Oran Park Podium Stage 2A

[DA Design Report]

October 2018

scott carver

Prepared for

[Greenfields Development Company Pty Ltd]
[Cnr Peter Brock Drive & Oran Park Drive]
[Oran Park NSW 2570]

Submission

[Development Application Submission]

Scott Carver Pty Ltd
Level One, One Chifley Square
Sydney NSW 2000 Australia
Telephone +61 2 9957 3988
www.scottcarver.com.au

Contents

Introduction

Introduction

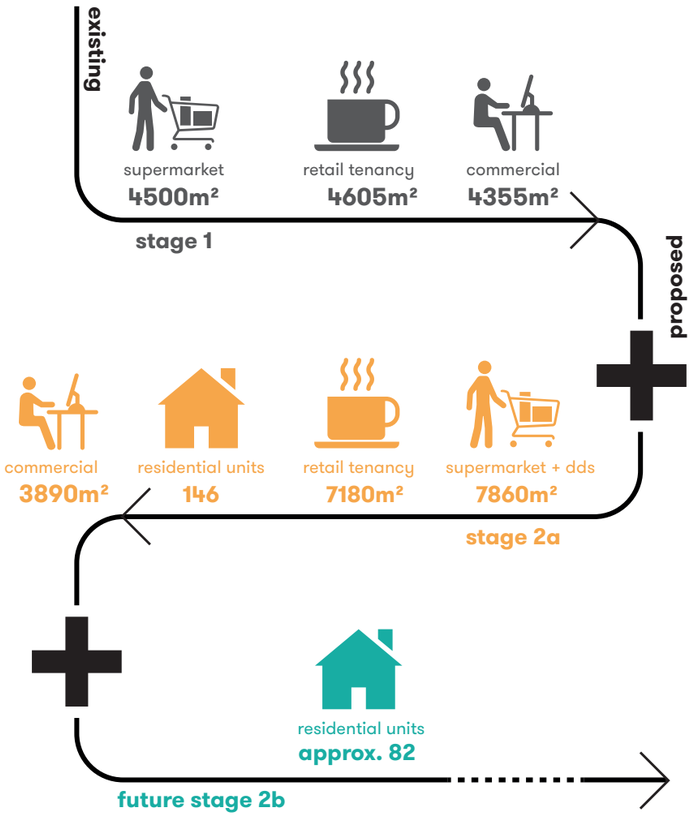
Purpose of this report

This Design Report has been prepared by Scott Carver in support of the Development Application submitted to Camden Council by Greenfields Development Company, in relation to the expansion of the existing Oran Park Podium retail centre and the proposed construction of residential apartments above the retail centre.

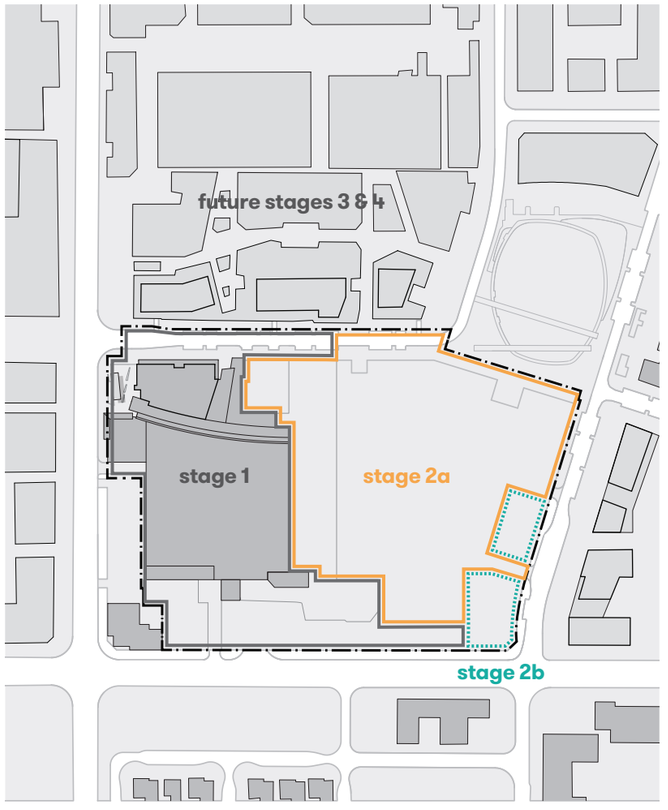
The report outlines the proposal in relation to its significant location within the Oran Park Town Centre and the opportunity to make a landmark statement at the nexus of the civic, community and open space heart of the Town Centre.

In relation to the residential component of the proposal, the report outlines the response to the Design Quality Principles of State Environmental Planning Policy No 65 and the Apartment Design Guide [ADG].

This report should be read in conjunction with the architectural drawings prepared by Scott Carver, the Statement of Environmental Effects prepared by UrbanCo and the other supplementary reports prepared by the proposal's consultant team.



Uses + stages



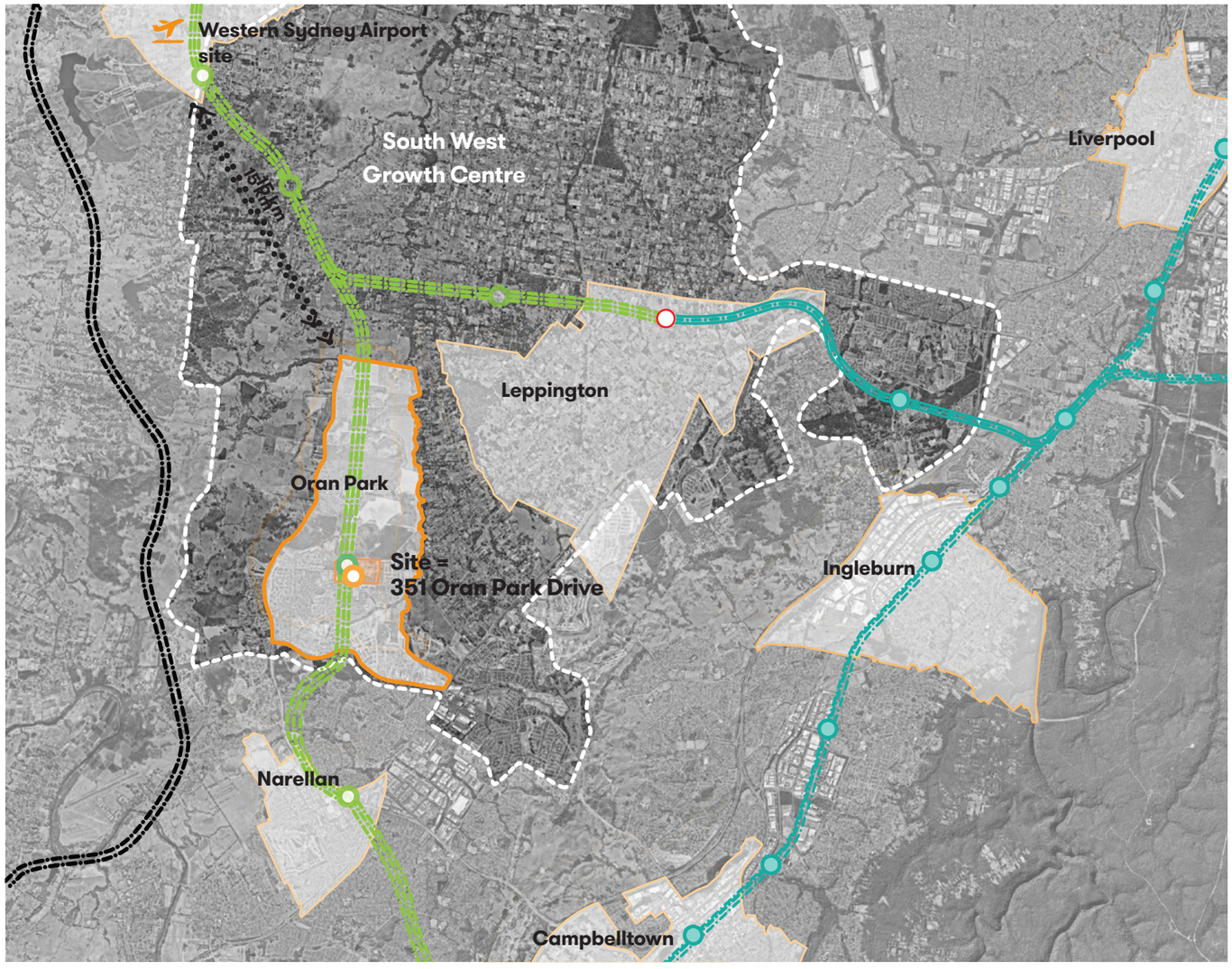
Stages

Site Analysis

02

Site Analysis

[Wider Context Plan]



Oran Park

Oran Park is situated within the south west growth centre of Sydney. 15 km from the future western Sydney air port site.

- SITE
- ORAN PARK TOWN CENTRE
- ORAN PARK
- NEIGHBOURING SUBURBS
- EXISTING RAIL LINE
- PROPOSED RAIL LINK EXTENSION
- PROPOSED OUTER SYDNEY ORBITAL CORRIDOR

Site Analysis

[Local Context Plan]

SITE

ORAN PARK TOWN CENTRE

PROPOSED RAIL CORRIDOR

Site Analysis

[Aerial Photograph]

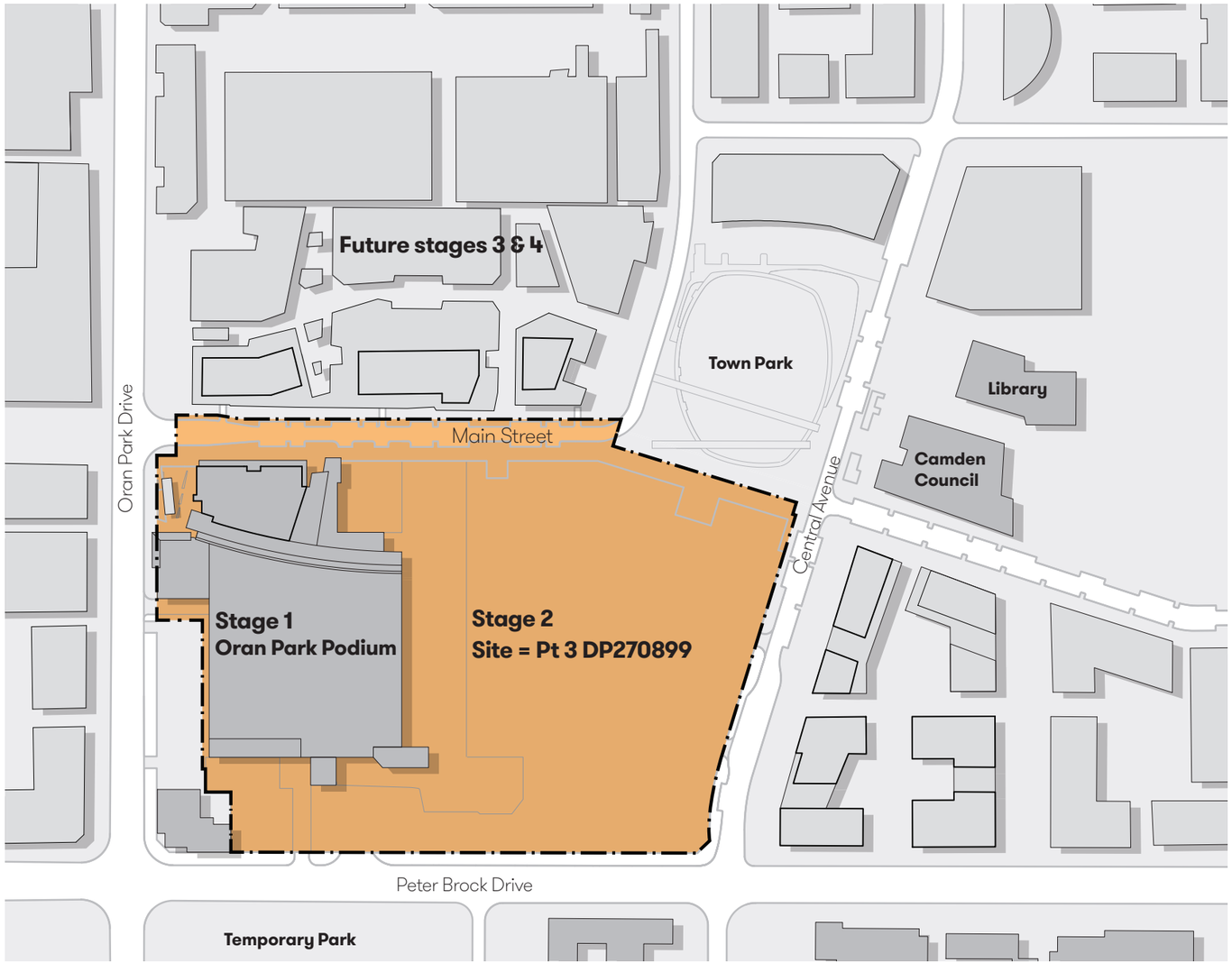
SITE STAGE 2

SITE STAGE 1

ORAN PARK TOWN CENTRE

Site Analysis

[Site Context Plan]



Site Characteristics

The site of the proposal, which includes the existing Oran Park Podium retail centre, is 55,260 sqm in area and is part of a larger landholding earmarked for the further expansion of the retail centre under the Town Centre Masterplan.

The site is surrounded on three sides by public roads. Oran Park Rd, the major access road to the Town Centre from the south, Peter Brock Drive, connecting the Town Centre to The Northern Road and Central Ave, the civic spine of the Town Centre. To the north is the established Town Park, jointly funded and constructed by the applicant and NSW Urban Growth. Also, to the north is Main St, a suspended roadway on the Podium property, which is proposed to be extended east and which becomes pedestrianised between the Town Park and the expanded retail centre.

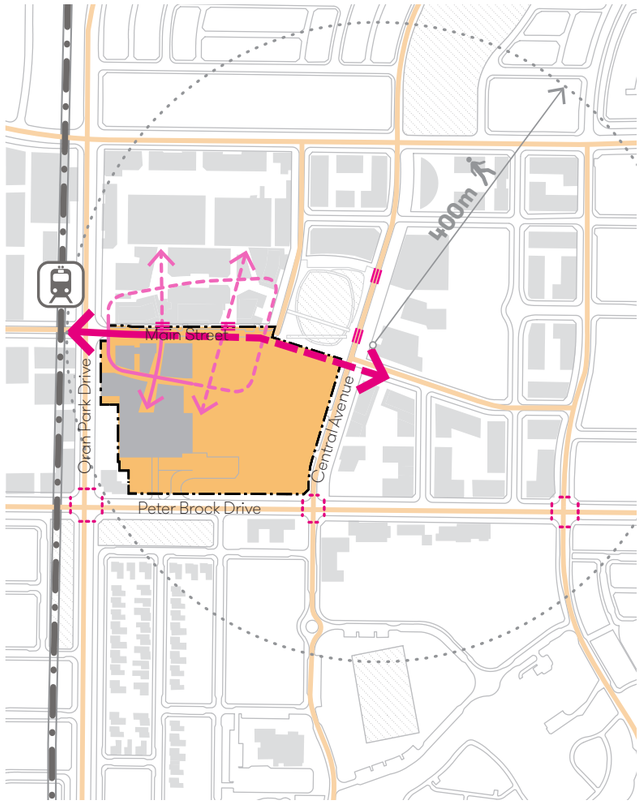
An area of the site fronting Central Ave and Peter Brock Drive has been set apart for the development of additional residential buildings in the future.

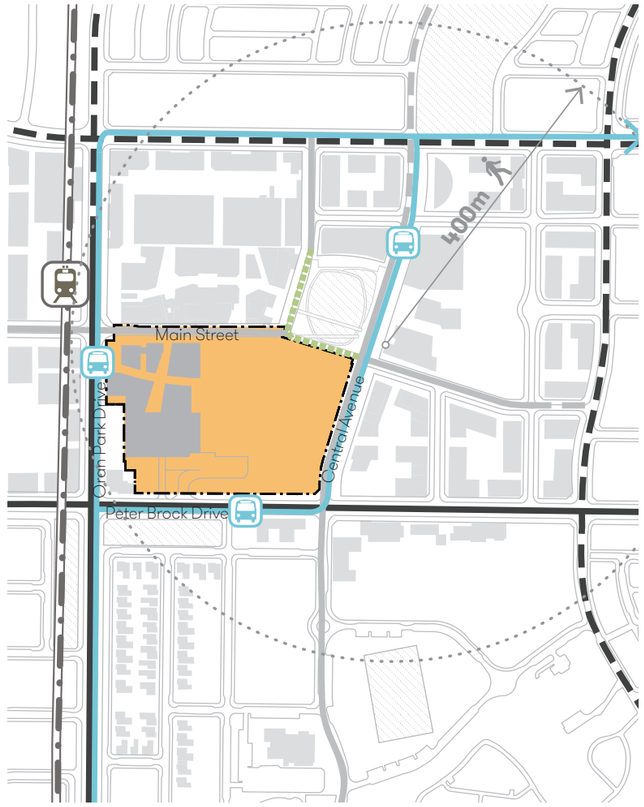
The edge of the site falls approximately 0.5m from west to east and a further 0.5m from north to south along Central Avenue. Given the length of the property boundaries these relatively minor falls have not restricted continuation of the retail centres main floor and at grade access can be provided to all new entry points to the retail centre and residential entries.

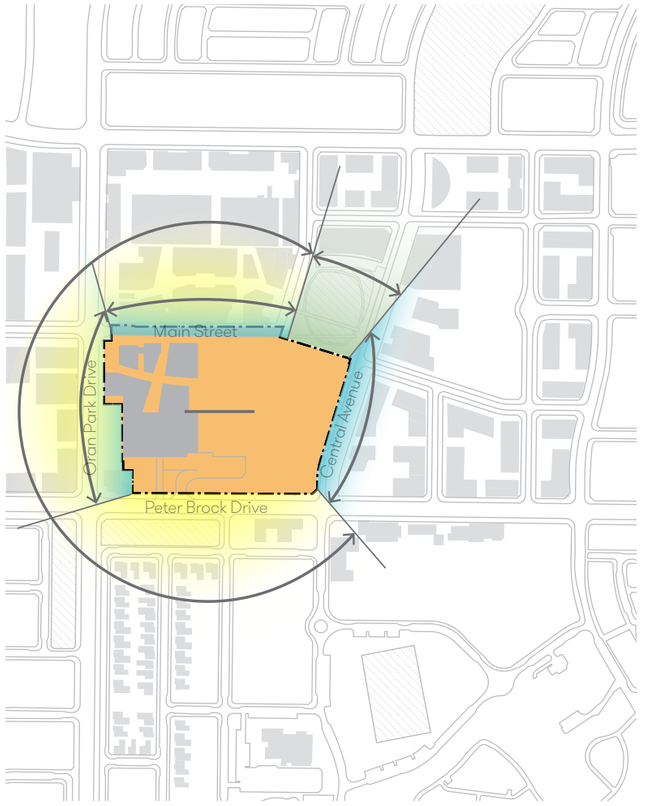
The area of the property where the new work is proposed has already been partially excavated in anticipation of the expansion of the basement parking.

