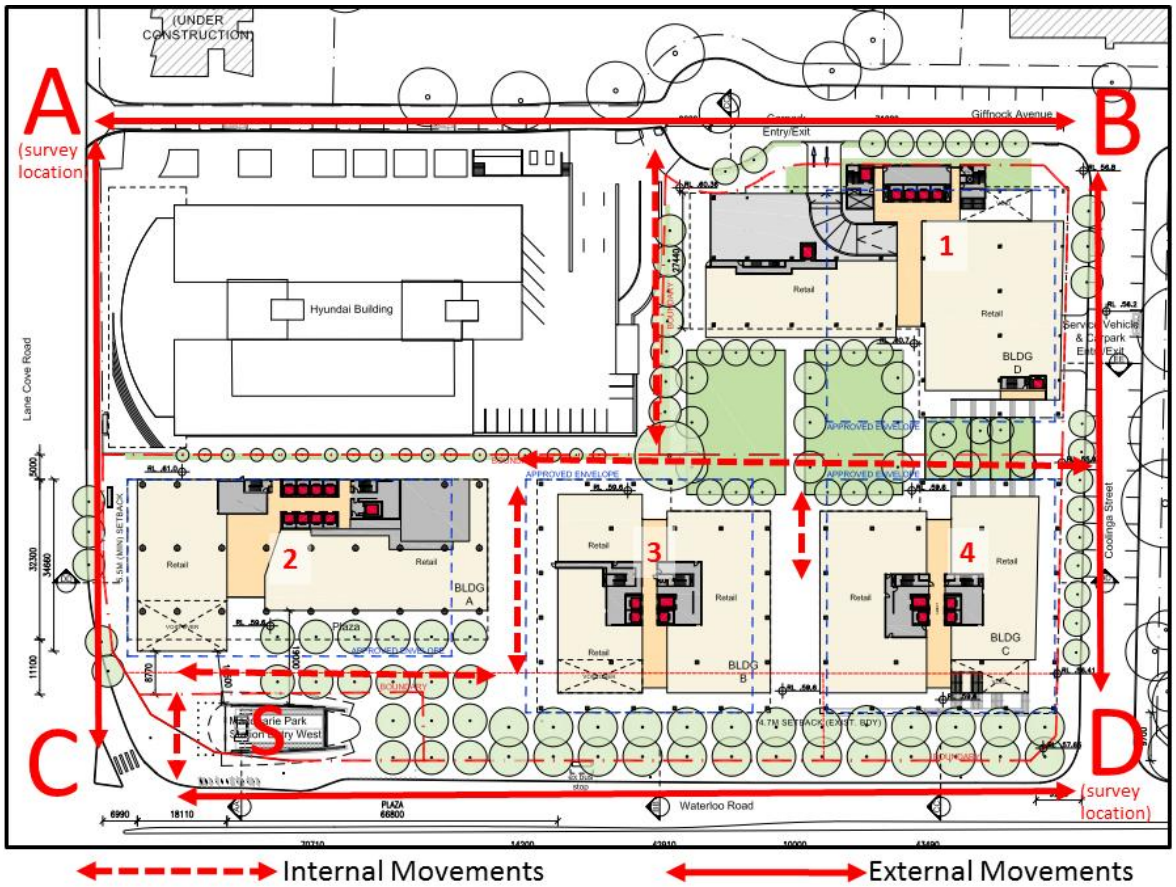


Figure 3.2 Redistribution of background flows through the site

4 TRIPS GENERATION, DISTRIBUTION AND ASSIGNMENT

The expected peak hour trip generation of the proposed development was based on the expected total building population, derived from the total Net Lettable Area (NLA) of the office space. The following details the assumptions made:

- the Net Lettable Area of the office floors of the new buildings was divided by a density of one employee per 12sqm to determine the maximum building population
- the building population on any given day is on average 85% of the total possible population
- 60% of the population on any given day arrive or depart during the morning peak period
- 95% of those are arriving and 5% departing in the morning peak hour
- 10% of those employees drive to work and get from their cars to their area of work via the lifts from the basement, therefore not appearing as a pedestrian movement at ground level
- the remaining 90% are assigned to the rail station for the purposes of this study as a conservative approach
- PM flows are equal to 75% of AM flows.

Table 4.1 below shows the resulting number of development trips generated by each building.

Table 4.1 Development Trip Generation

BUILDING	NLA	AM IN	AM OUT	PM IN	PM OUT
A	29,521	933	49	37	700
B	12,214	386	20	15	289
C	13,299	420	22	17	315
D	17,193	543	29	21	407

5 ASSESSMENT

5.1 LEVEL OF SERVICE (LOS)

A series of widths have been measured across each footway zone in the study area to understand the existing clear width available and the resulting pedestrian volumes expressed as the value of persons per metre per minute (PPMM) together with and the resulting LOS as can be seen in tabular format in Table 5.1 and diagrammatically in Figure 5.1.

The 14.9% seasonal variation was used to update the AM and PM Peak development distribution (2029). Table 5.1 has been updated accordingly. Overall the variation marginally increased the PPMM for the AM and PM Peaks, with no zone showing an increase over or above the previous capacity analysis. All zones for AM and PM Peak identify as a LOS A, with zone I_2 maintaining at LOS B.

Table 5.1 Recorded Widths, Demand and LOS

ID	WIDTH (M)	CLEARANCE (M)	EFFECTIVE WIDTH (M)	AM PPMM	PM PPMM	LOS AM	LOS PM
E_1	3.5	0.2	3.3	0.0	0.0	A	A
E_2	3.5	0.2	3.3	2.4	1.7	A	A
E_3	3.5	0.2	3.3	2.4	1.7	A	A
E_4	2.9	0.4	2.5	3.1	2.2	A	A
E_5	2.9	0.4	2.5	3.1	2.2	A	A
E_6	2.9	0.4	2.5	0.0	0.0	A	A
E_7	3.2	0.2	3	1.9	0.8	A	A
E_8	3.2	0.2	3	9.8	1.4	A	A
E_9	2.1	0.2	1.9	3.7	3.6	A	A
I_1	6.7	0.4	6.3	1.2	0.9	A	A
I_1a	6.7	0.4	6.3	1.2	0.9	A	A
I_1b	6.7	0.4	6.3	1.2	0.9	A	A
I_2	0.6	0	0.6	19.1	1.4	B	A
I_3	3.5	0.4	3.1	7.4	0.6	A	A
I_4	3.5	0.4	3.1	7.4	0.6	A	A
I_5	3.5	0.4	3.1	3.7	0.3	A	A
I_6	7.4	0.8	6.6	0.0	0.0	A	A
I_7	7.4	0.8	6.6	5.8	2.0	A	A
I_8	7.4	0.8	6.6	5.8	2.0	A	A
I_9	7.4	0.8	6.6	5.8	2.0	A	A
I_10	7.4	0.8	6.6	5.8	2.0	A	A
I_11	7.4	0.8	6.6	2.9	1.0	A	A

ID	WIDTH (M)	CLEARANCE (M)	EFFECTIVE WIDTH (M)	AM PPMM	PM PPMM	LOS AM	LOS PM
I_12	7.4	0.8	6.6	2.9	1.0	A	A
I_13	7.4	0.8	6.6	1.2	0.9	A	A
I_14	8	0.8	7.2	1.1	0.8	A	A
I_15	6.3	0.2	6.1	1.6	0.1	A	A
I_16	5	0.4	4.6	8.4	2.8	A	A
I_17	3.8	0.4	3.4	0.0	0.0	A	A
I_18	5	0.4	4.6	0.6	0.2	A	A
I_19	3.8	0.4	3.4	0.0	0.0	A	A
I_20	6.3	0.4	5.9	8.1	2.3	A	A
I_21	15	0.8	14.2	2.7	0.9	A	A
I_22	15	0.8	14.2	2.7	0.9	A	A
I_23	10	0.4	9.6	4.0	1.3	A	A
I_24	3.8	0.4	3.4	3.0	0.2	A	A
I_25	3.8	0.4	3.4	3.9	0.3	A	A
I_26	6		6	11.9	2.6	A	A
I_27	7	0.8	6.2	3.8	0.3	A	A
I_28	10		10	2.4	0.2	A	A
I_29	7	0.8	6.2	3.8	0.3	A	A
I_30	7	0.8	6.2	3.8	0.3	A	A
I_31	7	0.8	6.2	2.2	0.2	A	A
I_32	7	0.8	6.2	2.2	0.2	A	A
I_33	7	0.8	6.2	2.2	0.2	A	A
I_34	7	0.8	6.2	2.2	0.2	A	A
I_35	7	0.8	6.2	0.0	0.0	A	A

Detailed drawings including the footway widths for footway zones I_16 and I_18 were provided in *Macquarie Park Commerce Centre, Waterloo Road, Section 75w Response to NSW Department to Planning Queries, S10758, March 2018* as shown in Appendix A. As such these measurements were used in this analysis. It should be noted that the measurement for footway zone I_16 has been increased to a 5m footway between the dining areas, excluding the additional 2.75m width provided in the adjacent colonnade, as shown in Appendix A and as reflected in Table 5.1.

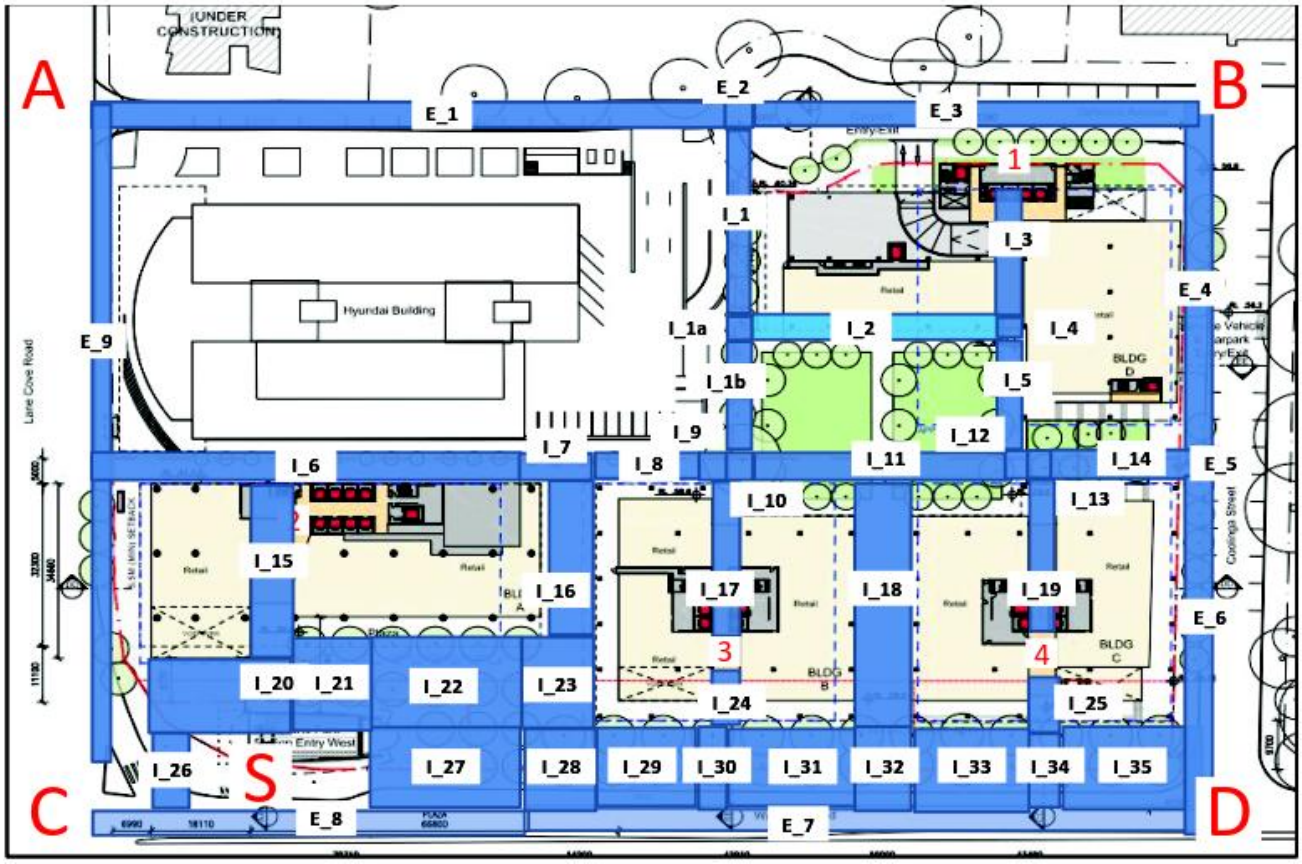


Figure 5.1 Static Pedestrian Analysis – LOS

As can be seen in Table 5.1 and Figure 5.1 all areas within the assessment are LOS A during the 2029 AM with development scenario, with the exception of link 'I_2' which may be used as a restaurant and café seating area in the future, thus reducing the effective width of the area for pedestrians and as such producing LOS B. However, LOS B is still an acceptable LOS for a walkway, as shown in Table 2.1.

5.2 COMPLIANCE WITH DEVELOPMENT CODE

The Development Control Plan (DCP) for the Macquarie Park Corridor outlines certain requirements for new development to ensure the appropriate level of connectivity to and through the sites contained within the precinct.

In terms of compliance with Section 4.2 b of the DCP, it is noted that the footpaths align with the intent of Figure 4.1.1. In terms of compliance with Section 4.2 c, the following are noted:

— footpaths of minimum 4 m in width have been provided across the site

— clear sightlines are present in plan form across each of the footways through the opening and set back of buildings to the footpath currently running on the each of the adjacent roads

— active frontages are significant with mainly retail uses at ground level of the new buildings.

5.3 COMPARISON TO APPROVED LAYOUT

The proposed layout has been compared with the previous approved scheme. The following is noted:

- the accessibility of the park has been maintained when comparing walking distances from the road frontages to the new park
- although frontage of the park to Giffnock Avenue has reduced, the visibility of the park from the other, busier streets is improved, including a clear sightline from Lane Cove Road, Waterloo Road, and Coolinga Street
- frontage of the surrounding retail uses to the park has increased, improving integration and safety of the park
- the revised 10m minimum width of the laneways between Buildings A and B, and Buildings B and C provides contingency to mitigate Councils concerns.

6 SUMMARY

An assessment of the future pedestrian movements across the proposed Macquarie Park Commerce Centre was undertaken to ensure that the proposed facilities would provide a convenient and comfortable environment for pedestrians and to ensure compliance with the relevant code contained within the local Development Control Plan. The following was identified:

- the assessment considered existing surveyed movements that may reroute across the site and also accounted for growth over a 10 year design horizon
- a seasonal variation adjustment was made to ensure the surveyed movements were increased to reflect a typical day
- a trip generation, distribution and assignment exercise was undertaken to determine the number of development related pedestrian movements that would utilise the future site
- all footway connections were shown to comply with the target Level of Service B, all but one minor link performing at Level of Service A. This demonstrates a good provision of pedestrian space
- compliance against the relevant sections of the local Development Control Plan was achieved
- in comparison with the approved May 2012 scheme, the new proposal showed better connections across the site and a safer pedestrian environment due to better sightlines through to the park and increased integration with active frontages within the development.

7 LIMITATIONS

7.1 SCOPE OF SERVICES

This report (the report) has been prepared in accordance with the scope of services set out in the contract, or as otherwise agreed, between the client and WSP (scope of services). In some circumstances the scope of services may have been limited by a range of factors such as time, budget, access and/or site disturbance constraints.

7.2 RELIANCE ON DATA

In preparing the report, WSP has relied upon data, surveys, analyses, designs, plans and other information provided by the client and other individuals and organisations, most of which are referred to in the report (the data). Except as otherwise stated in the report, WSP has not verified the accuracy or completeness of the data. To the extent that the statements, opinions, facts, information, conclusions and/or recommendations in the report (conclusions) are based in whole or part on the data, those conclusions are contingent upon the accuracy and completeness of the data. WSP will not be liable in relation to incorrect conclusions should any data, information or condition be incorrect or have been concealed, withheld, misrepresented or otherwise not fully disclosed to WSP.

7.3 OTHER LIMITATIONS

WSP will not be liable to update or revise the report to take into account any events or emergent circumstances or facts occurring or becoming apparent after the date of the report.

The scope of services did not include any assessment of the title to or ownership of the properties, buildings and structures referred to in the report nor the application or interpretation of laws in the jurisdiction in which those properties, buildings and structures are located.