Address	351 Oran Park Drive
Zoning	B2 Local Centre SEPP [Sydney Regional Growth Centres] 2006
Total Site Area	55,260 sqm

Site Analysis







Pedestrian and Cycle Movement

- *SITE*
- *PEDESTRIAN - EXISTING*
- *PEDESTRIAN - FUTURE*
- *PEDESTRIAN RETAIL - EXISTING*
- PEDESTRIAN RETAIL - FUTURE
- BICYCLE MOVEMENT - FUTURE (DCP)
- ZEBRA CROSSING
- TRAFFIC LIGHT CROSSING

Transport and Roads

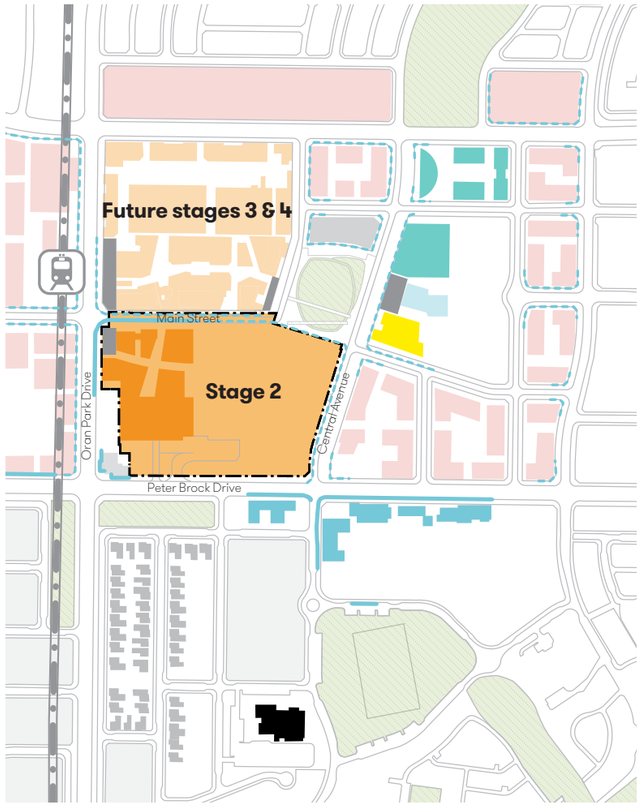
- SITE
- MAIN ROADS - EXISTING
- MAIN ROADS - FUTURE
- SECONDARY ROADS - EXISTING
- SECONDARY ROADS - FUTURE
- FUTURE BUS ROUTES (DCP)
- PROPOSED RAIL CORRIDOR
- CALMED STREET

Views and Vistas

- SITE
- STREET VIEWS
- TOWN PARK VIEWS
- DISTANT VIEWS

Site Analysis

[Land Uses]



Land use

- SITE
- EXISTING COUNCIL
- EXISTING RESIDENTIAL
- FUTURE RESIDENTIAL
- CHURCH
- EXISTING STAGE 1 [RETAIL]
- FUTURE RETAIL (DCP)
- EXISTING EDUCATION
- LIBRARY UNDER CONSTRUCTION
- FUTURE LEISURE
- FUTURE MIXED USE
- PLAZA
- PUBLLC OPEN SPACE
- ACTIVE STREET FRONTAGE -EXISTING
- ACTIVE STREET FRONTAGE - FUTURE (DCP)

Site Analysis Summary

The site occupies a substantial footprint at the heart of the Oran Park Town Centre, at the nexus of civic, community, open space and retail uses. The perimeter road and pedestrian network provides exceptional connectivity to these uses, with growing transport options, which will only be enhanced with the proposed North South Rail corridor to Oran Park and beyond.

The northern and easterly facing aspect provides excellent opportunities for solar access to residential apartments with open vistas across the Town Park and at levels above the podium, to distant views over Oran Park to the Blue Mountains.

The openness of the site in the north east corner facilitates the location of a significant residential component providing iconic built form as key visual markers in the urban fabric of the Town Centre. The location of a tall building element on the corner of the Town Park and Central Ave will have no adverse environmental impact on either the Town Park or the Civic precinct, minimal impact on the mixed-use precinct to the east, and no impact on any residential areas.

The expansion of the Oran Park Podium retail centre is intended to provide an enhanced food and beverage offering with the opportunity for outdoor dining, activating the precinct beyond normal shop opening hours and introduce a commercial building to further invigorates and supports the Town Centre activity. The synergy between mixed-use retail and commercial with the residential development identifies this site is an ideal location for increased residential density and building height.

Urban Design Analysis

Strengthen Opportunities

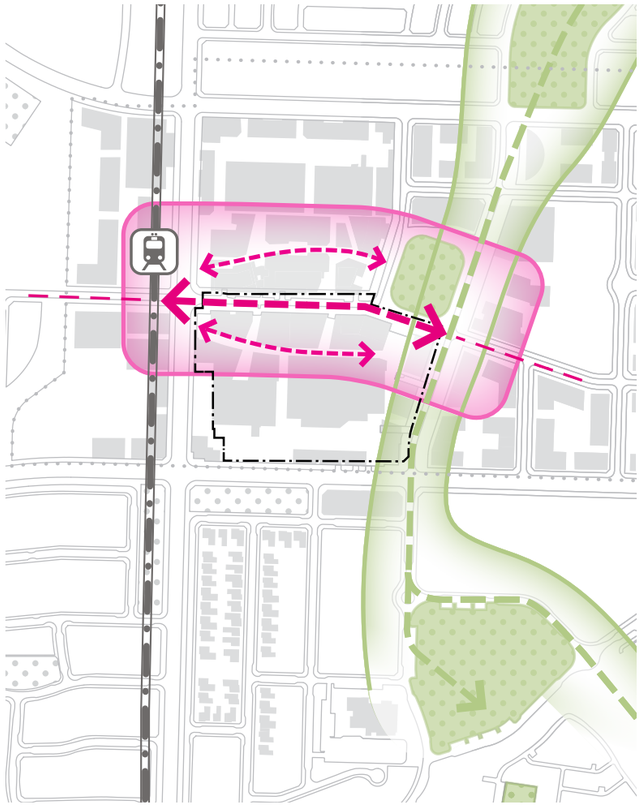
The Stage 2 development of the Town Centre plays a pivotal role in enhancing the structure and character of the Oran Park Town Centre. The Stage 2 Development is located at the nexus of the 'urban axis' and the 'nature axis'.

The urban axis is primarily defined by the Main Street, which is linked to the nature axis to the East. The nature axis ensures a variety of connected open spaces within the Oran Park Town Centre.

The existing Town Park is located adjacent to the Civic Node and is the iconic open space along the nature axis.

The Stage 2 development has extensive frontage along both the urban and the nature axis and fronts onto the Town Park.

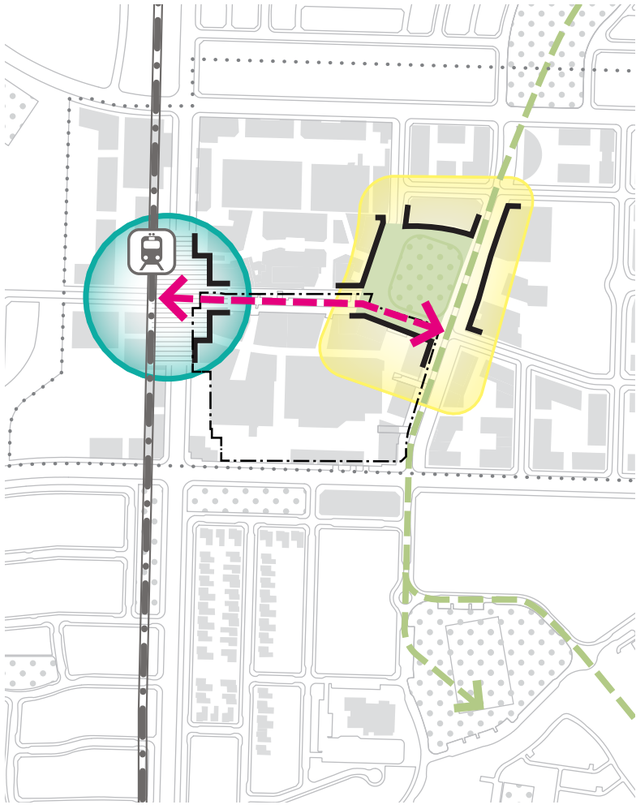
As a result the Stage 2 development is ideally positioned to be the landmark development that visually anchors the Main Street and the Civic Node.



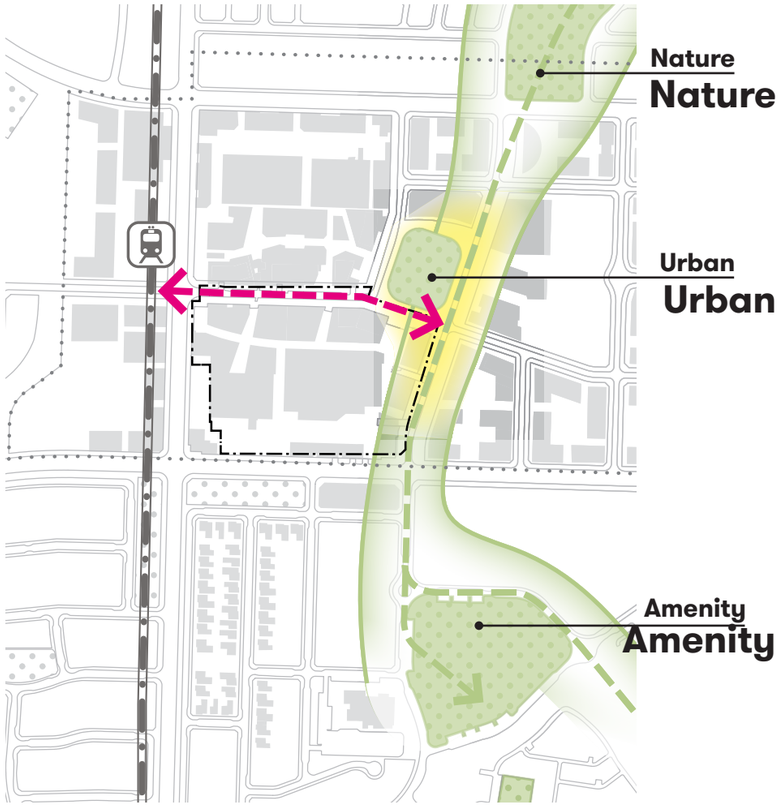
Urban + Nature Axis

Urban axis

Nature axis



Defining Main Street



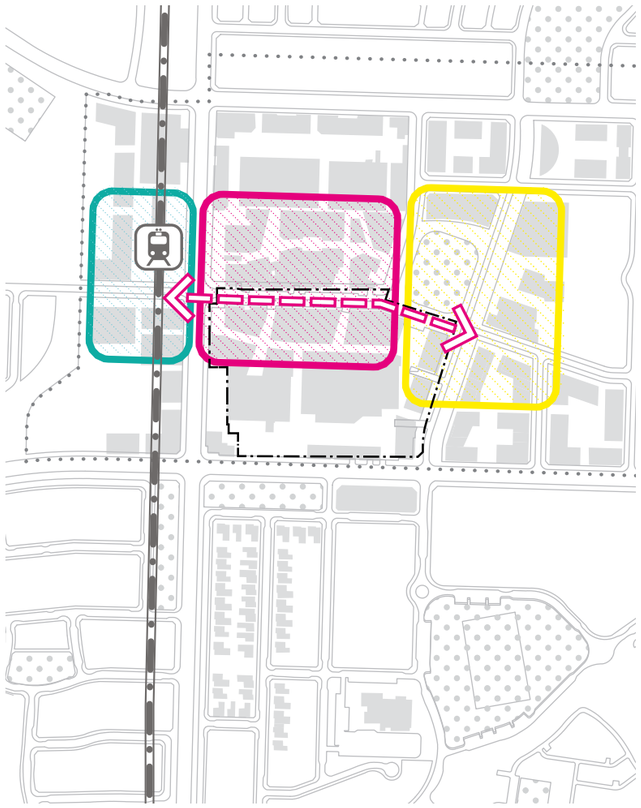
Variety Along Green Corridor

Reinforce Town Centre Structure

The Stage 2 development is located in the heart of the Town Centre next to the Town Park, Library and Council Offices. It is therefore a strategic development and part of the broader 'Civic' precinct.

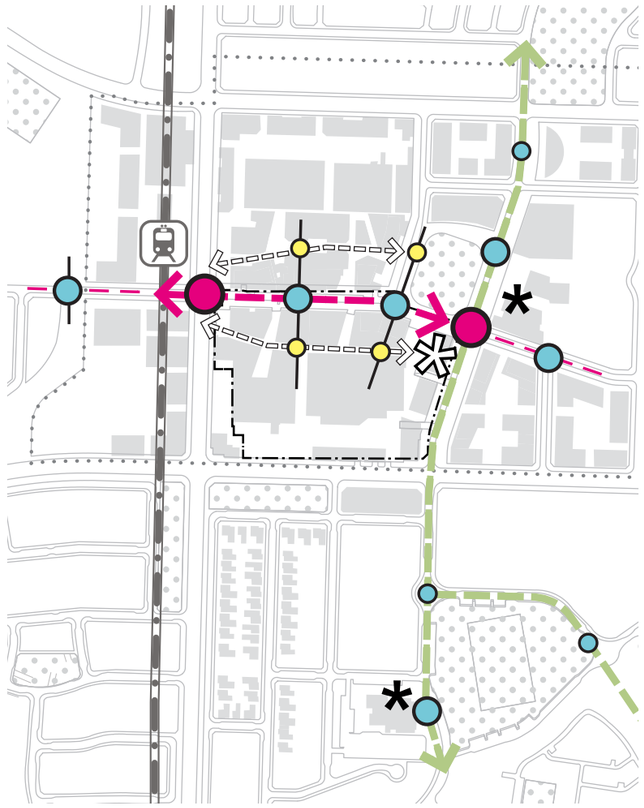
Due to it's location, the Stage 2 development will comprise of a vibrant ground level activation through active edges that foster interaction between the public domain and the retail centre.

A variety of visual nodes, open spaces and pedestrian linkages further reinforce the Stage 2 development and overall Town Centre Structure and the delivery of a walkable and legible Town Centre that is a pleasant, activated and safe.



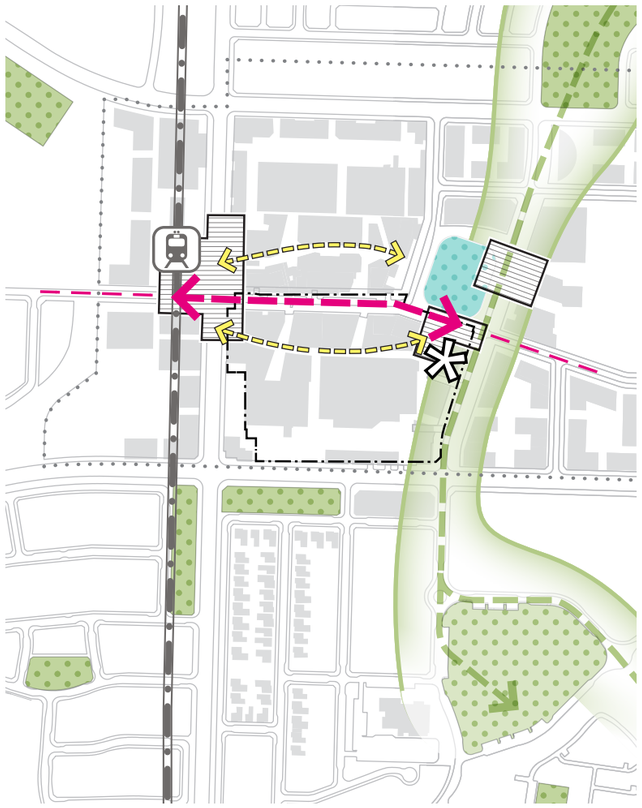
Key Precincts

- Gateway Precinct
- Main Street Precinct
- Civic Precinct
- Town Square
- Train



Nodes +Linkages

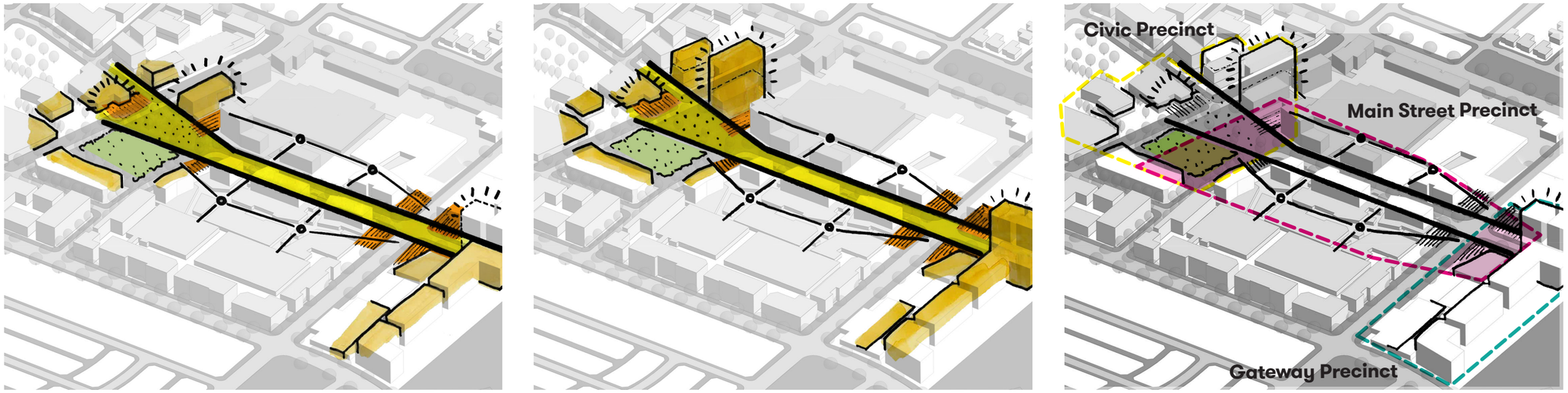
- Pedestrian
- Main Street
- Activity Nodes
- Public Space
- Special Buildings
- Major Node
- Secondary Node
- Internal Node



Variety of Open Spaces

- Urban Park
- Amenity Park
- Nature Park
- Internal retail
- Plaza

Balancing Precincts in Overall Town Centre



The Gateway Precinct will encourage density and height. The Civic Precinct at the other end of the Main Street with augmented height and density counter balances the Gateway Precinct, ensuring activity and Town Centre gravitas around the Civic Precinct as the heart of the community.

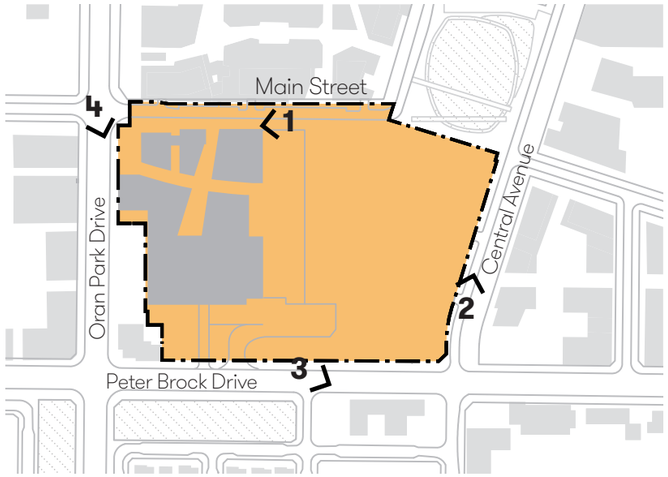
Allowance for focused distribution of height and density around the Gateway and the Civic Precinct ensures a balanced Town Centre, whilst becoming the anchors of the Main Street. The Stage 2 development is strategically positioned adjacent to the park and additional amenities. Increased height and density here will activate the Civic Precinct and support the retail centre.