APPENDIX A

LANEWAY DRAWINGS

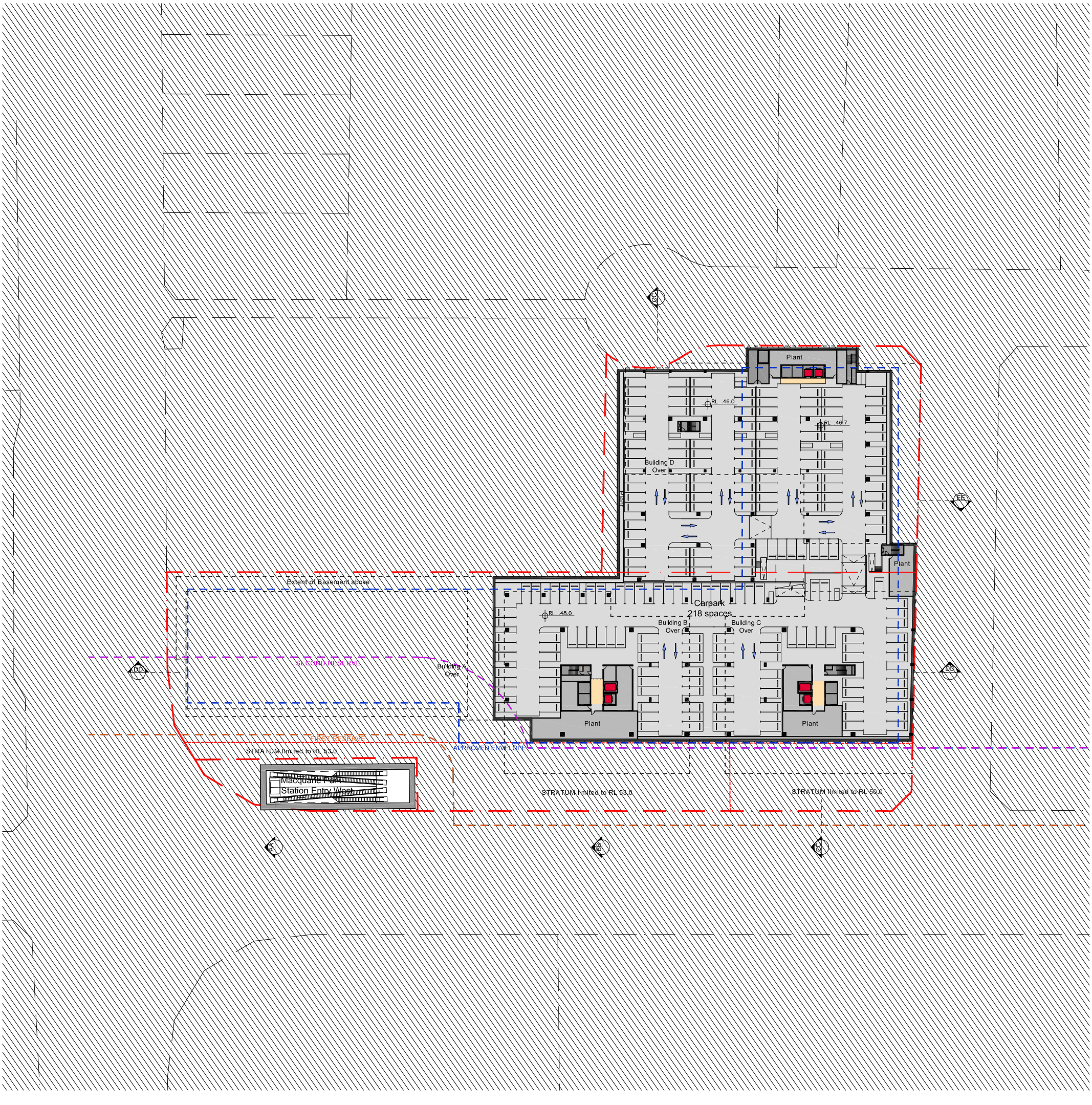
BATESSMART™

Macquarie Park Commerce Centre
Macquarie Park Station
Waterloo Road

Architectural Design Statement_Section 75W
S10758 June 2018

PA02[REV B]_004 Basement Level 004 Plan

Scale 1:1000



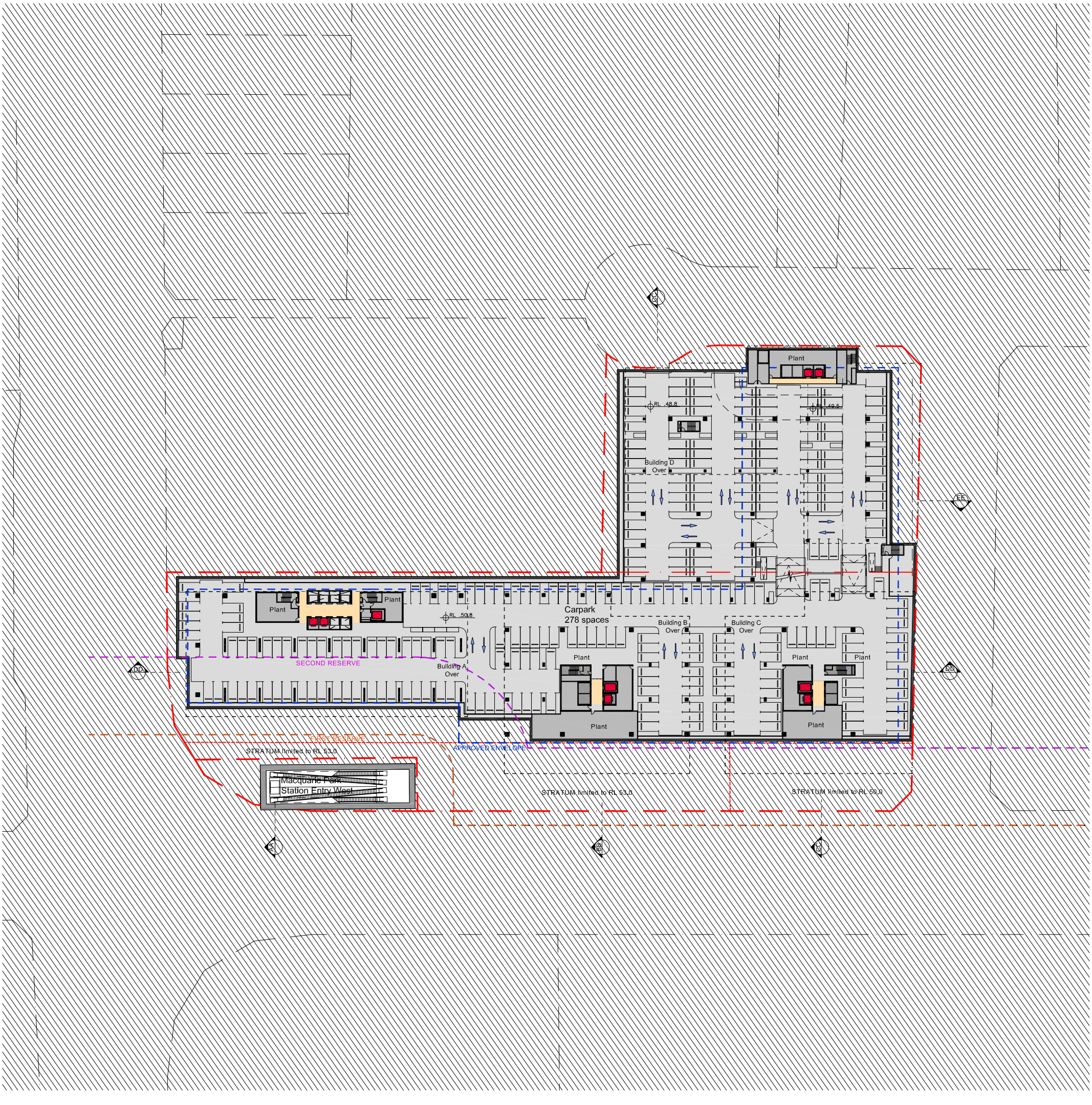
BATESSMART™

Macquarie Park Commerce Centre
Macquarie Park Station
Waterloo Road

Architectural Design Statement_Section 75W
S10758 June 2018

PA02[REV B]_003 Basement Level 003 Plan

Scale 1:1000



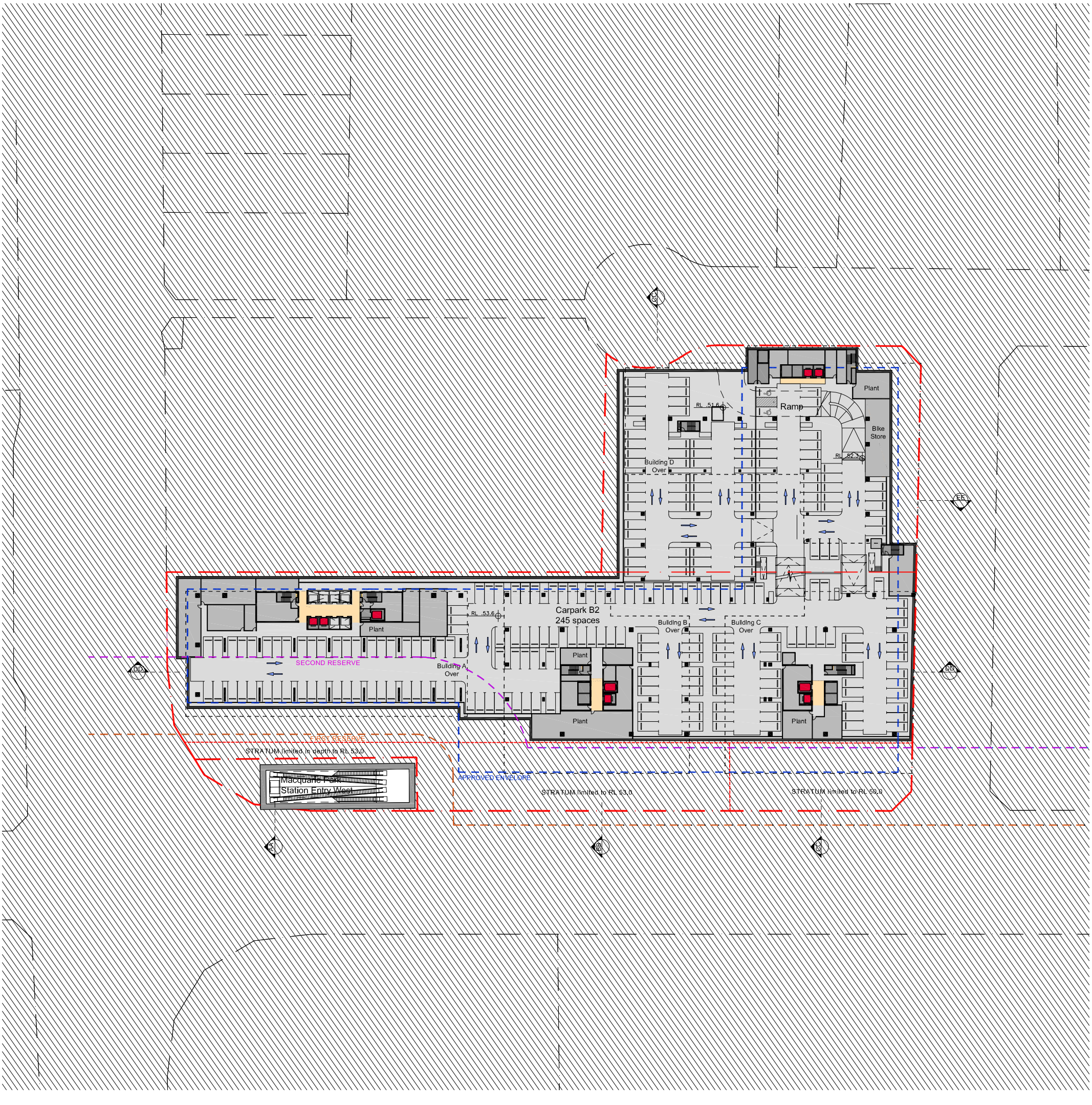
BATESSMART™

Macquarie Park Commerce Centre
Macquarie Park Station
Waterloo Road

Architectural Design Statement_Section 75W
S10758 June 2018

PA02[REV B]_002 Basement Level 002 Plan

Scale 1:1000



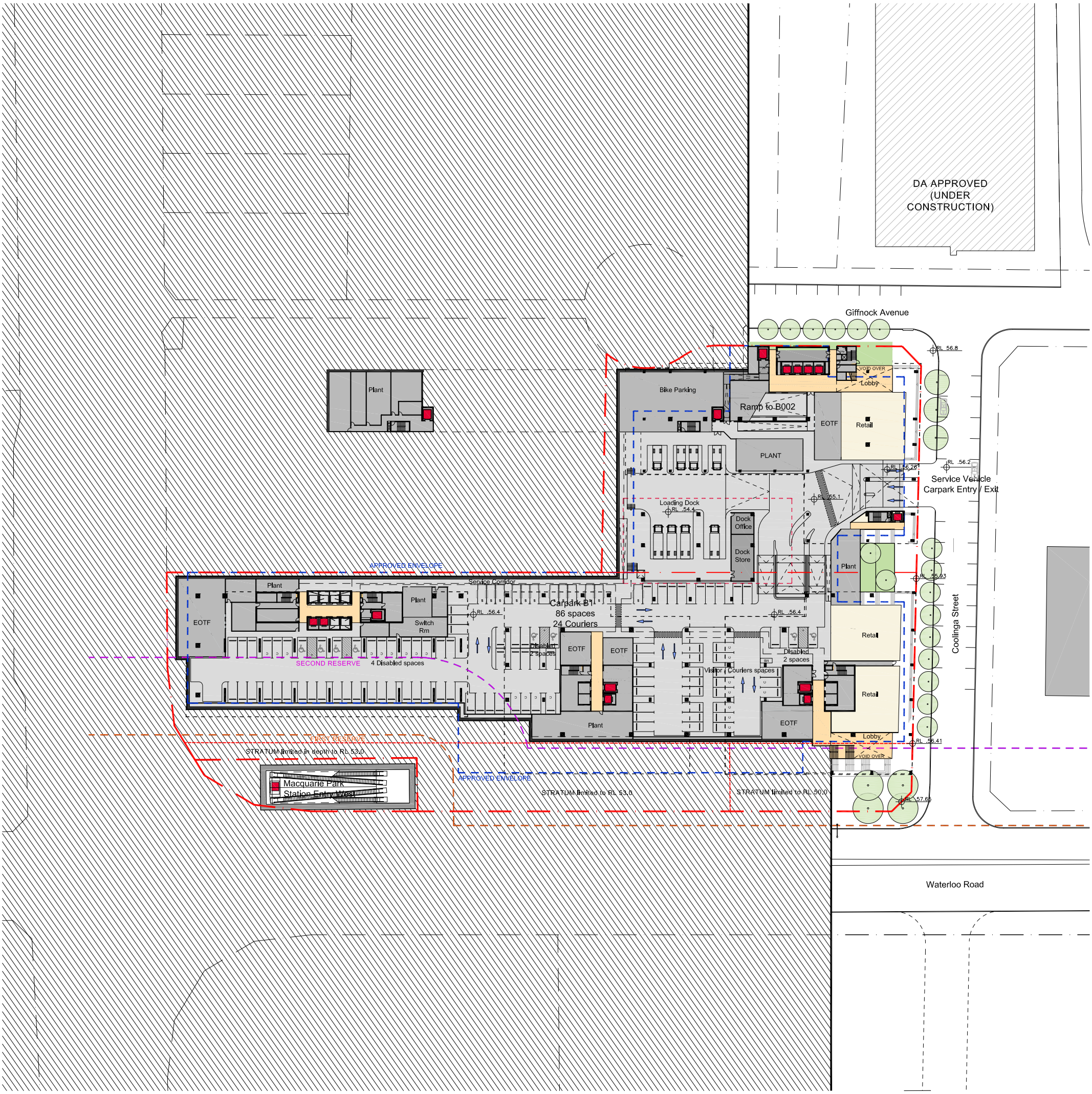
BATESSMART™

Macquarie Park Commerce Centre
Macquarie Park Station
Waterloo Road

Architectural Design Statement_Section 75W
S10758 June 2018

PA02[REV B]_001 Basement Level 001 Plan

Scale 1:1000



BATESSMART™

Macquarie Park Commerce Centre
Macquarie Park Station
Waterloo Road

Architectural Design Statement_Section 75W
S10758 June 2018

PA02[REV B]_00 Ground Level Plan

Scale 1:1000

Legend

New Trees

Existing Trees

DA APPROVED (UNDER CONSTRUCTION)

DA APPROVED (UNDER CONSTRUCTION)

Carpark Entry/Exit

Giffnock Avenue

Hyundai Building

Lane Cove Road

BOUNDARY

APPROVED ENVELOPE

Retail

BLDG A

BLDG B

BLDG C

BLDG D

Plaza

Macquarie Park Station Entry West

Service Vehicle & Carpark Entry/Exit

Coolinga Street

14.7M SETBACK (EXIST. BDY)

5.5M (MIN) SETBACK

Waterloo Road

PLAZA 66800

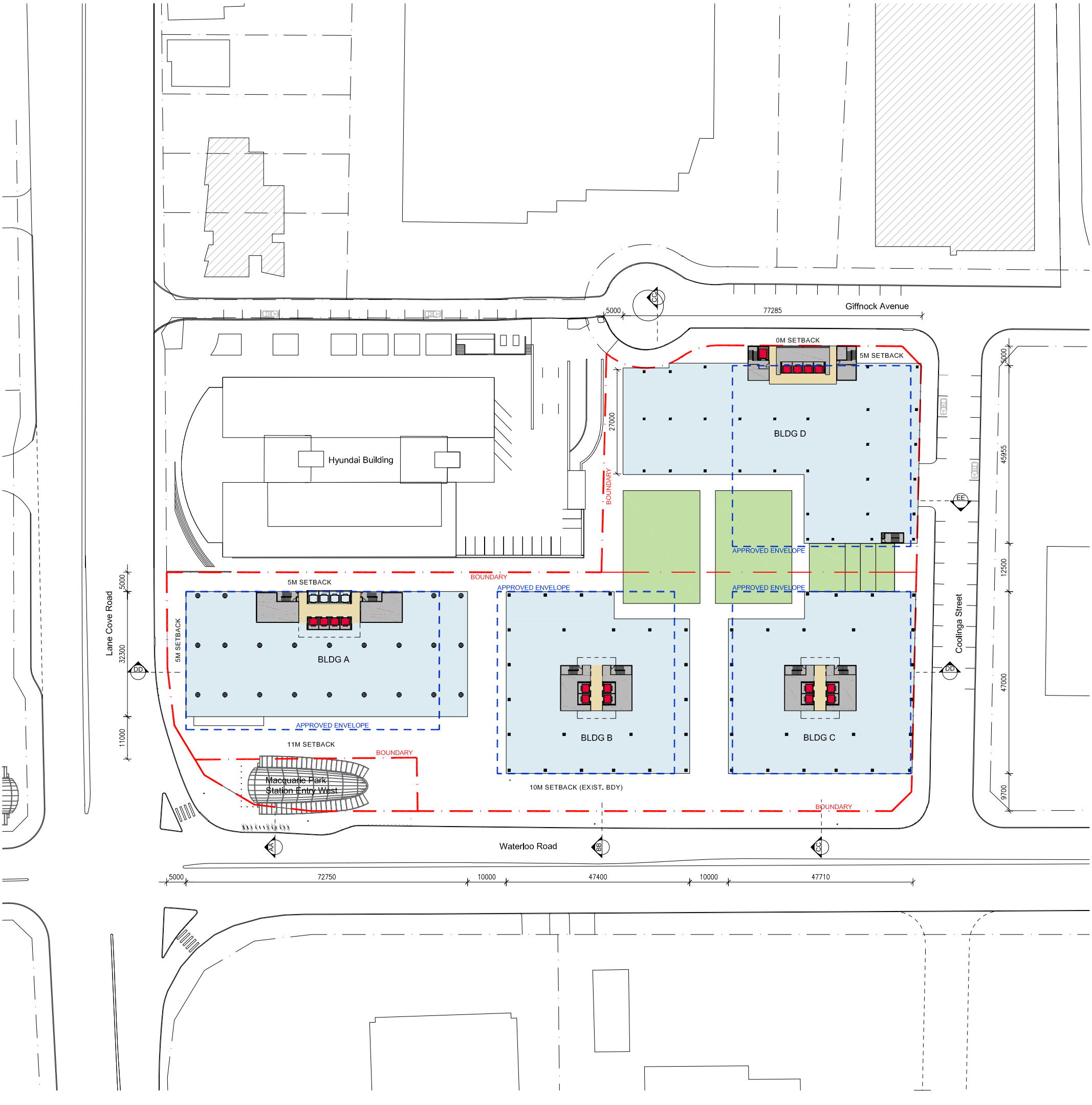
BATESSMART

Macquarie Park Commerce Centre
Macquarie Park Station
Waterloo Road

Architectural Design Statement_Section 75W
S10758 June 2018

PA02[REV B]_01 Typical Level Plan

Scale 1:1000



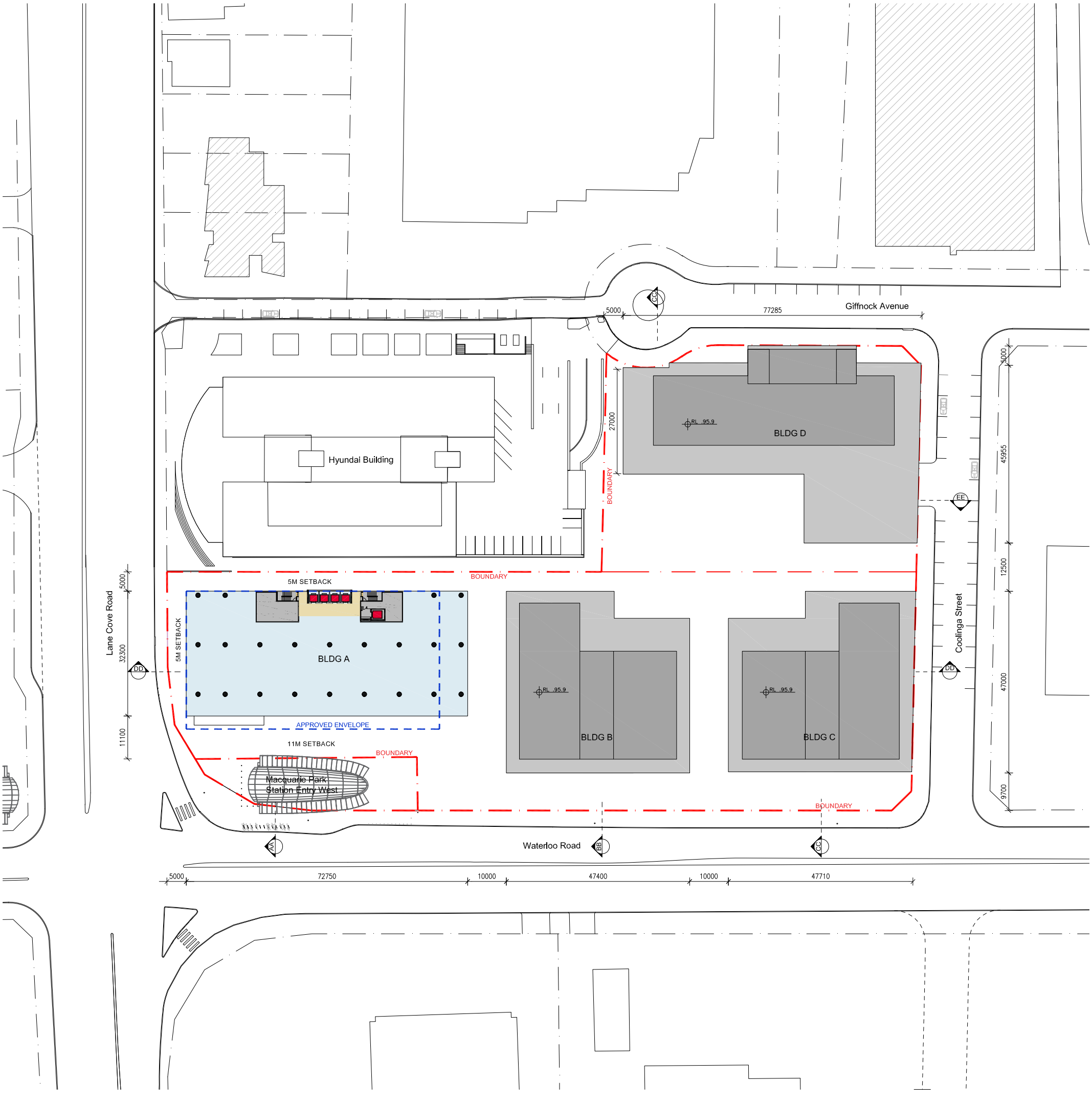
BATESSMART

Macquarie Park Commerce Centre
Macquarie Park Station
Waterloo Road

Architectural Design Statement_Section 75W
S10758 June 2018

PA02[REV B]_10 Upper Level Plan

Scale 1:1000



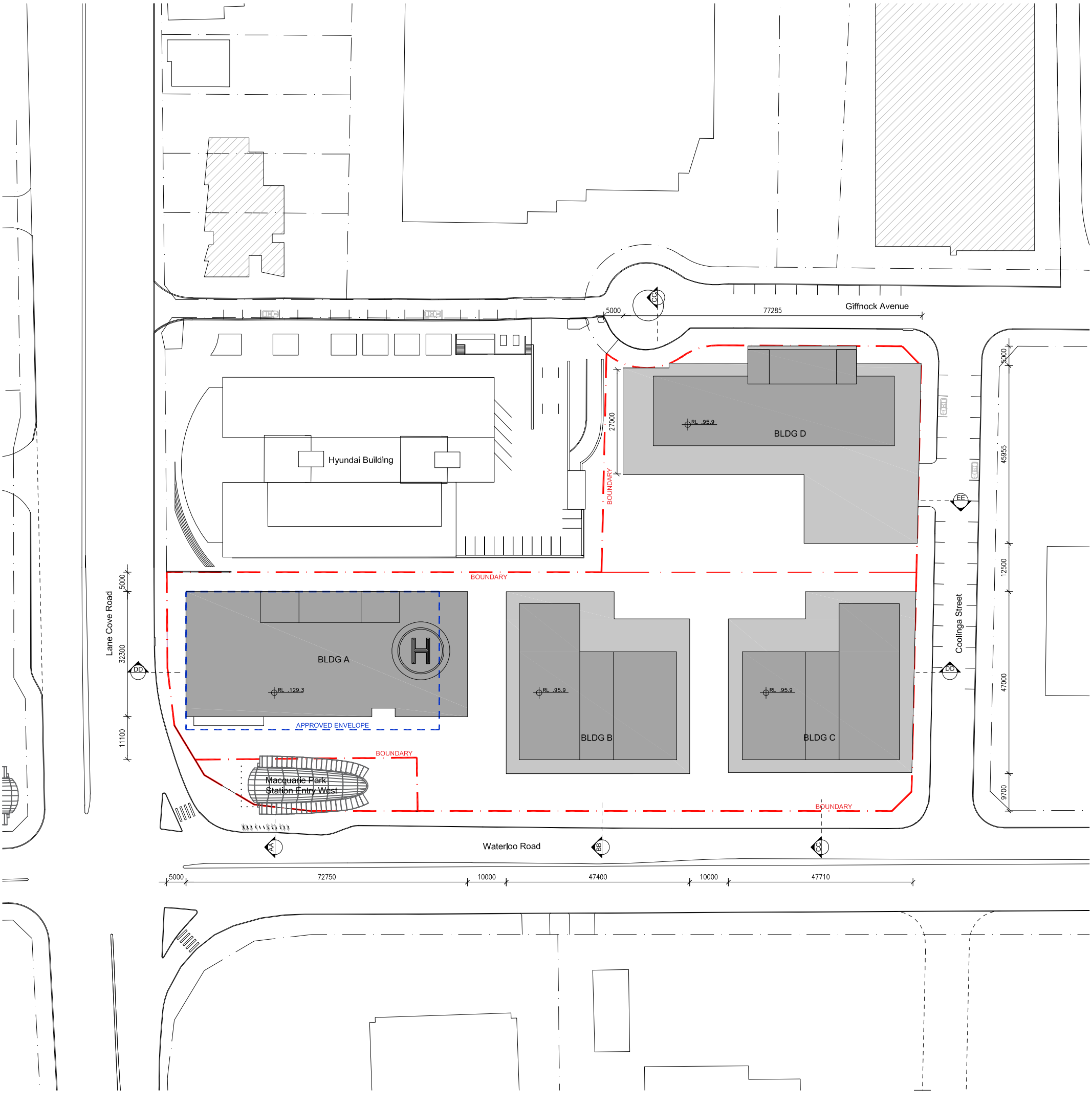
BATESSMART™

Macquarie Park Commerce Centre
Macquarie Park Station
Waterloo Road