Built Form

Town Centre Evolution

[Streetscapes]

Key Plan



Streetscape Character

The character of the Oran Park Town Centre is in a state of evolution. Prior to the construction of the Camden Council Administration Building, the area was dominated by the Podium retail centre with its 4 storey commercial component on the corner of Oran Park Drive and Main St and the smaller scaled Sales and Information Centre on the Peter Brock Drive Corner. The Council Administration Building is now complete and operational, and the adjoining Library is under construction. Both have significant setbacks from the street alignment creating public open space in front of them.

No development currently exists to the north, east or west. To the south, on the opposite side of Peter Brock Drive, is a single storey child care centre and a temporary park earmarked for medium density residential development. Beyond that the streetscape character becomes one and two storey single residences.

The conclusion that can be drawn is that the Oran Park Podium development will continue to provide the dominant streetscape character, extending the two storey scale retail character along Main St to the corner of Central Avenue and returning down Central Avenue for distance of approximately 30 metres, before being articulated by the residential Building 2 Entry. The remainder of the building is setback and comes to the ground prior to the location of the residential carpark entry. The remaining frontage of Central Avenue anticipates future multi-unit residential development, with the opportunity for courtyards and street address for ground floor apartments. A proposed 4 storey Commercial building will sit between the proposed Residential Building 1 and existing commercial building to consolidate the frontage of Main Street.

There will be no significant change to the streetscape in Peter Brock Drive as the retail component is well setback, in line with the existing.

[1] Main Street

[2] Central Avenue

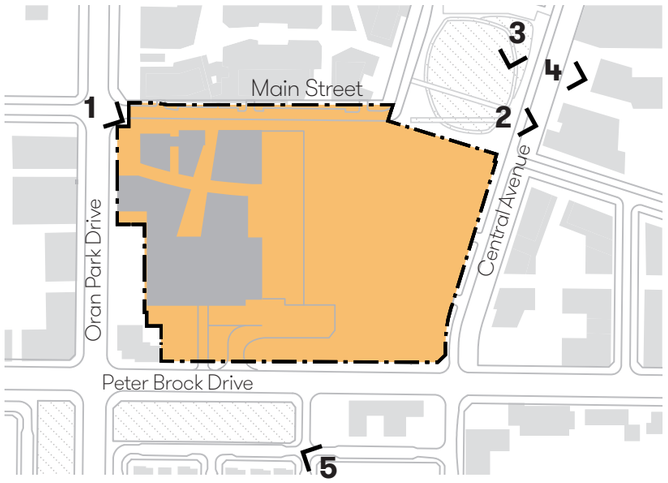
[3] Peter Brock Drive

[4] Oran Park Drive

Town Centre Evolution

[Built Character, typologies and materials]

Key Plan



[1] Oran Park - Stage 1

[2] Camden Council

[3] Town Park Pavilions

Built Character

As can be seen from the limited number of buildings completed or proposed in the immediate vicinity, there is a diversity of architectural expression. The Council Administration Building and the Library building are of significant architectural quality. Of lesser quality, but still expressing a unique architectural character is the 4 storey commercial component of the Oran Park Podium. The retail centre itself is not untypical of contemporary, cost effective retail architecture.

The extension of the retail centre will occupy approximately 70% of the street frontage between the existing commercial building and Central Ave. This provides the opportunity to redefine the architectural character of the street front and to provide a coherent, relational transition to the proposed residential buildings.

The intention is to provide a built character consistent with the Oran Park Precinct DCP 2007 objective of providing “high quality built form and energy efficient architectural design that promotes a ‘sense of place’ and modern character for the Town Centre”.

[4] Library - Construction Completed

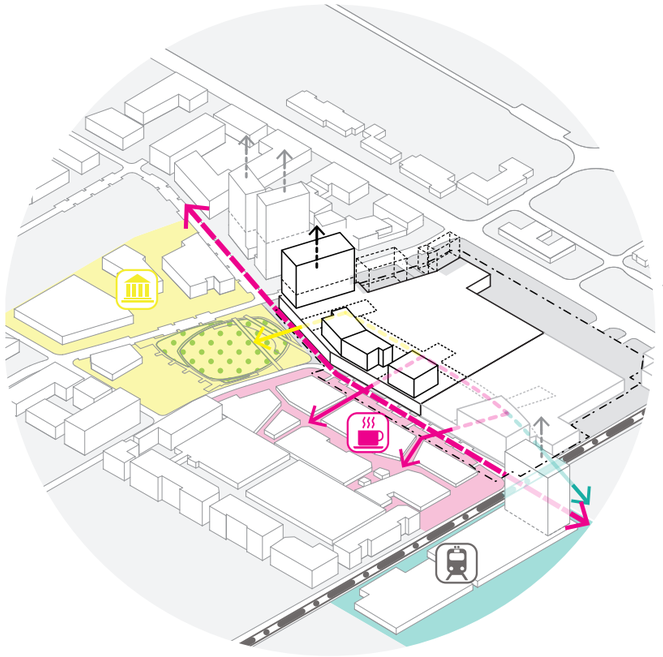
[5] Private Residential

Design Principles

The Stage 2 development of the Town Centre represents an opportunity to enhance the structure and character of the Oran Park Town Centre. Oran Park is currently undergoing a population growth at a considerable rate and with this growth: a vibrant and connected town centre is pivotal to success of Oran Park.

The key elements of Stage 2 of the town centre are:

- A **landmark development and visual anchor** to announce the nexus of the 'urban axis': Main Street and the 'nature axis': Central Avenue and the arrival at the Civic Precinct. The Stage 2 development is ideally positioned to be the landmark development that visually anchors the Main Street and the Civic Node.
- A **balanced Town Centre**. Allowance for focused distribution of height and density around the Gateway Precinct and the Civic Precinct ensures a balanced Town Centre, whilst becoming the anchors of the Main Street. Increased height and density here will activate the Civic Precinct and support the retail centre, generating local job opportunists and increased amenity.
- Reinforcing a **connected and walkable town centre**, with pedestrian linkages to stage 1, future developments and the Town Park.
- A **vibrant ground level with active edges** fosters the **interaction between the public domain and the retail centre**. Weather protected outdoor rooms for café and restaurant dining connect the retail to the public domain.
- Reinforcing the **Town Centre as place for social gathering and community interaction**. The 'Market Place' dining precinct reinforces the town centre as the social hub, as it becomes an extension of the Town Park.
- **Bringing the outside in**: a naturally ventilated wintergarden connects the "Market Place" to the Town Park. Day light and sky views are brought into pedestrian links and into the marketplace through large light canons, high level windows and angled entry canopies.
- A **vibrant community of diverse social interactions**: by providing a variety of apartment typologies and communal open space that is bursting with community activities and programmed spaces.



Concept Diagram

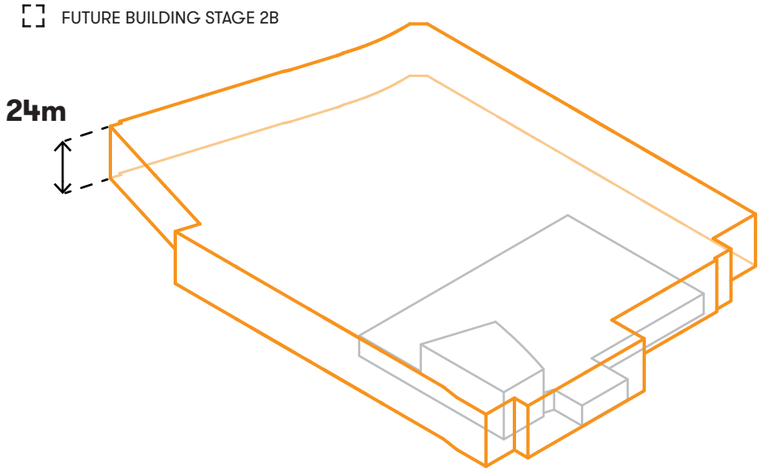
GATEWAY PRECINCT
MAIN STREET PRECINCT (INCLUDING FUTURE STAGES)
CIVIC PRECINCT
GREEN SPACE
PROPOSED BUILDING STAGE 2A
FUTURE BUILDING STAGE 2B
SURROUNDING BUILDING
DENSITY GROWTH
MAIN STREET

Massing Strategy

[Study on the development of the building form and key design strategies.]

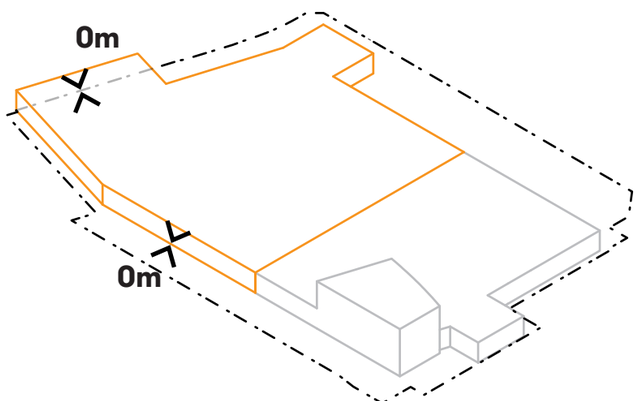
LEGEND

FUTURE BUILDING STAGE 2B



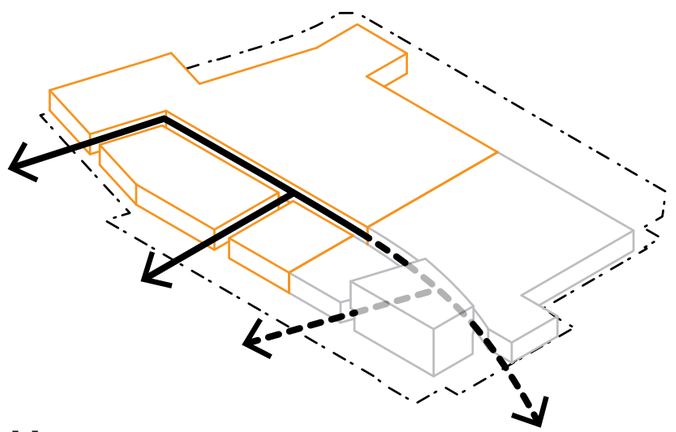
[1]

Building envelope



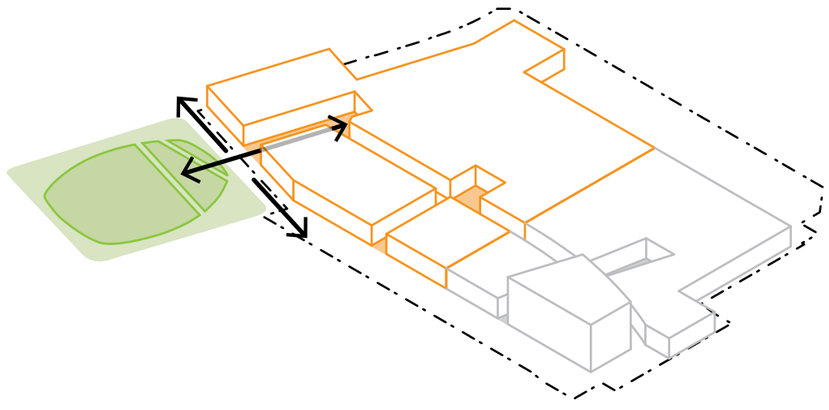
[2]

Site setbacks + Retail massing



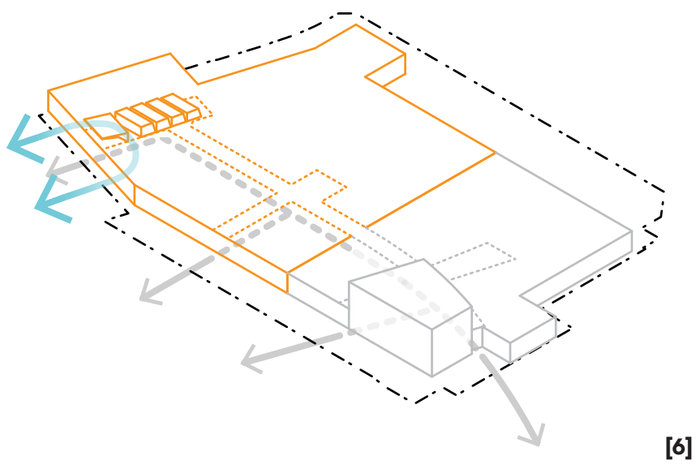
[3]

Site links + Circulation



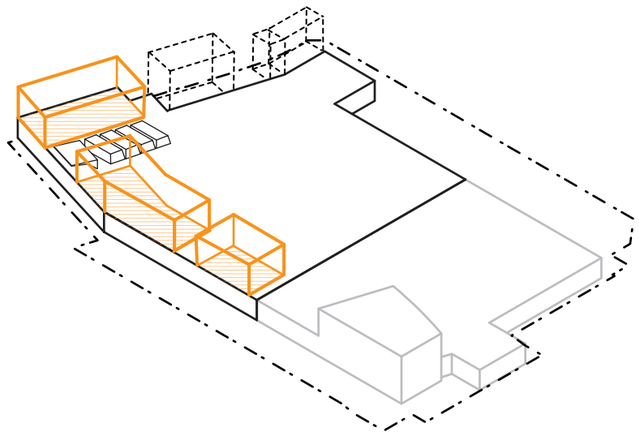
[4]

Orientate link to Park and add Marketplace



[5]

Introduce daylight into the Marketplace



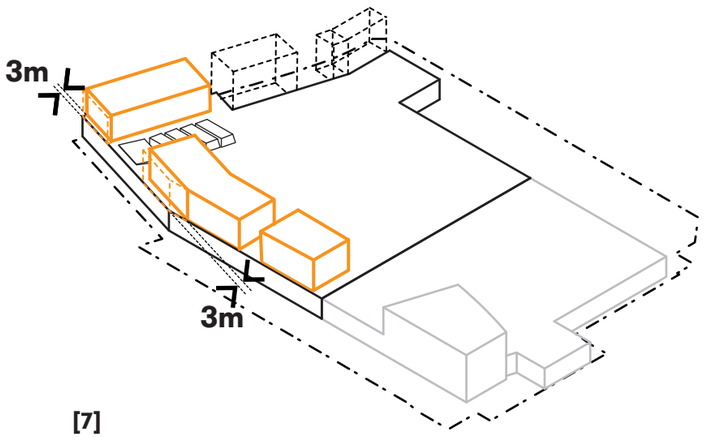
[6]

Residential + Commercial frontage to streets

Massing Strategy

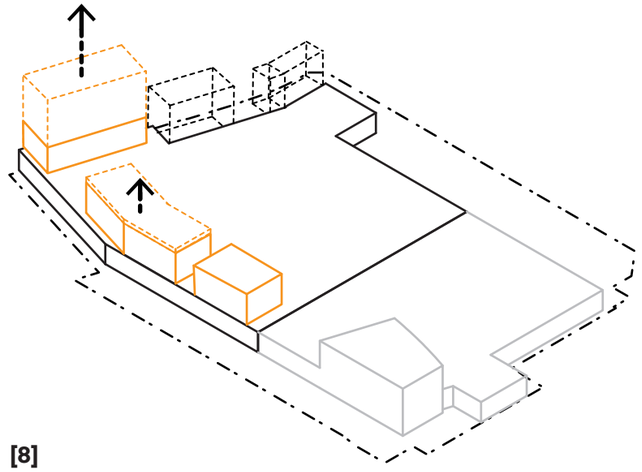
LEGEND

FUTURE BUILDING STAGE 2B



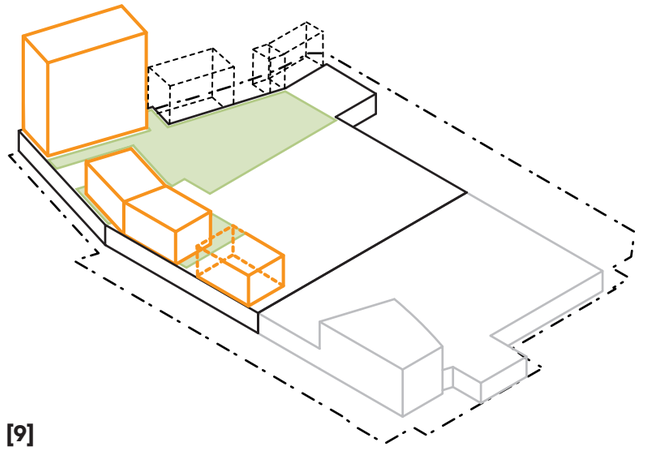
[7]

Set back from street to define Retail



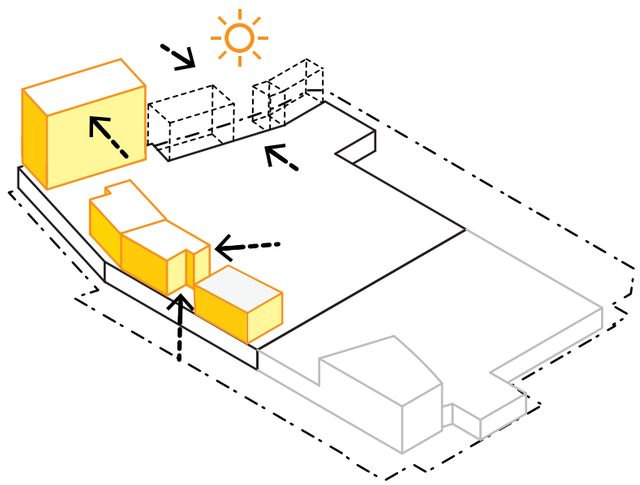
[8]

Increase density at view points and town centre anchor points



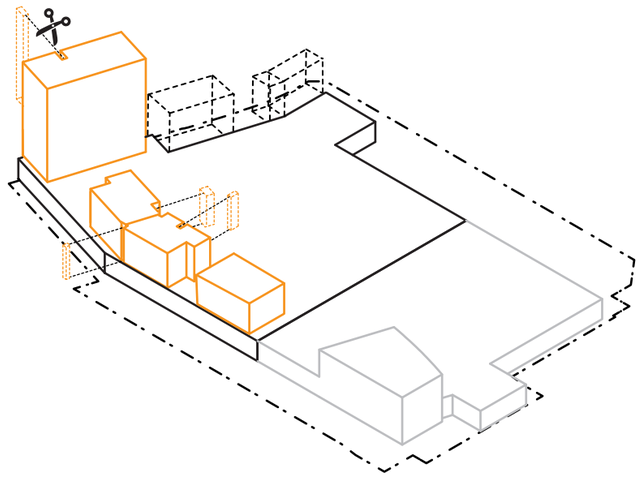
[9]