Architectural Design Statement_Section 75W
S10758 June 2018

PA02[REV B]_20 Roof Plan

Scale 1:1000



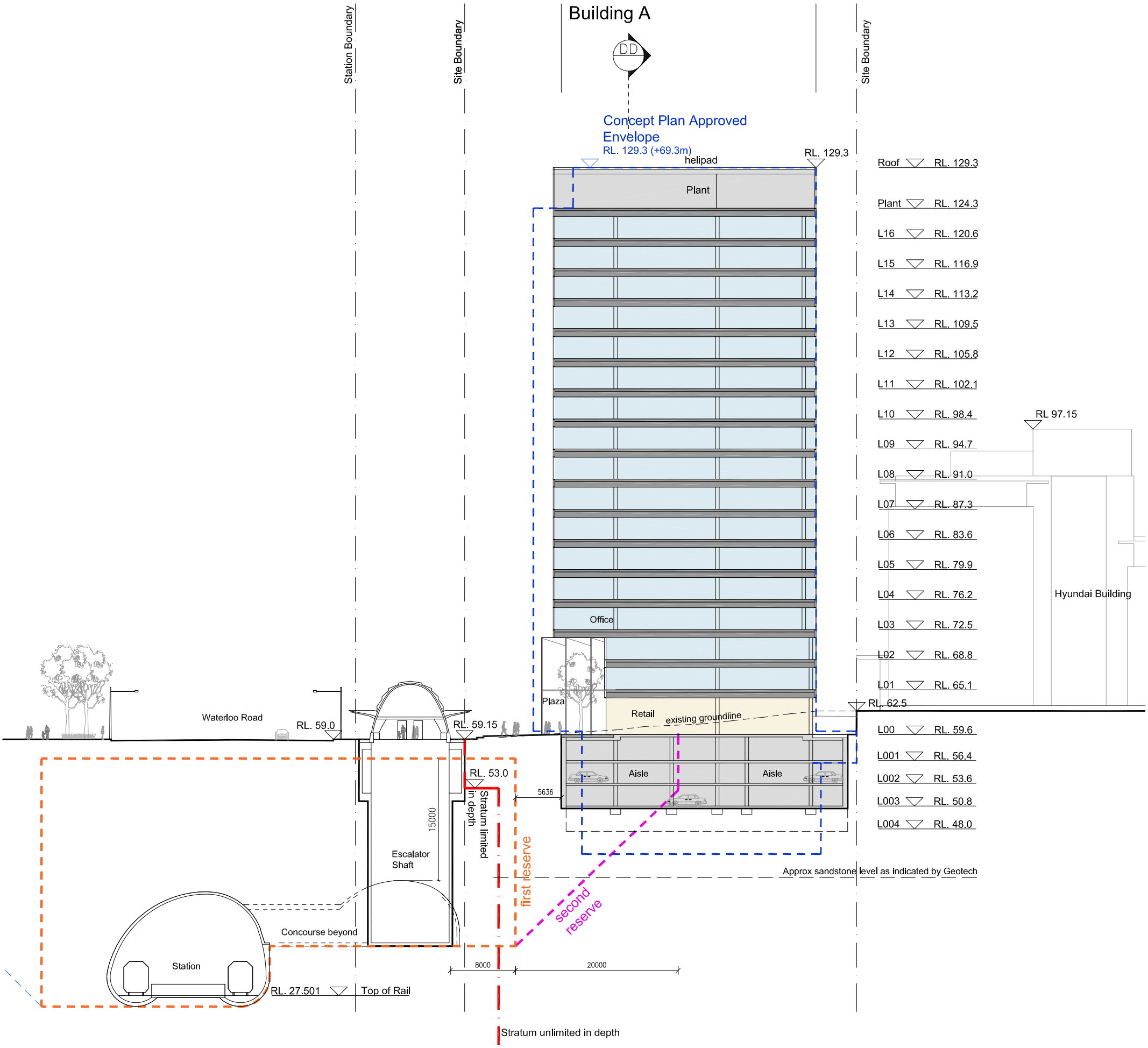
BATESSMART™

Macquarie Park Commerce Centre
Macquarie Park Station
Waterloo Road

Architectural Design Statement_Section 75W
S10758 February 2018

PA06-01[REV B] Section AA

Scale 1:500



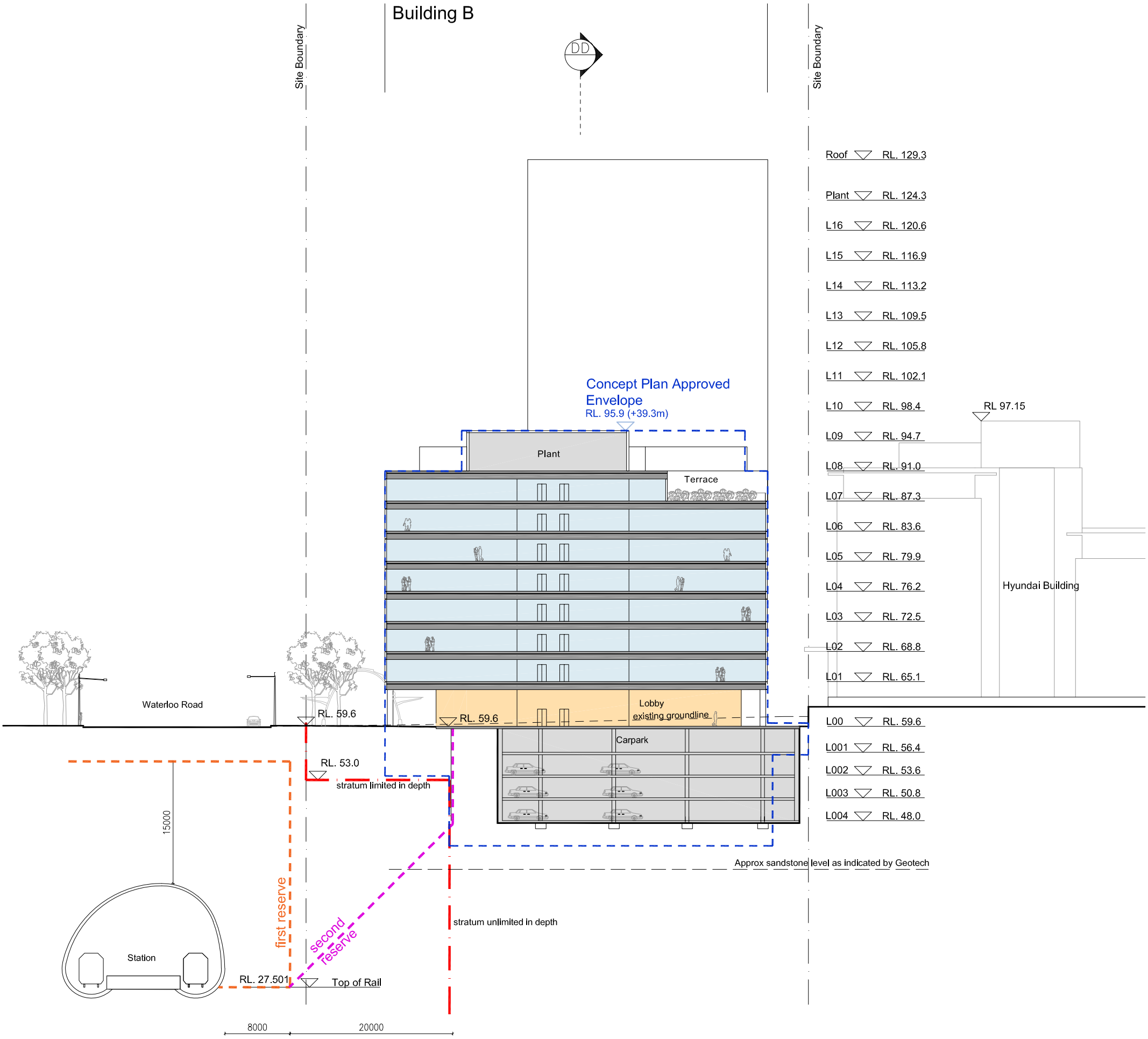
BATESSMART™

Macquarie Park Commerce Centre
Macquarie Park Station
Waterloo Road

Architectural Design Statement_Section 75W
S10758 February 2018

PA06-02[REV B] Section BB

Scale 1:500



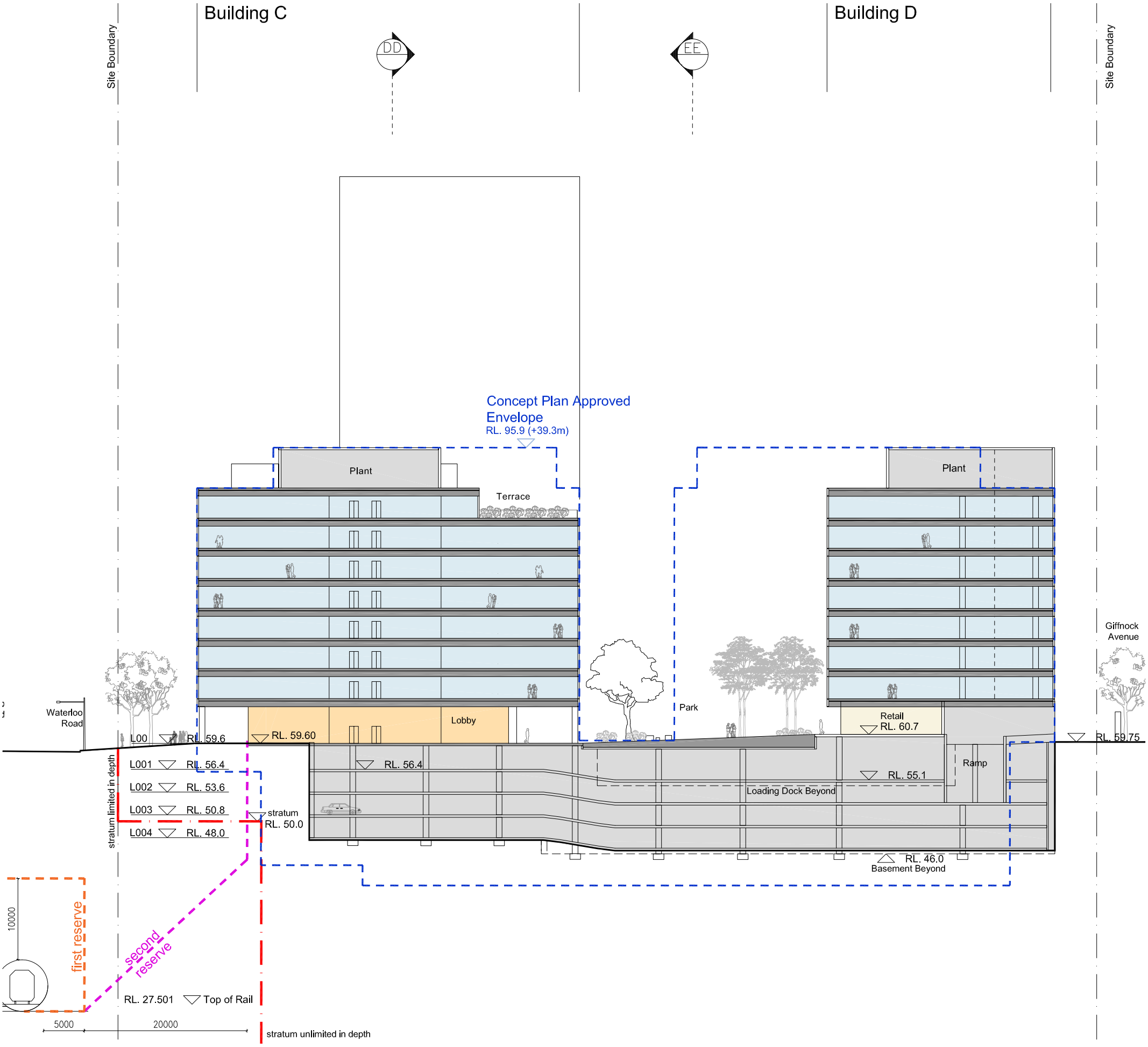
BATESSMART™

Macquarie Park Commerce Centre