Communal Open Space



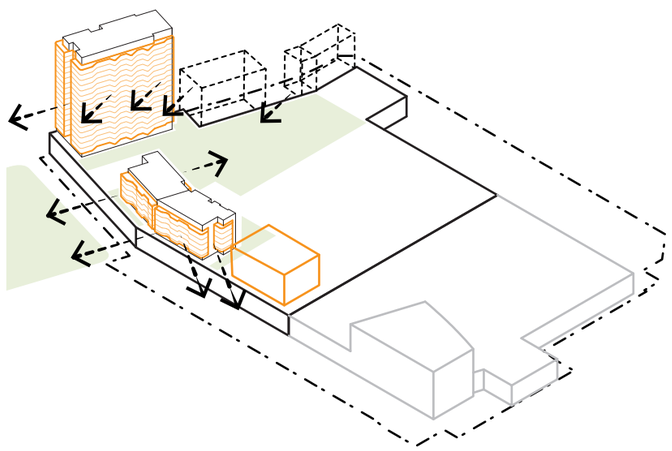
[10]

Maximum solar opportunities



[11]

Articulation for residential cross ventilation



[12]

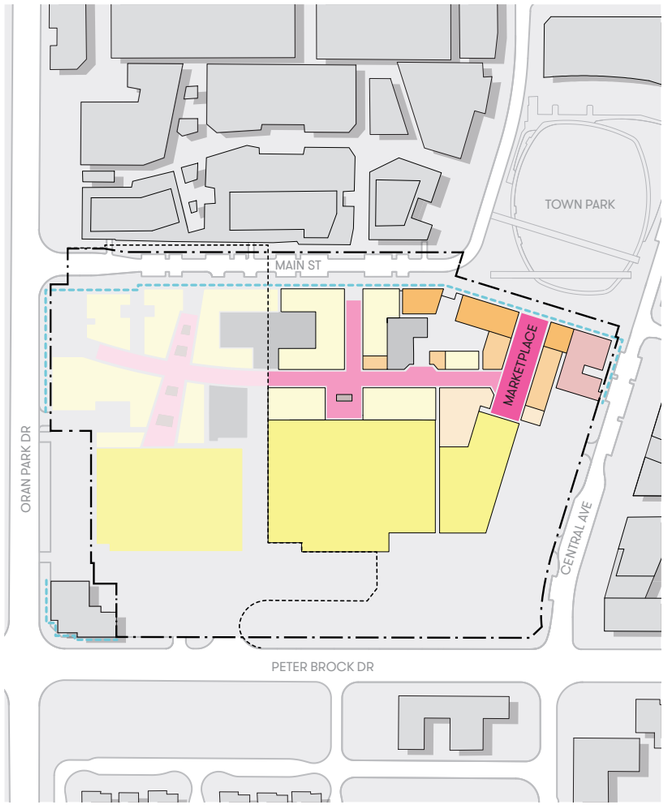
Balconies articulated to capture views

Environmental, Social & Economic Sustainability

05

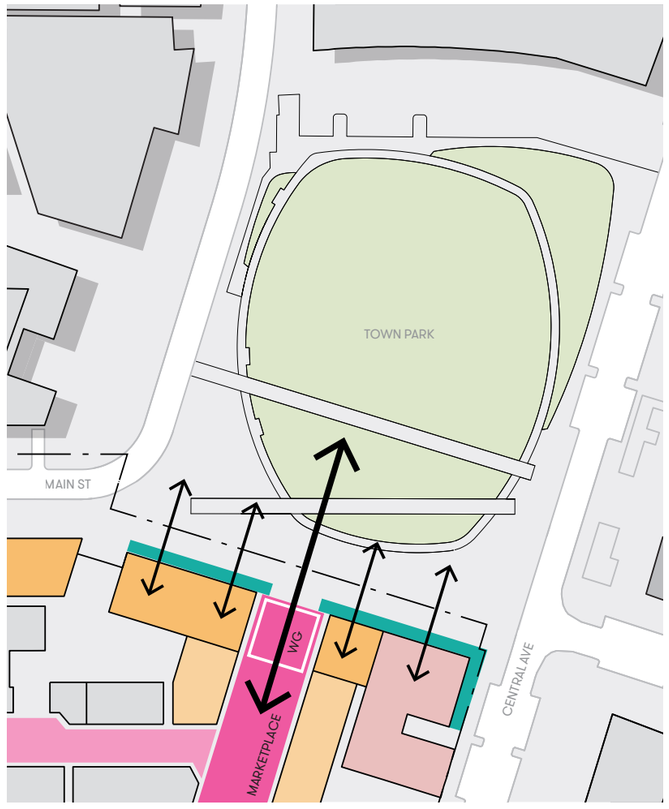
Social and Economic Sustainability

Active ground floor, dining precinct and level 1 communal open space



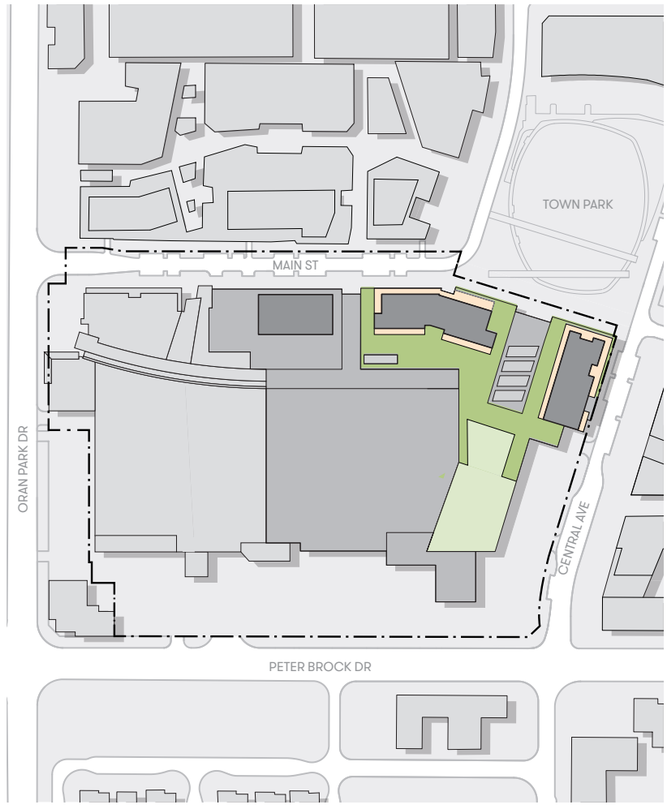
Ground Floor Activation and Uses

- SITE BOUNDARY
- STAGE LINE
- SPECIALITY RETAIL
- RESTAURANT
- ARCADE
- TAVERN
- FOOD RETAIL
- FRESH FOOD
- MARKETPLACE
- ACTIVE STREET FRONTAGE



Dining precinct relationship to park

- SITE BOUNDARY
- MARKETPLACE
- WINTER GARDEN
- ARCADE
- TOWN PARK
- OUTDOOR DINING
- PARK CONNECTION



Level 1 Podium Communal Open Space

- SITE BOUNDARY
- PRIVATE OPEN SPACE
- COMMUNAL OPEN SPACE
- COMMUNAL LANDSCAPED SPACE
- EXISTING ROOF
- PROPOSED ROOF
- BUILT ENVELOPE

Climate Analysis

[Thermal comfort, Rain, Wind + Solar Access]

[The moderate climate at Oran Park presents an opportunity to create comfortable outdoor spaces, making use of the northern solar access and summer breezes. Due to the rainfall and higher winds speeds in the cooler months these outdoor spaces will need to be weather protected.]

Comfort Statistics (day)

42% of the year

Comfortable to sit outside due to suitable temperatures

North to east facing outdoor areas here have good access to **cooling from breezes in warmer months**

3.8m/s average wind speed

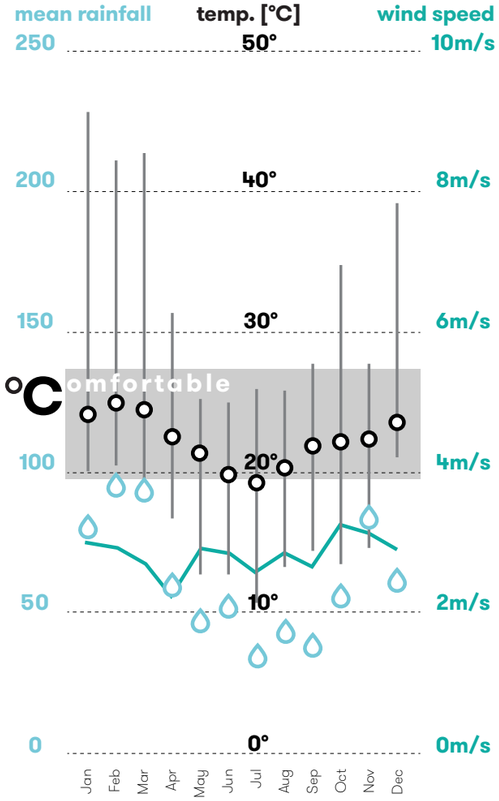
Wind protection also needed for comfort in **cooler months**

°C **19°-26°**

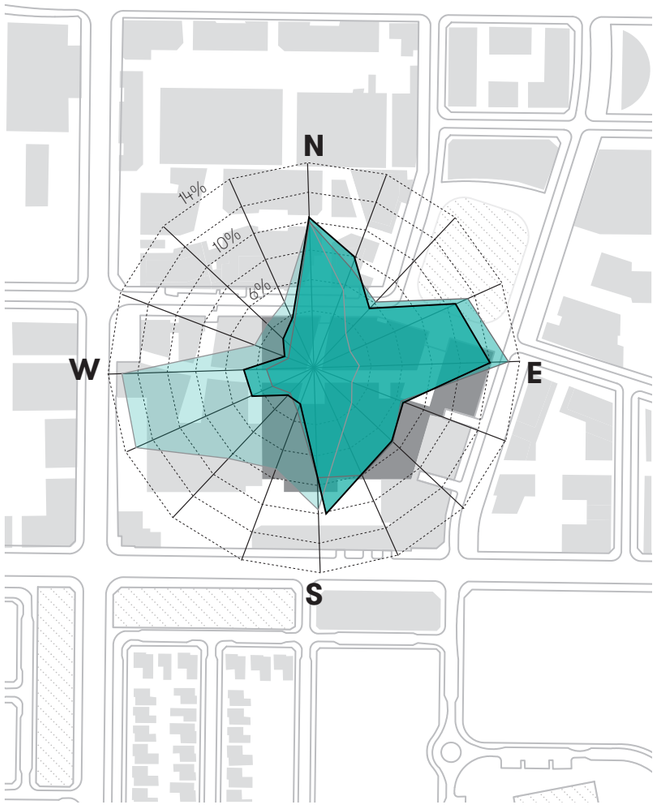
External temperature comfort (including winds) for **10 months** of the year

High rainfall February and **March 60-80mm** per month

obstructing high **summer** sun and **allowing** in low **winter** sun

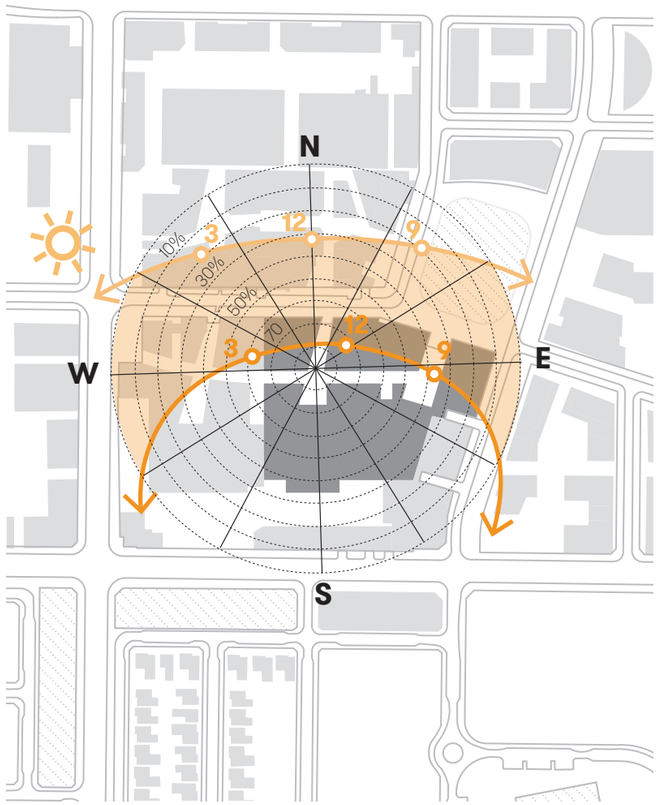


Comfort: rain, temperature and wind



Site wind rose overlay [day 800am - 800pm]

- ANNUAL
- SUMMER
- WINTER

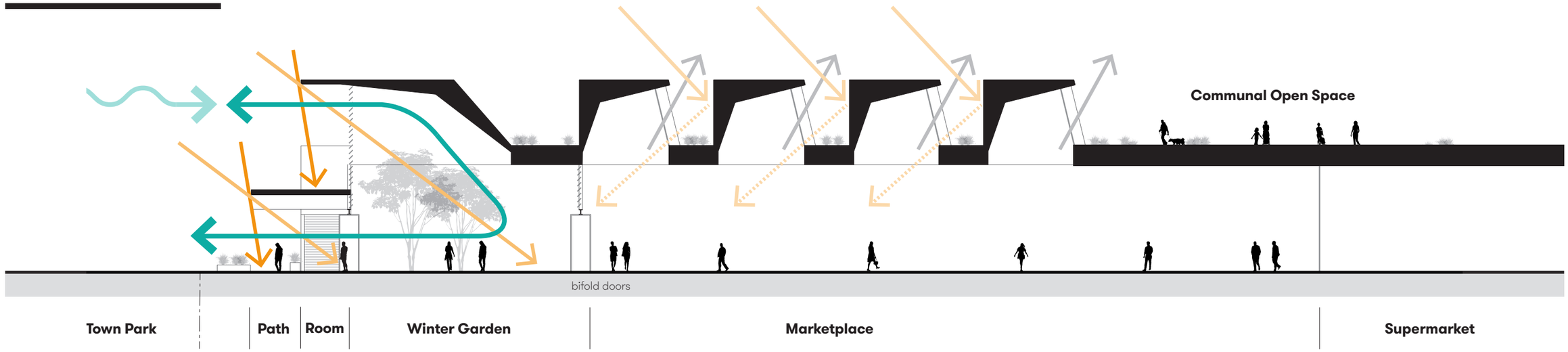


Site sun path overlay

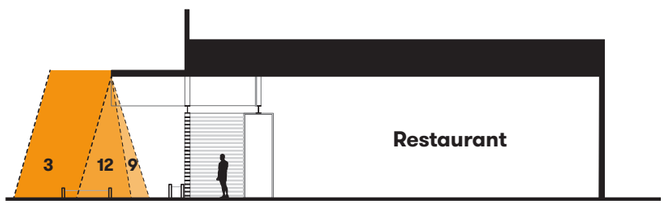
- SUMMER SOLSTICE [21 DECEMBER]
- WINTER SOLSTICE [21 JUNE]
- ANNUAL VARIATION

Environmental Design

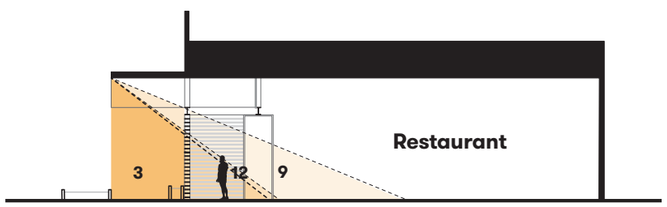
[Retail Design - ventilation, solar and sky views]



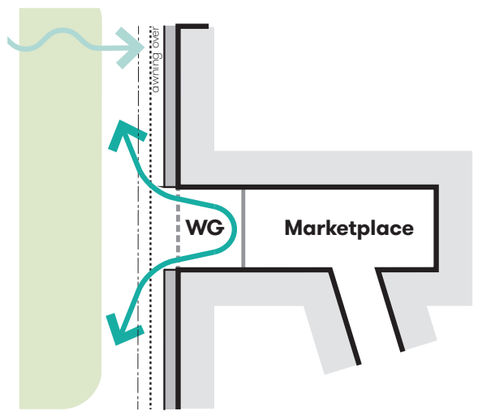
Design Section



Summer solstice [21 December]



Winter solstice [21 June]



Summer, Autumn and Spring Ventilation

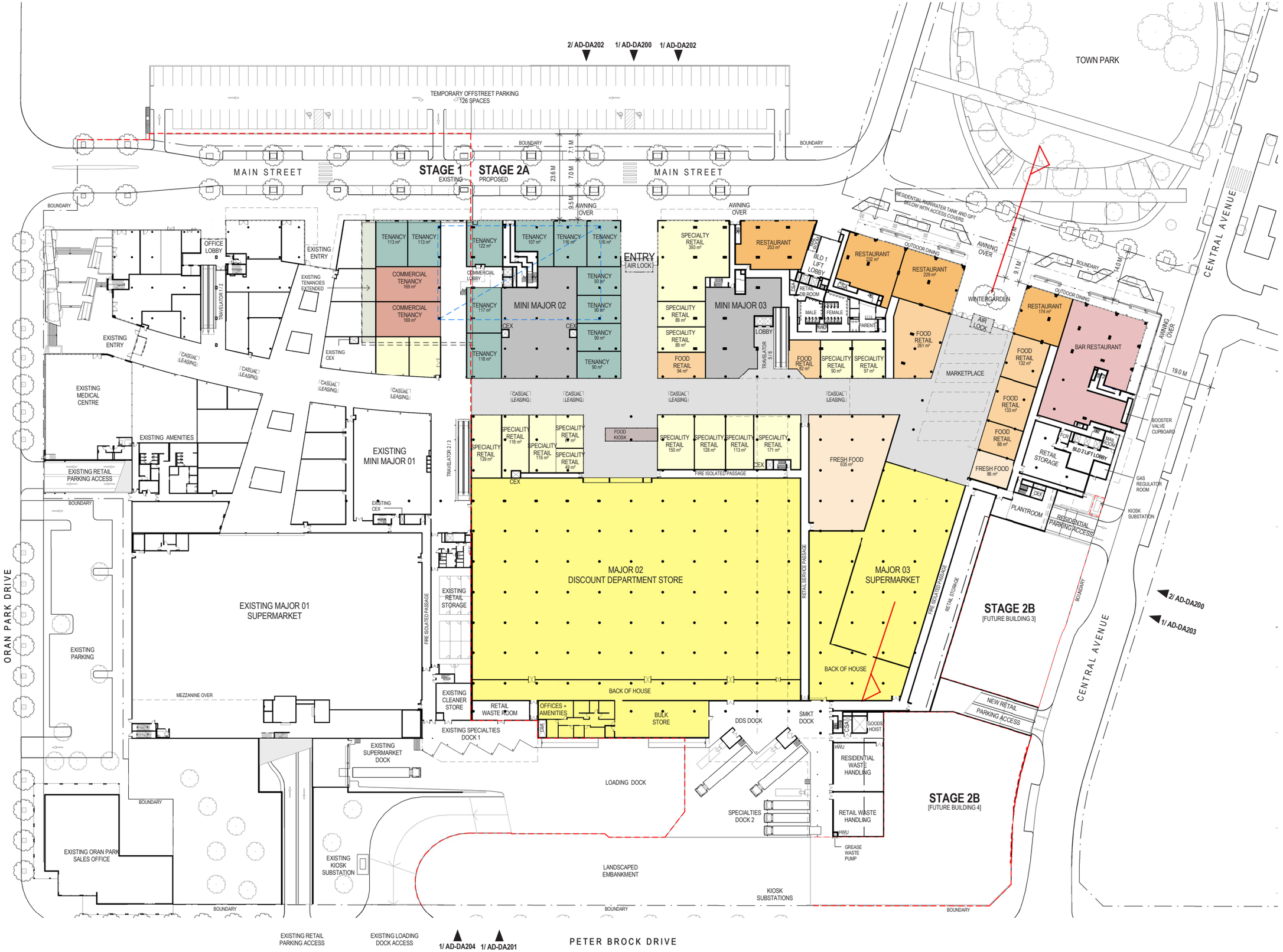
Key

The retail and dining precinct is orientated towards the Town Park to the north, optimising solar access and summer breezes and thereby encouraging outdoor activities.