Macquarie Park Station
Waterloo Road

Architectural Design Statement_Section 75W
S10758 February 2018

PA06-03[REV B] Section CC

Scale 1:500



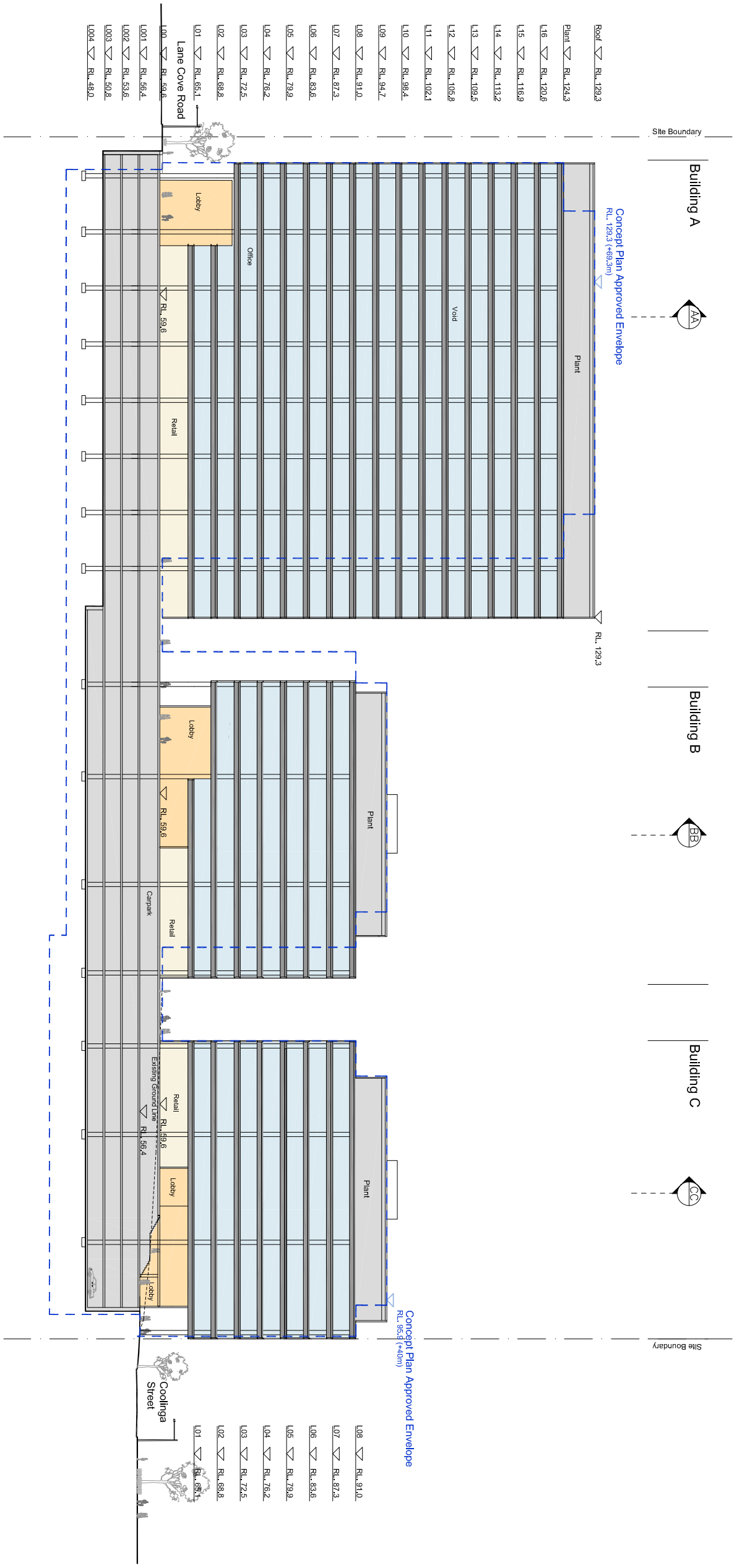
BATESSMART™

Macquarie Park Commerce Centre
Macquarie Park Station
Waterloo Road

Architectural Design Statement_Section 75W
S10758 February 2018

PA06-04[REV B] Section DD

Scale 1:750



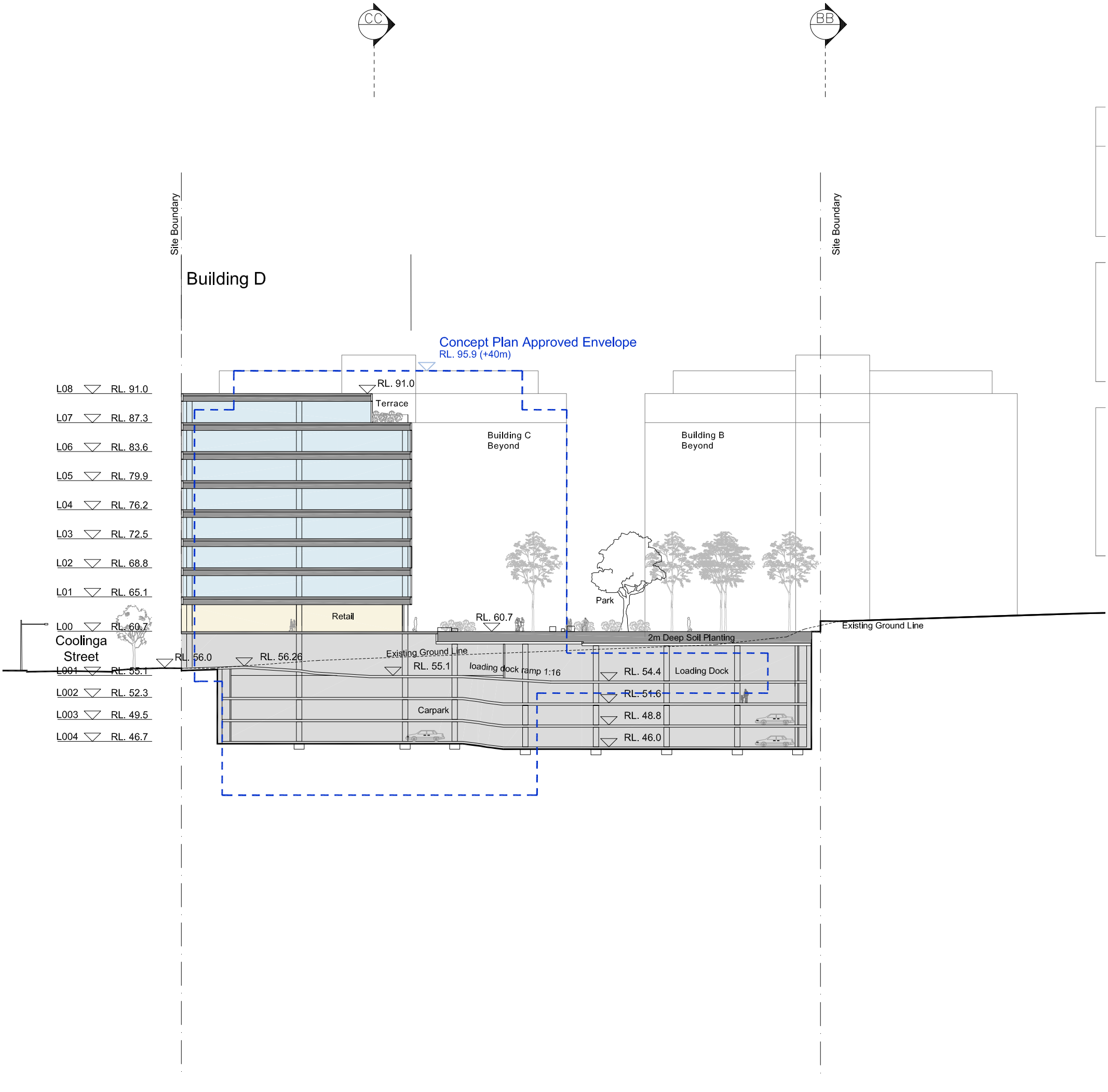
BATESSMART™

Macquarie Park Commerce Centre
Macquarie Park Station
Waterloo Road

Architectural Design Statement_Section 75W
S10758 February 2018

PA06-05[REV B] Section EE

Scale 1:500



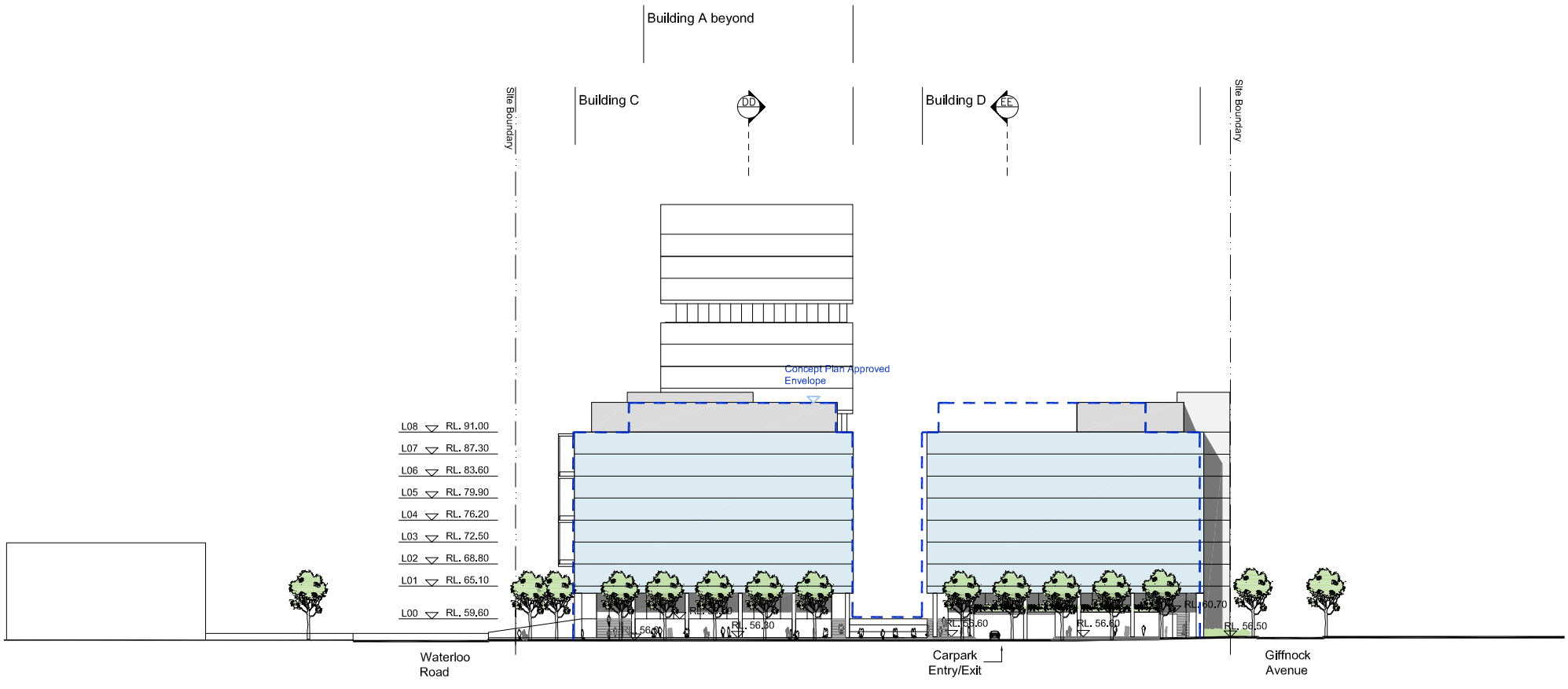
BATESSMART™

Macquarie Park Commerce Centre
Macquarie Park Station
Waterloo Road

Architectural Design Statement_Section 75W
S10758 June 2018

PA05-01 Elevations
[REV B]_Waterloo Road & Coolinga Street

Scale 1:1000



Coolinga Street Elevation

Waterloo Road Elevation

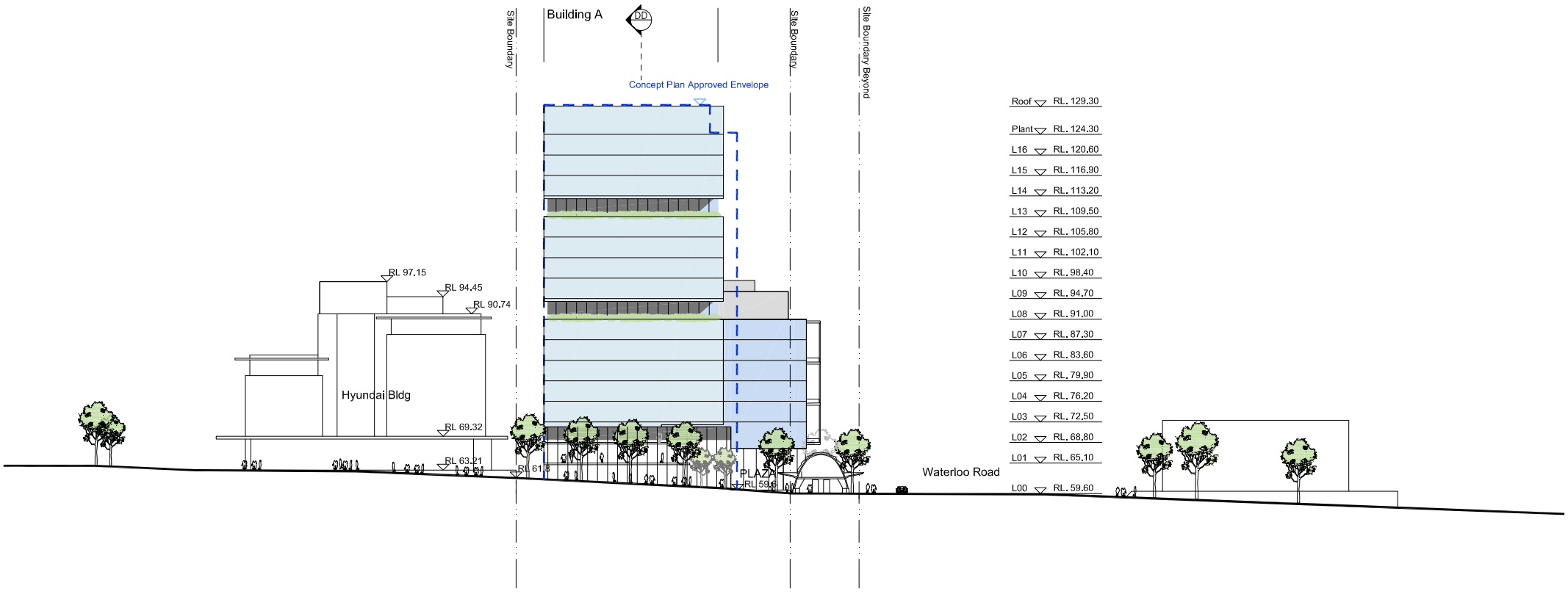
BATESSMART™

Macquarie Park Commerce Centre
Macquarie Park Station
Waterloo Road

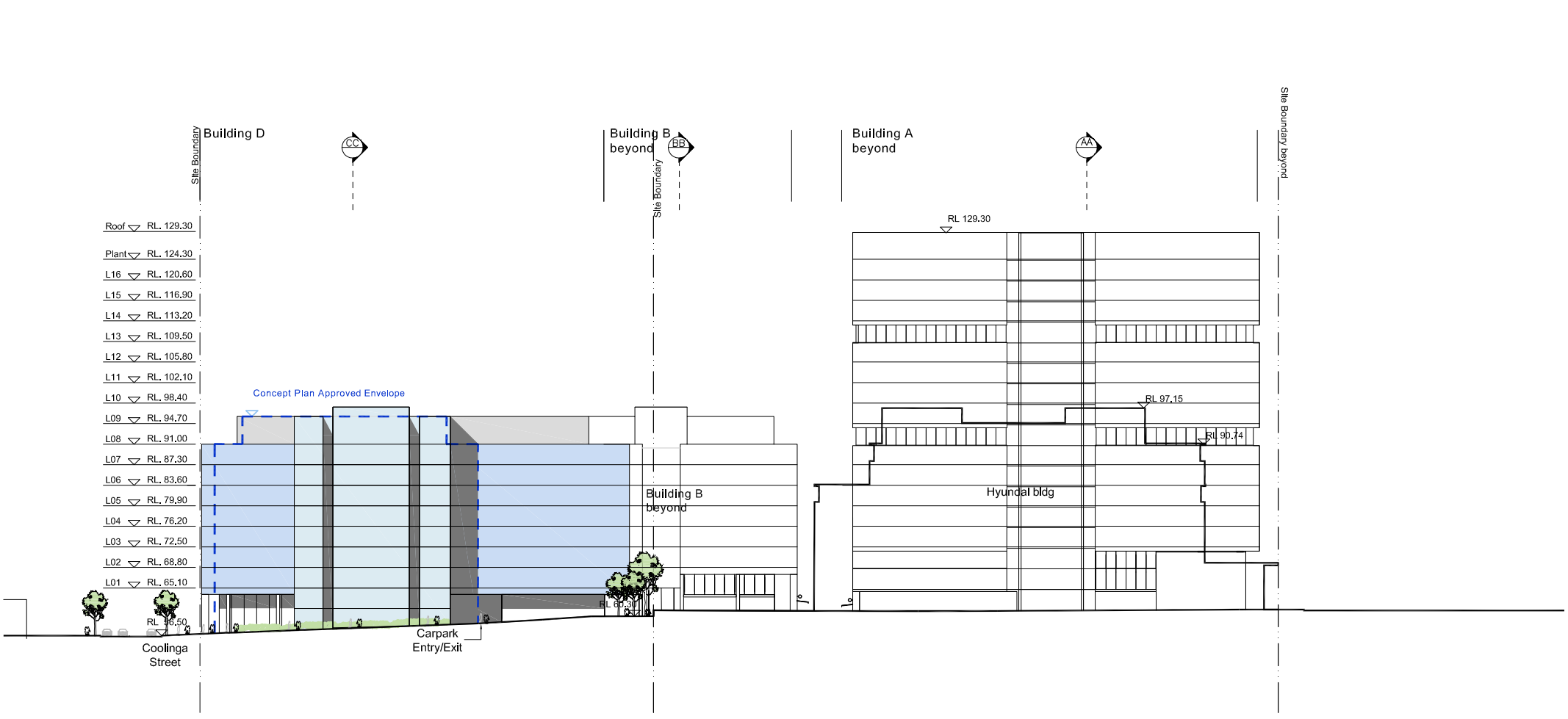
Architectural Design Statement_Section 75W
S10758 June 2018

PA05-02 Elevations
[REV A]_Lane Cove Road & Giffnock Avenue

Scale 1:1000



Lane Cove Road Elevation



Giffnock Avenue Elevation