This dining edge to the Town Park, has a series of urban rooms that are weather protected during the cooling months by the use of bifolds and planting.

The winter garden that connects the “Market Hall” to the Town Park is naturally ventilated, making the most of the moderate climate and breezes.

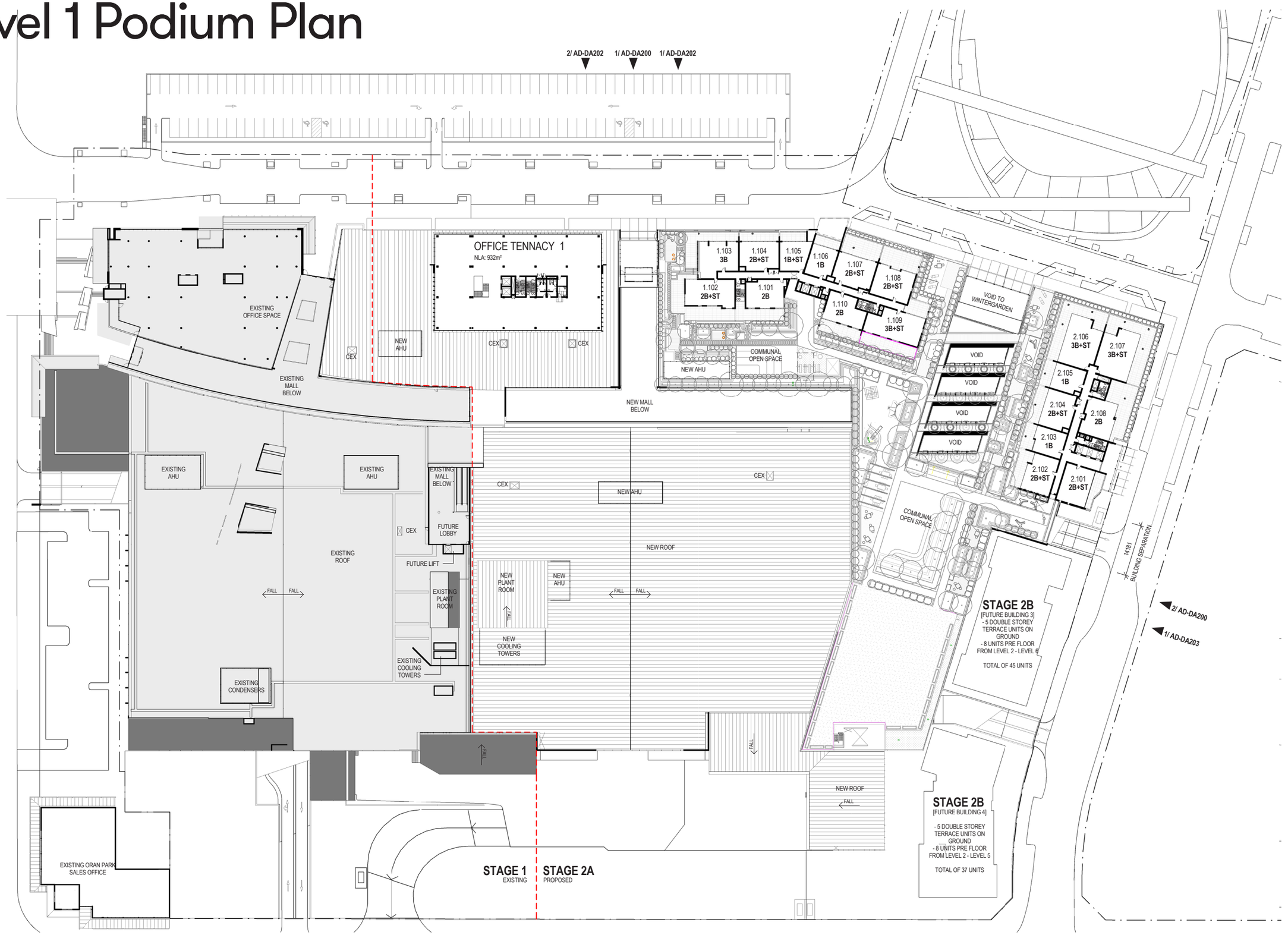
The Market Hall and retail arcades maximise the use of natural lighting through the introduction of skylights for daylighting. The skylights in the “Mark Hall” are oriented to the south to maximise daylight and sky views, but ensure no direct sunlight fall upon the food and beverage tenancies below. The entry canopy to the precinct is angled to let in winter sun but block the hot summer sun.



0 10 20 30 40 50m

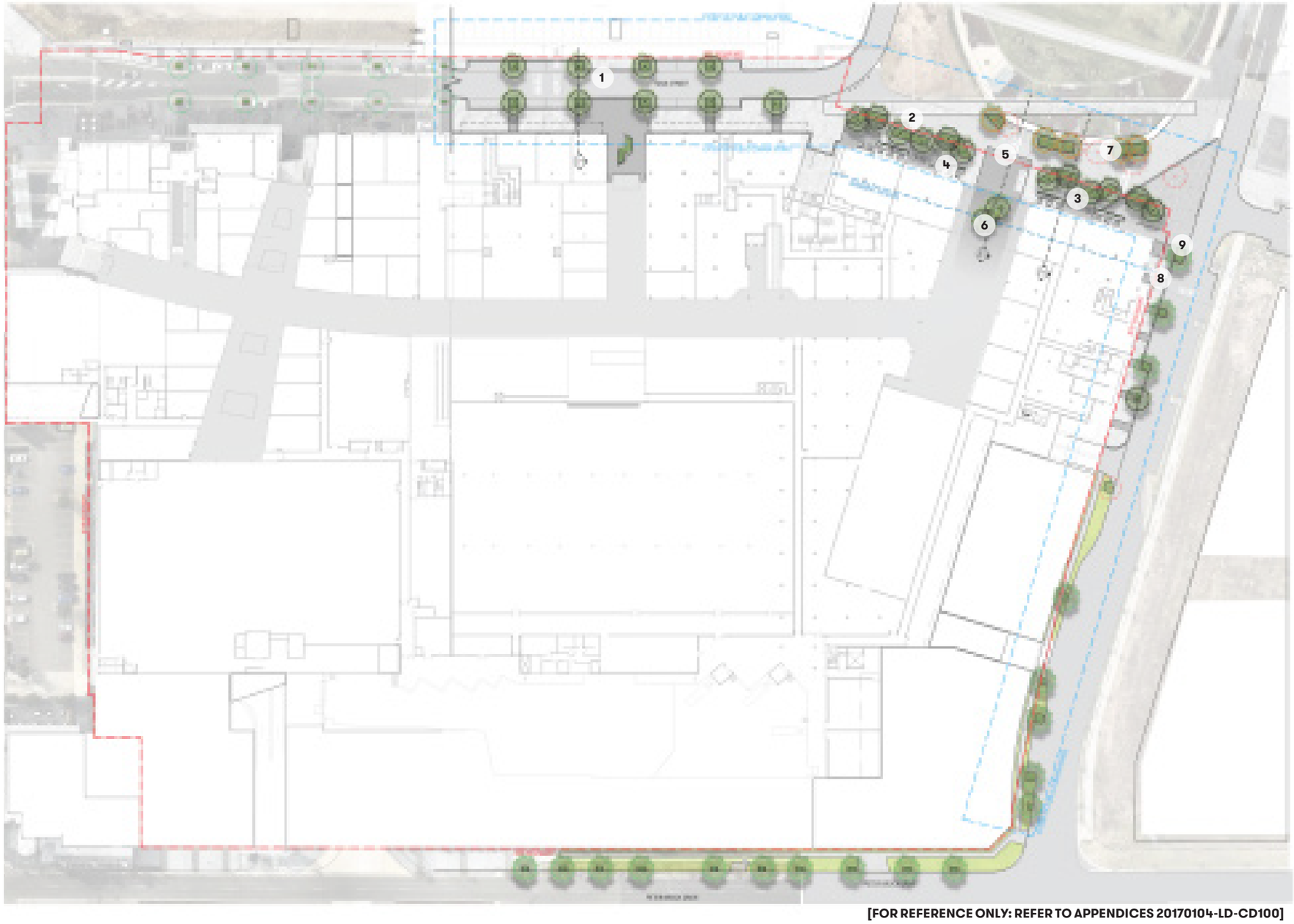
Scale 1:1000 @ A3

Level 1 Podium Plan



Public Domain

[Site Strategy]



[FOR REFERENCE ONLY: REFER TO APPENDICES 20170104-LD-CD100]

LEGEND

1 Proposed Pyrus ussuriensis to tie into existing street tree planting palette on Main St.

2 Proposed Pyrus ussuriensis to retail breakout area to provide shade and mitigate prevailing winds.

3 Outdoor dining areas to encourage public domain activation for ground floor tenancy's.

4 Raised planters to tie into arbour structure and create a sense of enclosure and shade for ground floor tenancy's.

5 Paving palette for the proposed retail to seamlessly tie into the existing parkland character. Granite paving to match existing.

6 Winter Garden. Transition space between the public domain and retail centre. Large tree planting of Native Frangipani to maximise deep soil area combined with lush plantings of Ficus lyrata and understorey planting to create visual interest upon arrival.

7 Existing trees to park edge to be transplanted to tie into existing parkland character. Transplanted trees to be consolidated into proposed garden beds with native understorey planting.

8 Upgrades to paving and pedestrian access to Central Avenue including granite infill and banding as per Oran Park Town Centre Public Domain Manual. Existing Corymbia citriodora street trees to be retained and protected.

9 Additional Corymbia citriodora street to unify Central Avenue and provide a sense of scale to the proposed retail.

Public Domain

[Retail + Park Interface]

LEGEND

1 Proposed Pyrus ussuriensis to tie into existing street tree planting palette on Main St.

2 Proposed Pyrus ussuriensis to retail breakout area to provide shade and mitigate prevailing winds.

3 Outdoor dining areas to encourage public domain activation for ground floor tenancy's.

4 Raised planters to tie into arbour structure and create a sense of enclosure and shade for ground floor tenancy's.

5 Paving palette for the proposed retail to seamlessly tie into the existing parkland character. Granite paving to match existing.

6 Winter Garden. Transition space between the public domain and retail centre. Large tree planting of Native Frangipani to maximise deep soil area combined with lush plantings of Ficus lyrata and understorey planting to create visual interest upon arrival.

7 Existing trees to park edge to be transplanted to tie into existing parkland character. Transplanted trees to be consolidated into proposed garden beds with native understorey planting.

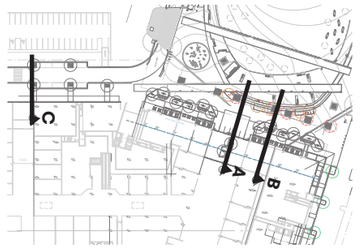
8 Upgrades to paving and pedestrian access to Central Avenue including granite infill and banding as per Oran Park Town Centre Public Domain Manual. Existing Corymbia citriodora street trees to be retained and protected.

9 Additional Corymbia citriodora street to to unify Central Avenue and provide a sense of scale to the proposed retail.

[FOR REFERENCE ONLY: REFER TO APPENDICES 20170104-LD-CD102]

Public Domain

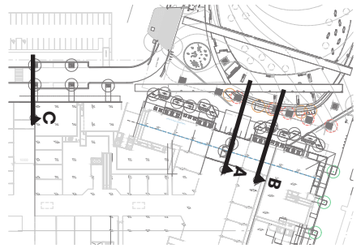
[Cross Sections]



[FOR REFERENCE ONLY: REFER TO APPENDICES 20170104-LD-CD200]

Public Domain

[Cross Sections]

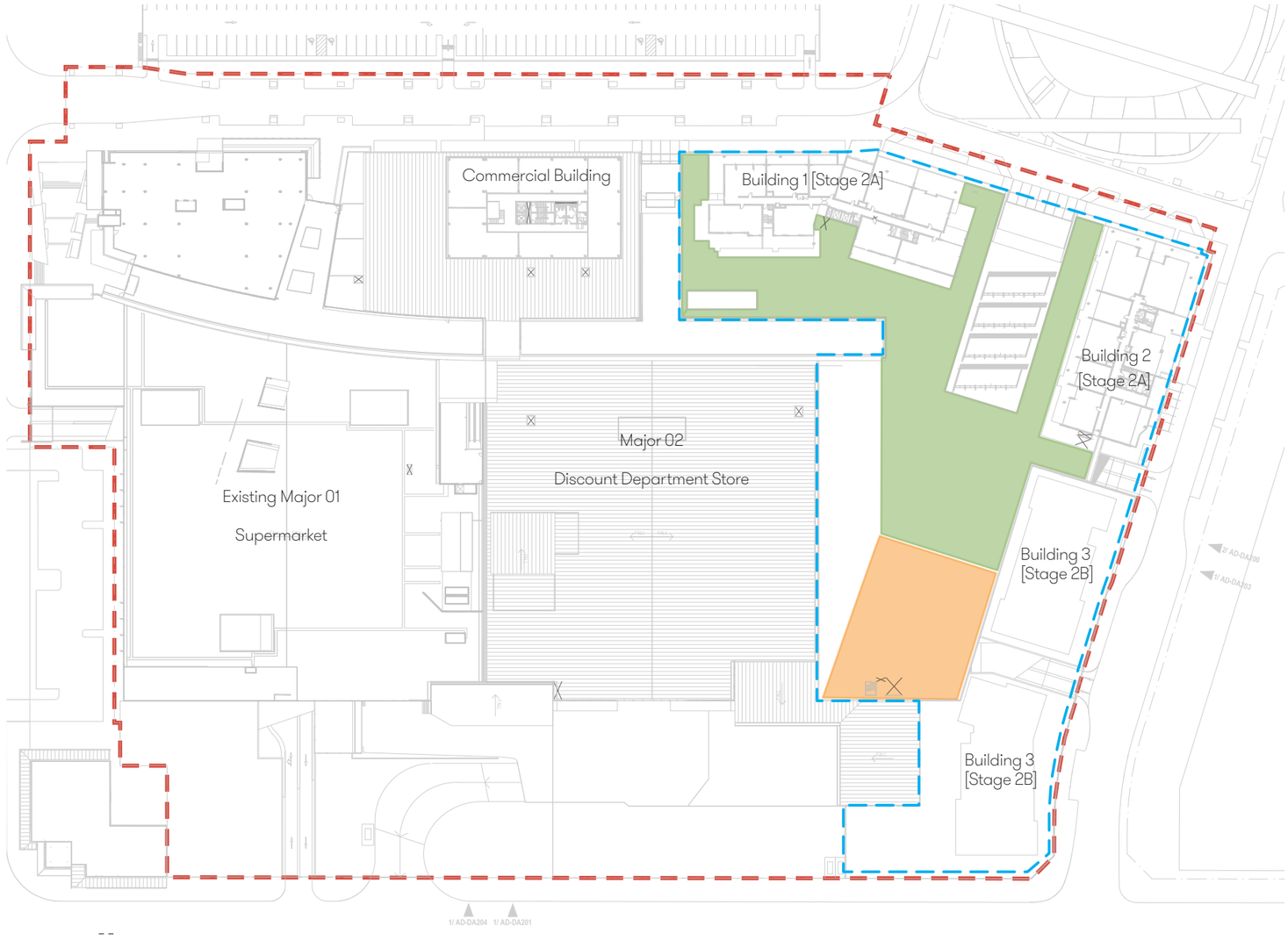


3 PUBLIC DOMAIN SECTION C
1:50

[FOR REFERENCE ONLY: REFER TO APPENDICES 20170104-LD-CD201]

Communal Podium

[Communal Open Space ADG Compliance]



LEGEND:

Site Boundary [55,278m^2]

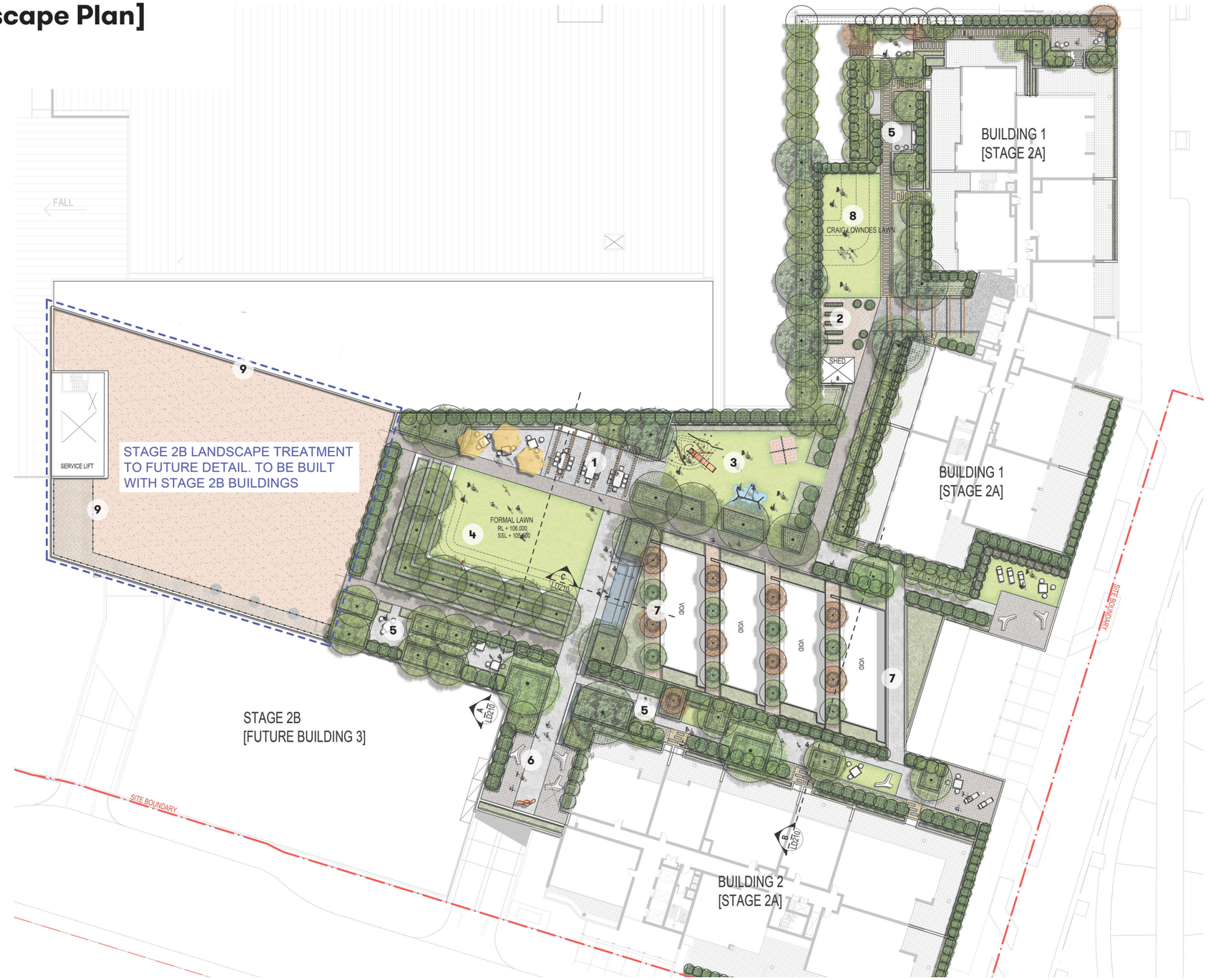
Proposed Residential Site Boundary [15,054m^2]

Stage 2A Communal Open space
- 3885m^2
- 25.6% Communal Open Space

Stage 2B Temporary Landscape Treatment [permanent design to be built with Stage 2B]
- Additional 1340m^2
- 34% Communal Open Space

Communal Podium

[Landscape Plan]



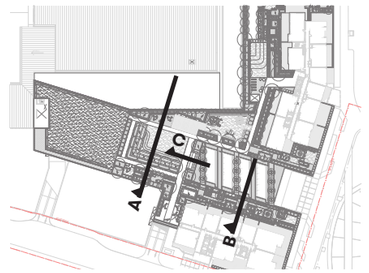
LEGEND:

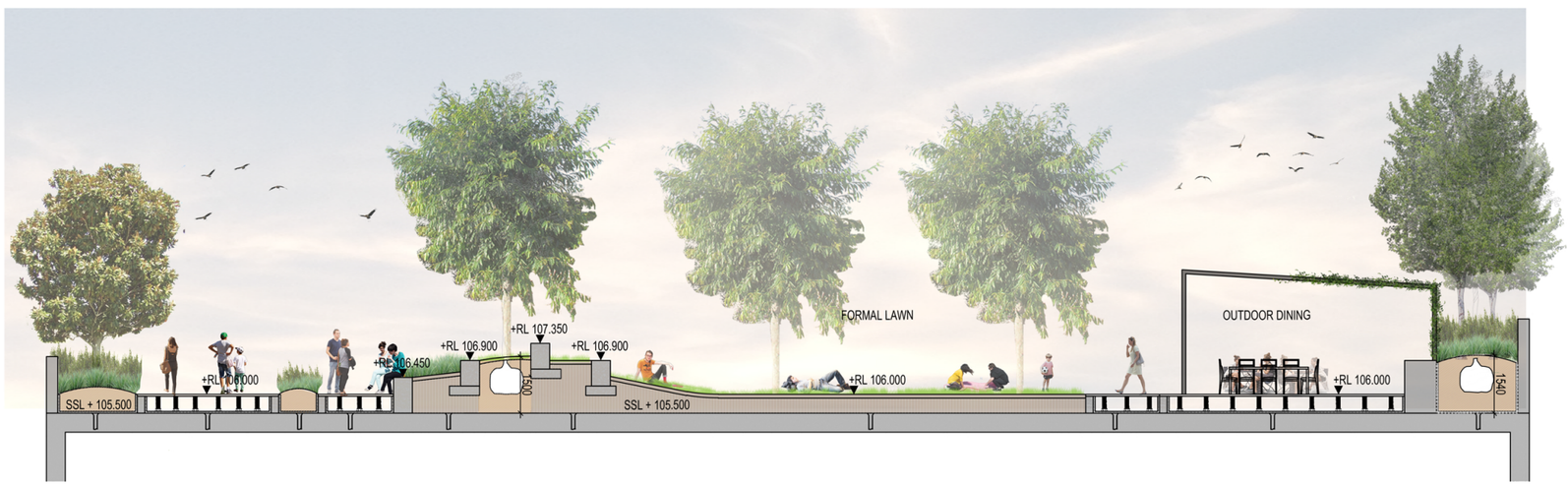
1. Shade pavilions for residents to relax and retreat from the sun. Bespoke shade structures with timber battens and stainless steel wires to encourage climbers. Pavillion to include barbecue facilities and power outlets. Shade structures to be integrated with raised planter
2. Community gardens area - prefabricated planters with fruit and vegetable plantings for residents use
3. Children's play lawn with mounded astroturd, climbing robes, swing, slide, informal steppers, balance beans and bespoke play tower
4. Formal lawn area with lush avenue planting to surrounds. Mounded lawn orientated to the Northern sun to create seating and relaxation opportunities
5. Meandering pathways and a combination of timber decked and artificial lawn breakout spaces for relaxation and working from home. Breakout spaces to include GPO's to charge portable devices
6. Art elements to reinforce site identity and tie into the parkland sculptures
7. Proprietary large scale pot plants with ornamental tree planting. Incorporated lighting elements to create visual interest
8. Informal lawn breakout spaces with luscious planting providing opportunity for relaxation and passive activities
9. Proprietary GRC planters with ornamental planting to provide wind/solar protection and visually soften the edge of the play area

[FOR REFERENCE ONLY: REFER TO APPENDICES 20170104-LD-CD110, 111, 112, 113]

Communal Podium

[Communal Open Space Sections]





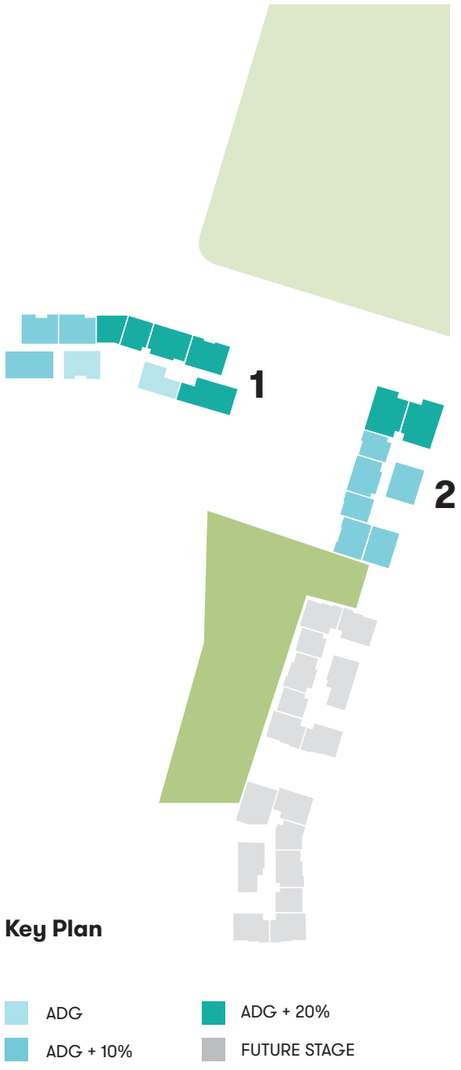
1 PODIUM SECTION AA
1:100

2 PODIUM SECTION BB
1:100

[FOR REFERENCE ONLY: REFER TO APPENDICES 20170104-LD-CD210]

Apartment Typologies

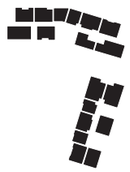
Providing a range of typologies to serve a diverse growing population.



Key Plan

ADG
ADG + 10%
ADG + 20%
FUTURE STAGE

Dwelling Sizes



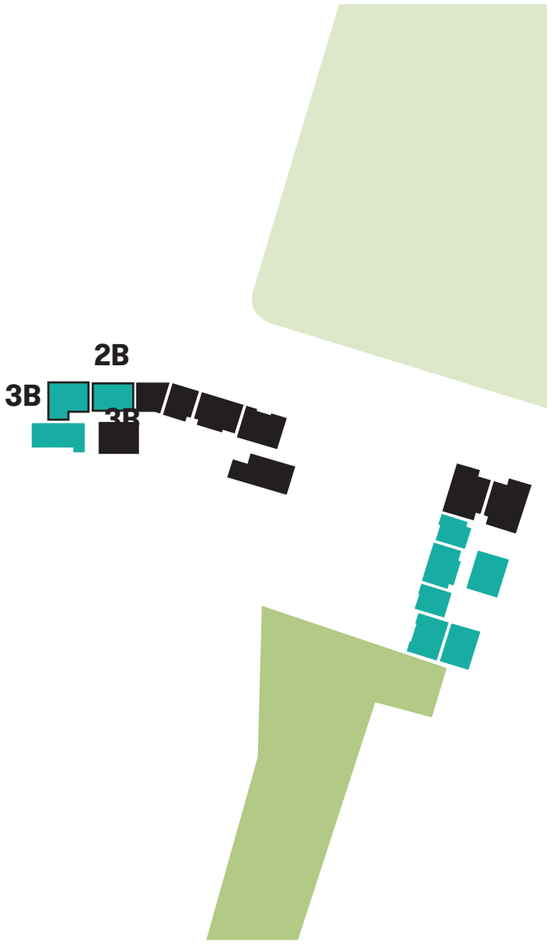
	ADG	+10%	+20%
Building **1**	**10**	**15**	**25**
Building **2**	**-**	**72**	**24**
Totals	**10**	**87**	**49**
	6.8%	**59.5%**	**33.5%**

Dwelling Mix

Dwelling	No.	Mix %
1 Bed	**34**	22%
2 Bed	**78**	54%
3 Bed	**34**	23%
Totals	**146**	

Apartment Typologies

ADG + 10%



Key Plan

Large Living Areas Larger bedrooms where available

Larger bedrooms where available

2 bathrooms

Study nooks where available

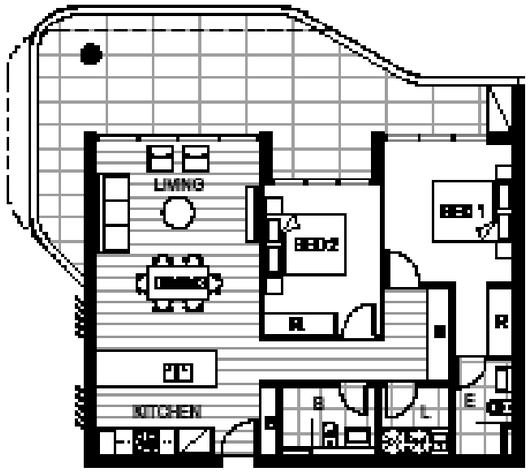
Larger Balcony spaces with shutters for additional climate control

Views to Town Park, Main Street and

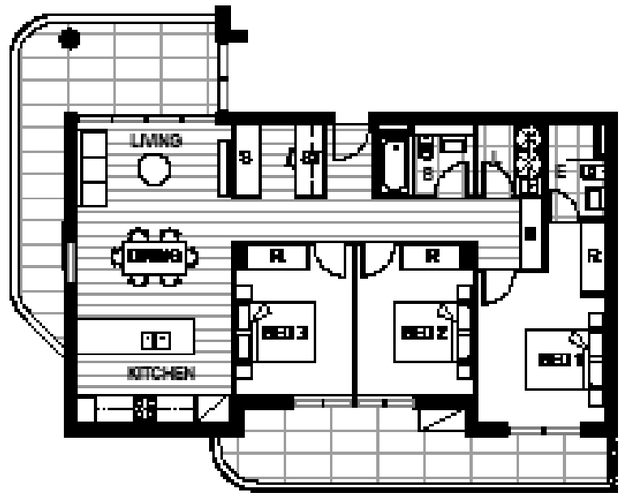
ADG + 10%

Internal area	
1 Bedroom	**55m²**
2 Bedroom	**82.5m²**
3 Bedroom	**100m²**

2 Bedroom Apartment
83m²
POS - 20m²



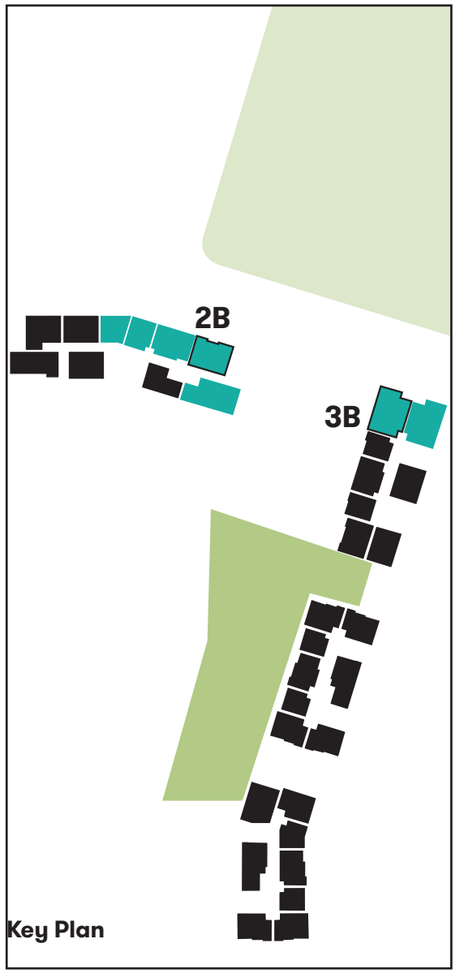
3 Bedroom Apartment
100m²
POS - 30m²



0 1 2 3 4 5m
Scale

Apartment Typologies

ADG + 20%



Larger Living Areas **[4.5m wide]**

Larger bedrooms **[3.6m wide]**

2 bathrooms

Study nooks

Separate Laundries

Larger Balcony spaces with shutters for additional climate control

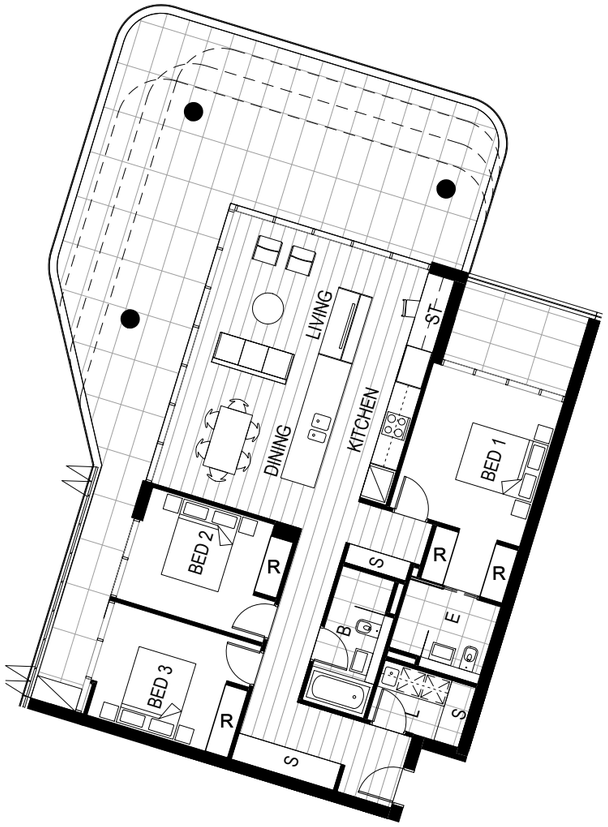
Views to Town Park & Main Street

ADG + 20%

Internal area	
1 Bedroom	**60m²**
2 Bedroom	**90m²**
3 Bedroom	**110m²**

2 Bedroom Apartment
90m²
POS - 31m²

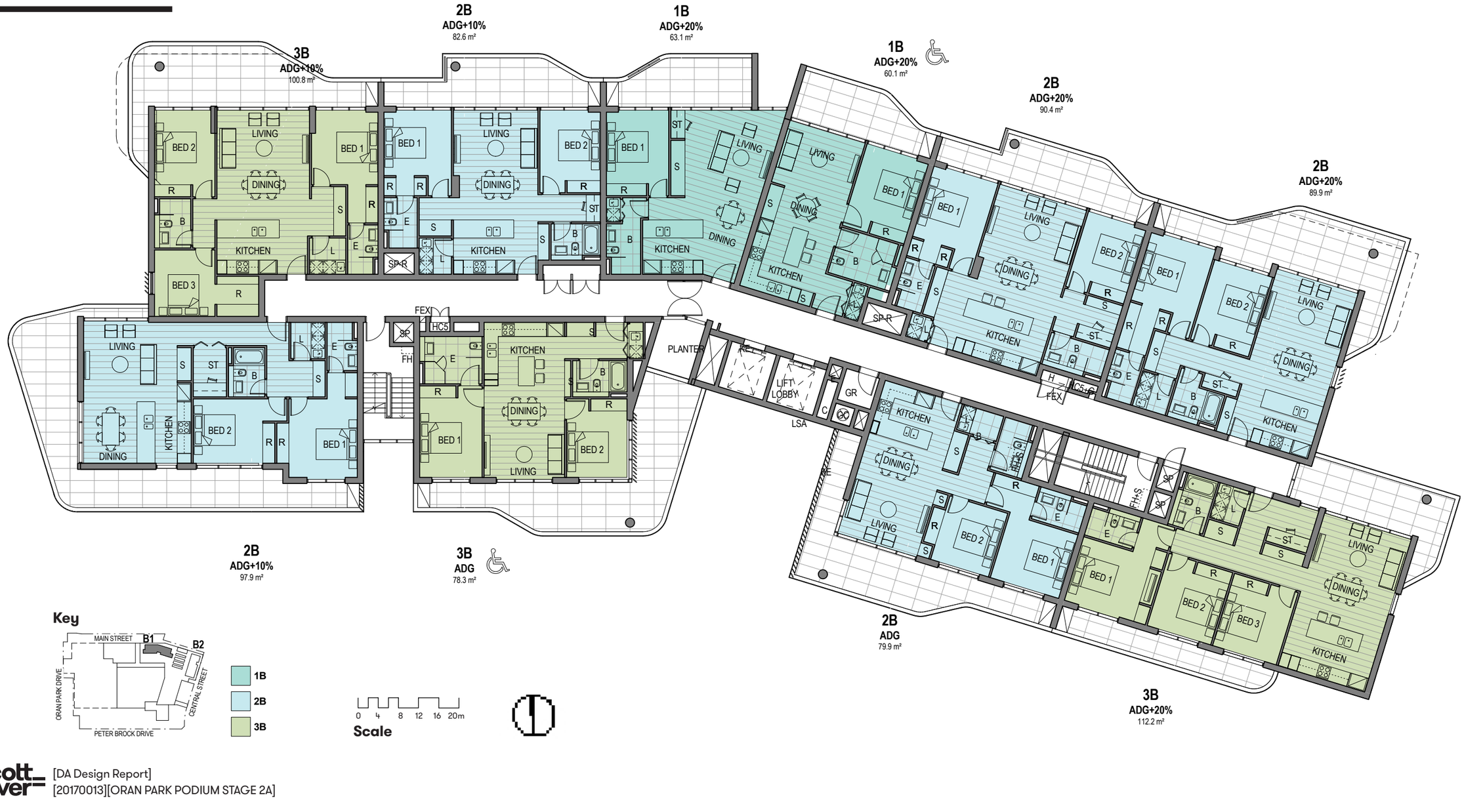
3 Bedroom Apartment
115m²
POS - 78m²



0 1 2 3 4 5m
Scale

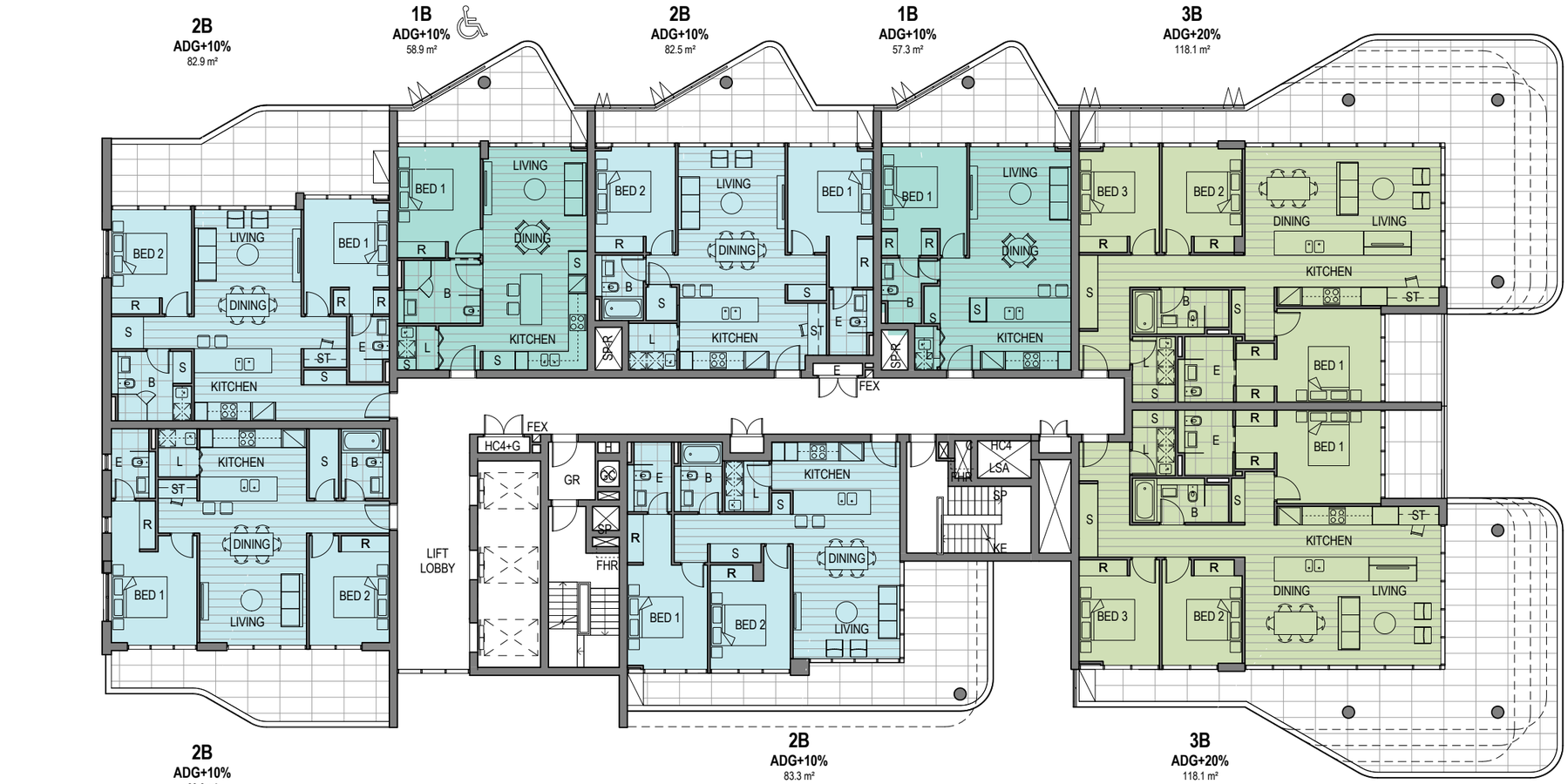
Typical Residential Level

Building 1 Plan

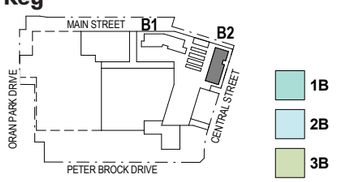


Typical Residential Level

Building 2 Plan



Key



1B
2B
3B

0 4 8 12 16 20m

Scale

Materiality

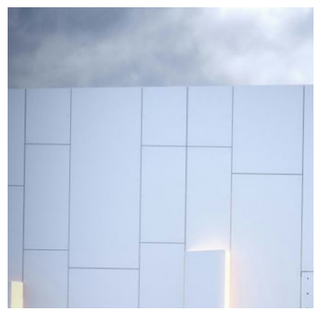
06

Materiality

[Retail Materials Board]

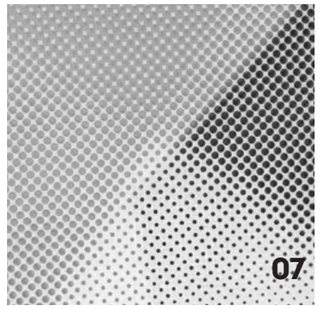
Retail Fascia
[prefinished fibre cement panels]

Retail Awning
[prefinished metal clad and timber look soffit awning - non combustable]



Shopfront detail
[timber look cladding - non combustable]

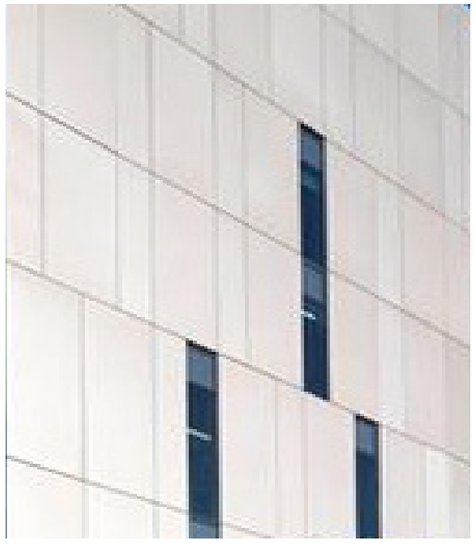
Retail Entry Awning
[patterned awning glazing]

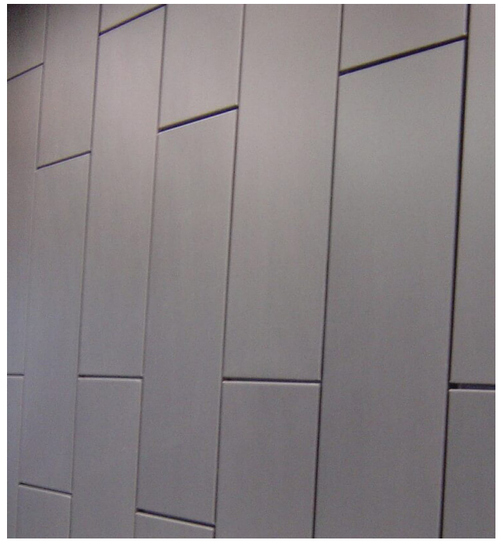


Materiality

[Commercial Materials Board]

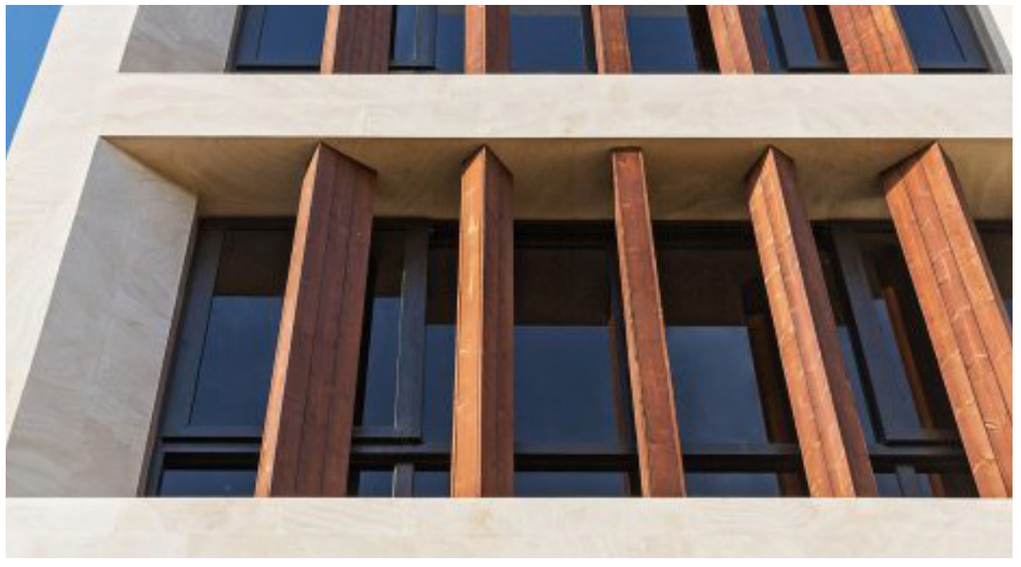
Commercial facade
[prefinished metal cladding
- non combustable]





Commercial windows
[prefinished grey annodised
windows with timber look
transoms]

Commerical louvres
[prefinished metal louvres
with timber look - non
combustable]



Materiality

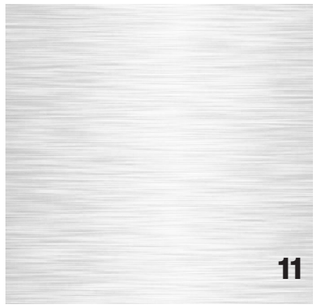
[Residential Materials Board]

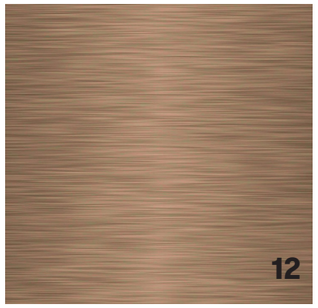
Balcony Balustrades/screens
[perforated metal balustrade]

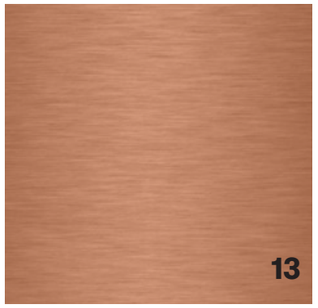
External Walls
[prefinished patterned precast concrete]

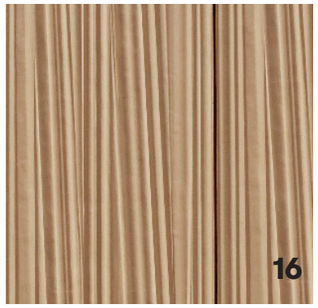
[timber look cladding - non combustable]

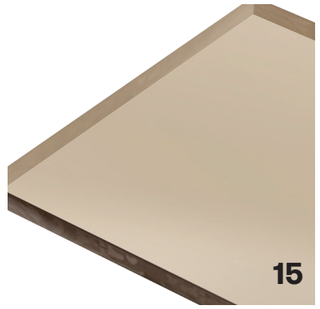
[prefinished aluminium framed tinted glazing]

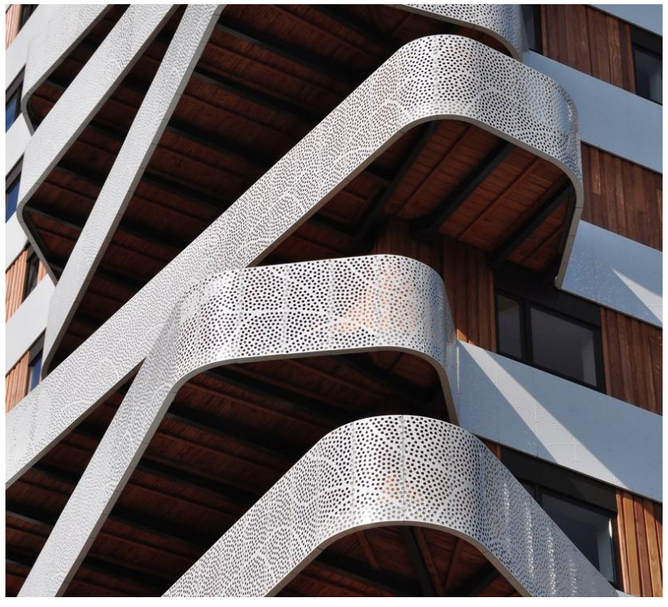


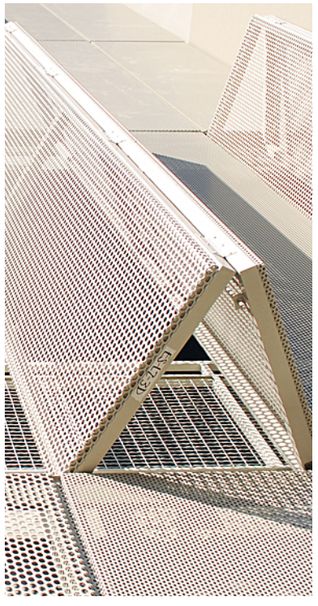












Perspectives

[Market Hall Entrance]

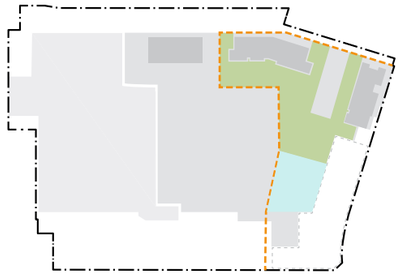
Perspectives

[View from Central Avenue]

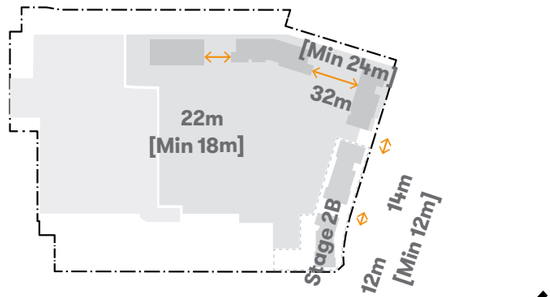
Compliance Summary

SEPP, DCP and ADG Compliance Summary

24+



25.8%



Building Height Plane

[SEPP **Maximum 24m]**

Increased height subject to Planning Proposal approval for Residential Building 2

- EXISTING
- STAGE 2A RETAIL
- STAGE 2A RESIDENTIAL
- FUTURE STAGE
- LANDSCAPED AREA

Landscaped Area

[ADG **25.8% landscaped of site area]**

- 15,054 sqm of residential site area for the purpose of calculating percentage of landscaped area
- 3,885 sqm of communal landscaped open space
- 1,340 sqm of communal open space (Stage 2B)

Building Separation

NOTE:

Stage 2B for future residential development

ADG Compliance Summary

34%

Communal Open Space

[ADG 25% communal open space]

Landscaped Communal Open Space - **3,885m²**

Communal Open Space - **1,340m²**

Total - **5,225m²**

[Stage 2A & 2B combined]

[ADG Part 3d Communal and public open space]

7%

Deep Soil

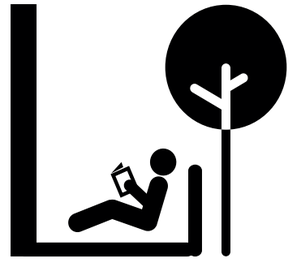
[ADG 7% of site area]

[ADG Part 3e Deep soil zones]

Private Open Space

[ADG minimum area and depth below for dwellings types]

Dwelling	Area	Depth
1 Bed	**8**	2m
2 Bed	**10**	2m
3 Bed	**12**	2.4m



Podium Apartments Private Open Space

[ADG minimum area of 15m2 and a depth of 3m]

[ADG Part 4e Private Open Space and Balconies]

13%

No Sunlight

[ADG maximum 15% of dwellings]

[ADG Part 4a Solar and Daylight Access]

Residential Amenity and Compliance

[Residential Design - Solar access]

79%

Solar Access

[ADG minimum 70% of dwellings]

[2hrs between 9am and 3pm]

NOTE:

Future Stage 2B residential buildings

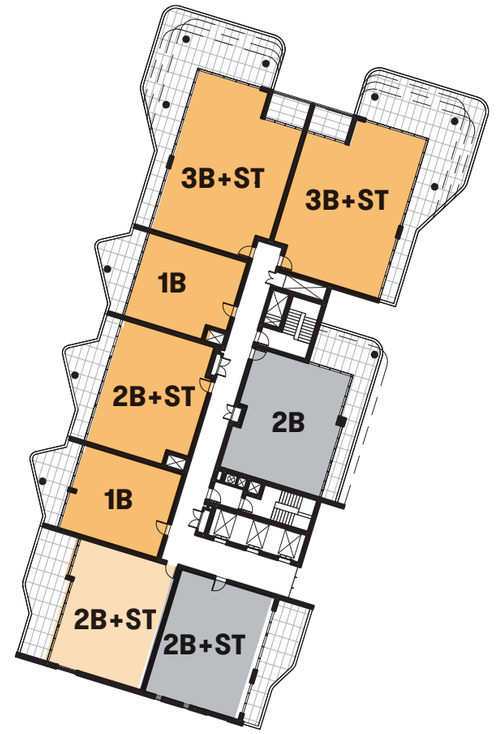
Building 3 estimated to achieve **71%** solar access

Building 4 estimated to achieve **94%** solar access

[ADG Part 4a Solar and Daylight Access]

- YES
- YES L6 - 12
- NO

Building 1



Building 2

0 5 10 15 20 25m

Scale 1:500 @ A3

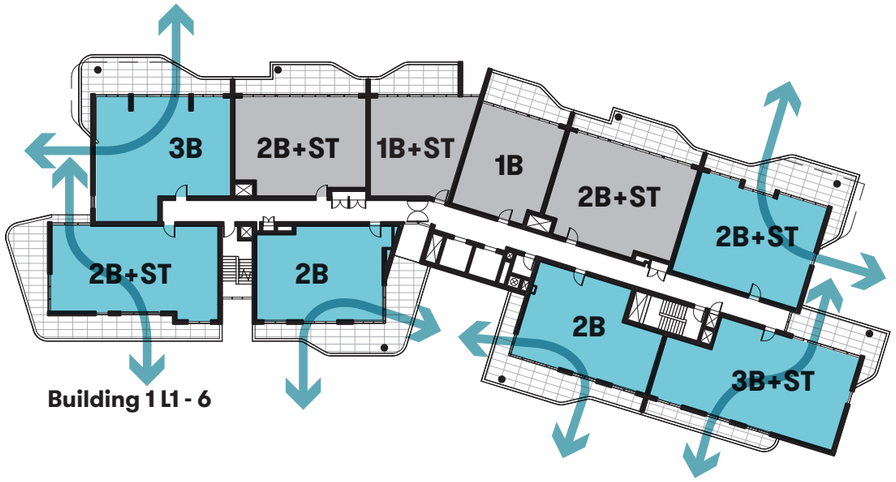
Residential Amenity and Compliance

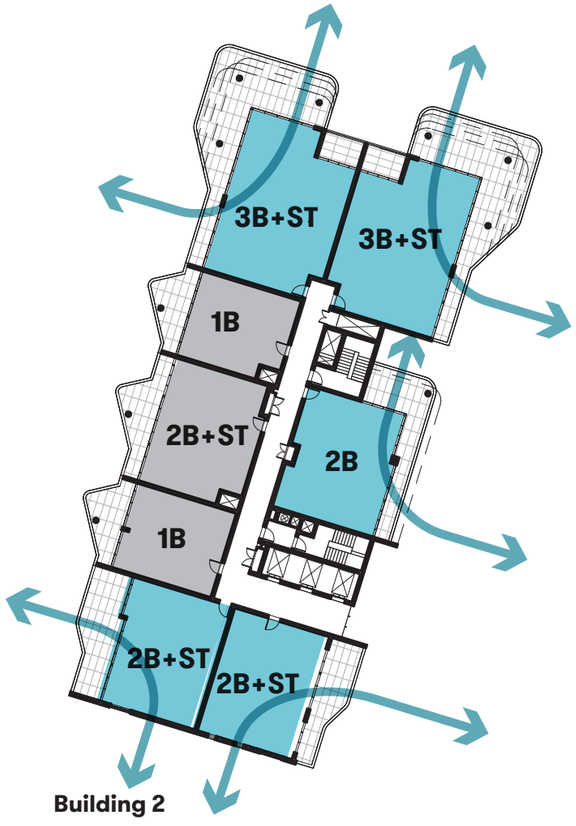
[Residential Design - Cross ventilation]

65%

Naturally Cross Ventilated

[ADG **minimum 60%** of dwellings]





NOTE:

Future Stage 2B residential buildings

Building 3 estimated to achieve **73%** cross ventilation

Building 4 estimated to achieve **75%** cross ventilation

[ADG Part 4b Natural Ventilation]

YES

NO

NOTE: COMPLIANT FROM LEVEL 9 AS PER ADG, EXCLUDED FROM DIAGRAM

0 5 10 15 20 25m

Scale 1:500 @ A3

Appendix 1

[Design Verification Statement & SEPP65 Principles]

Design Verification Statement

Level One, One Chifley Square Sydney NSW 2000 Australia [www.scottcarver.com.au]
Scott Carver Pty Ltd [ABN 38 002 570 854] +61 2 9957 3988

Camden Council
70 Central Avenue
ORAN PARK NSW 2570

To Whom It May Concern

02 October 2018

Project [20170013] = Oran Park Podium – Stage 2A
Mixed Use Residential, Retail & Commercial development
SEPP 65 Design Verification Statement.

I, Doug Southwell, confirm that Scott Carver has undertaken the design of the proposed residential, retail and commercial mixed-use development on behalf of Greenfields Development Company Pty Ltd

I confirm that the project has been designed to respond to the Design Principles of the State Environmental Planning Policy 65 – Design Quality of Residential Apartment Development and the associated Apartment Design Guide.

Doug Southwell
[Director | Nominated Architect NSW 7362]
dougs@scottcarver.com.au
+61 402 440 204

SEPP65 Principles

Statement of Design

Scott Carver has been responsible for the design of the project and it has been designed to respond to the best practice design principles of SEPP65.

Scott Carver verifies that the 9 Design Quality Principles set out in the Apartment Design Guide (ADG) are achieved for the proposed building development.

CONTEXT & NEIGHBOURHOOD CHARACTER

Good design responds and contributes to its context. Context is the key natural and built features of an area, their relationship and the character they create when combined. It also includes social, economic, health and environmental conditions. Responding to context involves identifying the desirable elements of an area's existing or future character. Well designed buildings respond to and enhance the qualities and identity of the area including the adjacent sites, streetscape and neighbourhood. Consideration of local context is important for all sites, including sites in established areas, those undergoing change or identified for change.

The proposed design complies with Principle 1 in that it:

- *Provides weather protected colonnades that form a Providing a connected and walkable Town Centre, with outdoor pedestrian linkages to Stage 1 of the retail centre, the existing Town Park and future developments.*
- *Continues the alignment of the existing Stage 1 indoor pedestrian arcade through Stage 2 connecting to the Town Park and Council Administration Building.*
- *Locates new buildings to respond to the importance of the site as a visual anchor in the civic precinct, by providing building height at the intersection announcing the nexus of the 'urban axis' (: Main Street) and the 'nature axis': (Central Avenue).*
- *Reinforces the Town Park and emerging Town Centre as a place for social gathering and community interaction.*
- *Provides an indoor atrium space and Market Hall serving as a dining precinct and an extension of the Town Park, reinforcing the Town Centre as a social hub.*
- *Incorporates active retail edges at ground level addressing the Town Park and interacting with public domain.*
- *Provides building materials that respond to the existing character of the structural steel pavilions within the Town Park and the use of timber linings and timber battens together with terracotta coloured facade panels respond to the prevailing residential character of the area as well as the facade of the proposed new library.*
- *Incorporates roof monitors to the Market Hall that respond to the architectural language of the Stage 1 retail centre.*
- *A 4 storey Commercial building that sits on top of the retail to link and active the Market Place and Public Domain.*

BUILT FORM & SCALE

Good design achieves a scale, bulk and height appropriate to the existing or desired future character of the street and surrounding buildings.

Good design also achieves an appropriate built form for a site and the building's purpose in terms of building alignments, proportions, building type, articulation and the manipulation of building elements. Appropriate built form defines the public domain, contributes to the character of streetscapes and parks, including their views and vistas, and provides internal amenity and outlook.

The proposed design complies with Principle 2 in that it:

- *Provides building height and density that is distributed to create a transition in building heights from the Gateway Precinct and Stage 1 of the retail centre to the 5 storeys of Building 1 and 12 storeys of Building 2 at the street corner diagonally opposite the new Council Administration Centre, a 4 storey Commercial building that sits between Building 1 and Existing Commercial will further facilitate density and activation to the Town Centre,*
- *Treats Building 2 as a legible street corner marking the intersection of the urban and nature axes and marking the Town Centre when seen from the surrounding suburbs,*
- *Locates Building 1 and 2 as book ends to the atrium and Market Hall emphasising it as a key place for meeting and social gatherings,*
- *Locates the building height and Market Hall to identify Main Street as the key pedestrian spine in the Town Centre while activating the city precinct and supporting the retail centre,*
- *Incorporates a building podium that provides a street building of pedestrian scale defining the public and retail functions, with residential buildings above setback 3 m to provide good residential amenity and landscaped private open space,*
- *Provides a podium built to the boundary to ensure consistency with the Stage 1 development and the DCP and to provide continuous pedestrian movement between Stages 1 and 2 along Main Street,*
- *Distributes the built form to ensure visual privacy and separation and solar access requirements of the ADG are met,*
- *Provides a highly articulated built form that contributes to the streetscape and pedestrian character of Main Street and includes a variety of materials including glass, timber and terracotta coloured panels, steel framed verandah rooms, planter boxes and glass bifold doors and street canopies demarcating the retail entrances.*

SEPP65 Principles

DENSITY

Good design achieves a high level of amenity for residents and each apartment, resulting in a density appropriate to the site and its context.

Appropriate densities are consistent with the area's existing or projected population. Appropriate densities can be sustained by existing or proposed infrastructure, public transport, access to jobs, community facilities and the environment.

The proposed design complies with Principle 3 in that it:

- *Proposes high-density residential dwellings in the Town Centre of a growth area and locality where there are a number of bus services and a potential future train station. The site is adjacent to a variety of services and amenities, including the new Council Administration Centre, Town Park, health, education and sports/recreation facilities,*
- *Provides mixed uses such as high density residential apartments above a retail and entertainment precinct providing highly desirable lifestyle opportunities four residents of the site and surrounding residential neighbourhoods.*

SUSTAINABILITY

Good design combines positive environmental, social and economic outcomes. Good sustainable design includes use of natural cross ventilation and sunlight for the amenity and liveability of residents and passive thermal design for ventilation, heating and cooling reducing reliance on technology and operation costs. Other elements include recycling and reuse of materials and waste, use of sustainable materials, and deep soil zones for groundwater recharge and vegetation.

The proposed design complies with Principle 4 in that it:

- *Provides apartment buildings that are located to optimise solar access, cross ventilation and outlook exceeding the requirements of the Apartment Design Guide. All residential corridors and lobby's are provided with daylight and natural ventilation,*
- *Incorporates a retail and dining precinct orientated towards the Town Park to the north optimising solar access and summer breezes and thereby encouraging outdoor activities,*
- *Provides communal open space in the form of extensive roof top garden above the podium providing high levels of visual amenity to the majority of apartments above, reducing thermal heat gains to retail spaces below and reducing the heat island effect of otherwise concrete and metal roof surfaces. The programmed and active communal open space is irrigated from the rain collected within the development to minimize potable water use,*
- *Provides a naturally ventilated winter garden that connects the Market Hall to the Town Park,*
- *Maximises the use of natural lighting to the Market Hall and retail arcades through the introduction of daylighting from roof skylights,*
- *Incorporates long life cycle and low-maintenance materials such as patterned precast concrete, fibre cement panels, glazing, steel structures, patterned glazed awnings, timber look cladding and perforated metal balustrades,*
- *Selects construction materials that reduce heating and cooling costs and incorporates a comprehensive BASIX analysis of the building included in a separate BASIX/ESD report.*

LANDSCAPE

Good design recognises that together landscape and buildings operate as an integrated and sustainable system, resulting in attractive developments with good amenity. A positive image and contextual fit of well-designed developments is achieved by contributing to the landscape character of the streetscape and neighbourhood.

Good landscape design enhances the development's environmental performance by retaining positive natural features which contribute to the local context, coordinating water and soil management, solar access, micro-climate, tree canopy, habitat values, and preserving green networks. Good landscape design optimises usability, privacy and opportunities for social interaction, equitable access, respect for neighbours' amenity, provides for practical establishment and long term management.

The proposed design complies with Principle 5 in that it:

- *Incorporates a landscape design that takes into consideration the site's context, particularly its site history, geology and native vegetation,*
- *Provides an integrated landscape and architecture solution at the junction of the ground level retail space and Town Park featuring planting boxes, street planting and weather protected verandah rooms for outdoor dining,*
- *Provides a landscape and open space design that is highly programmed and full of activity with a range of community uses for future occupants. The podium on level 1 includes the communal open space that will accommodate a BBQ area and flexible community room, multiple use games court, sculpture garden, breakout spaces, kids play areas, tennis tables and formal and informal lawns for both passive and active recreation,*
- *Provides a building setback of 3m from Main Street and Central Avenue on Level 1, which includes planters in front of the landscaped private open space which softens the façade edge.*

SEPP65 Principles

AMENITY

Good design positively influences internal and external amenity for residents and neighbours. Achieving good amenity contributes to positive living environments and resident well-being.

Good amenity combines appropriate room dimensions and shapes, access to sunlight, natural ventilation, outlook, visual and acoustic privacy, storage, indoor and outdoor space, efficient layouts and service areas, and ease of access for all age groups and degrees of mobility.

The proposed design complies with Principle 6 in that it:

- *Provides high quality street amenity with legible building foyers and prominent street corners,*
- *Provides a variety of single storey dwelling types to suit varied occupant demographics suited to both owner occupier and short and long-term rentals,*
- *Ensures that apartment living spaces and their balconies are oriented towards views of the Town Park and the proposed communal open space and mountains to the west,*
- *Provides well considered and well-proportioned room sizes that can be furnished in many ways,*
- *Provides a number of dwelling types that exceed the amenity outlined in Apartment Design Guide, with larger apartments from +10% to +20% larger than the ADG. These larger apartments also have increased amenity, with separate laundries, study nooks, additional bathrooms and larger bedrooms, living areas and balconies,*
- *Incorporates a variety of private and communal outdoor spaces in the form of podium courtyards, balconies both recessed and overhanging, and a communal open space on the podium,*
- *Provides levels of solar access and cross ventilation as per the ADG guidelines.*

SAFETY

Good design optimises safety and security, within the development and the public domain. It provides for quality public and private spaces that are clearly defined and fit for the intended purpose. Opportunities to maximise passive surveillance of public and communal areas promote safety.

A positive relationship between public and private spaces is achieved through clearly defined secure access points and well-lit and visible areas that are easily maintained and appropriate to the location and purpose.

The proposed design complies with Principle 7 in that it:

- *Provides pedestrian entrances to the apartment buildings from both Main Street and Central Avenue. These that are clearly legible and well-lit and provide access to a secure lobby,*
- *Incorporates vehicle access to the basement car park via a clearly sign posted and well lit entry ramp from Central Avenue,*
- *Provides high levels of passive surveillance from the retail, market hall and residential apartments above,*
- *Incorporates communal open space that is highly visible from the apartments above,*
- *Allows for internal and external lighting provided in accordance with Australian Standards.*

HOUSING DIVERSITY AND SOCIAL INTERACTION

Good design achieves a mix of apartment sizes, providing housing choice for different demographics, living needs and household budgets.

Well-designed apartment developments respond to social context by providing housing and facilities to suit the existing and future social mix. Good design involves practical and flexible features, including different types of communal spaces for a broad range of people, providing opportunities for social interaction amongst residents.

The proposed design complies with Principle 8 in that it:

- *Provides a retail centre, active street edges and a Market Hall all offering opportunities for public social interaction,*
- *Provides a variety of dwelling types that include 1, 2, and 3 bedroom apartments.*
- *Incorporates a number of dwelling types to suit a variety of occupants and rental markets that go above and beyond the amenity and area outlined in Apartment Design Guide, with larger apartments from +10% to +20% larger than the ADG minimum standards,*
- *Provides a highly programmed communal open space on the level 1 podium for social interaction amongst residents,*
- *Provides controllable outlook from podium level dwellings to the adjacent communal open space.*

AESTHETICS

Good design achieves a built form that has good proportions and a balanced composition of elements, reflecting the internal layout and structure. Good design uses a variety of materials, colours and textures.

The visual appearance of well designed apartment development responds to the existing or future local context, particularly desirable elements and repetitions of the streetscape.

The proposed design complies with Principle 9 in that it:

- *Treats the facades to include a variety of materials and finishes which provide visual interest and have a high aesthetic content,*
- *Incorporates a variety of architectural treatments including overhanging balconies, recessed balconies and slots for articulation, podium terraces, blade walls and variety of window articulations,*
- *Reflects the internal floor layout on the façade through the expression of structure and openings creating diverse and interesting patterns,*
- *Includes a clearly articulated podium to Main Street and Central Avenue that responds to and creates a street scale character and identifies the retail and public functions of the development.*

Appendix 2

[ADG Compliance Checklist]

ADG Compliance Checklist

Part 3 SITING THE DEVELOPMENT

3A - Site Analysis	Compliance	Comments
Objective 3A-1		
Site analysis illustrates that design decisions have been based on opportunities and constraints of the site conditions and their relationship to the surrounding context.	Y	Refer to the body of this report for detailed site analysis.

3B - Orientation	Compliance	Comments
Objective 3B-1		
Building types and layouts respond to the streetscape and site while optimising solar access within the development.	Y	Buildings front Main Street and Central Ave with direct access to lift lobbies. Building 1 street frontage is north facing and there are no buildings to the south. Building 2 frontage is east facing. Orientation and separation between the buildings has maximised solar access.
Objective 3B-2		
Overshadowing of neighbouring properties is minimised during mid winter.	NA	No adjoining residential properties are impacted by the proposal.

3C - Public domain interface	Compliance	Comments
Objective 3C-1		
Transition between private and public domain is achieved without compromising safety and security.	NA	No apartments are located on street level.
Objective 3C-2		
Amenity of the public domain is retained and enhanced	Y	Refer to the Landscape Report and drawings for compliance with the Oran Park DCP 2007 Public Domain Manual.
Objective 3C-2 [cont]		
Amenity of the public domain is retained and enhanced		All apartments are located above the retail podium. Only entries and lift lobbies occupy street frontage. Entries are fully accessible. Mail boxes are integrated into the buildings lobbies. Other than at the vehicle entry parking is not visible from the street. All ventilation is incorporated in the retail façade. Materials adjacent the public domain are predominantly part of the retail component but will has the same requirements for durability.

3D - Communal and public open space	Compliance	Comments
Objective 3D-1		
An adequate area of communal open space is provided to enhance residential amenity and to provide opportunities for landscaping.	Y	Refer the Landscape Drawings and Report for detail of communal open space provision,
Design Criteria 1 Communal open space has a minimum area equal to 25% of the site.	Y	Refer the Landscape Report for the rationale for defining the amount of site area relevant to the residential component against which a minimum 25% of communal open space is proposed.
Design Criteria 2 Developments achieve a minimum of 50% direct sunlight to the principal usable part of the communal open space for a minimum of 2 hours between 9 am and 3 pm on 21 June (mid winter).	Y	

Objective 3D-2		
Communal open space is designed to allow for a range of activities, respond to site conditions and be attractive and inviting.	Y	Refer the Landscape Drawings and Report for detail of communal open space provision, Communal open space has been well considered, providing areas for seating, eating and meeting. Both passive and active areas are provided as well as lawn and mature tree zones for shade and visual amenity.
Objective 3D-3		
Communal open space is designed to maximise safety.	Y	The podium level location ensures access by residents only. The communal open space is surveyed from the Courtyards of the podium level apartments as well as from apartments above which overlook the podium. Refer the Landscape Drawings and Report for detail of child friendly play areas.
Objective 3D-4		
Public open space, where provided, is responsive to the existing pattern and uses of the neighbourhood.		No public open space is proposed due to the proximity of the Town Park to the north and its connectivity to the retail component of the development

3E - Deep soil zones	Compliance	Comments
Objective 3E-1		
Deep soil zones provide areas on the site that allow for and support healthy plant and tree growth. They improve residential amenity and promote management of water and air quality.	N	Note that the retail component of this mixed-use development occupies 100% site coverage precluding the provision of deep soil zones. Refer the Landscape Report for further commentary.

3E - Deep soil zones [cont]	Compliance	Comments
Objective 3E-1 [cont]		
Design Criteria 1 Deep soil zones are to meet the following minimum requirements: Site Area = <650sqm | no minimum dimension | DSZ is 7% of site area Site Area = 650sqm - 1,500sqm | 3m minimum dimension | DSZ is 7% of site area Site Area = >1,500sqm | 6m minimum dimension | DSZ is 7% of site area	N	

3F - Visual privacy	Compliance	Comments
Objective 3F-1		
Adequate building separation distances are shared equitably between neighbouring sites, to achieve reasonable levels of external and internal visual privacy.	Y	No neighbouring sites are impacted by the proposed location of the buildings on the site.
Design Criteria 1 Separation between windows and balconies is provided to ensure visual privacy is achieved. Minimum required separation distances from buildings to the side and rear boundaries are as follows: - up to 4 levels | 6m (habitable rooms and balconies) | 3m (non-habitable rooms) - 5-8 levels | 9m | 4.5m - 9+ levels | 12m | 6m Note: Separation distances between buildings on the same site should combine required building separations depending on the type of room. Gallery access circulation should be treated as habitable space when measuring privacy separation distances between neighbouring properties.	Y	Separation between Building 1 and Building 2 significantly exceeds the minimum requirement.

Objective 3F-2		
Site and building design elements increase privacy without compromising access to light and air and balance outlook and views from habitable rooms and private open space.	Y	Privacy to courtyard apartments from communal open space at podium level is achieved by wall and landscape enclosure. Lower level balconies have predominantly solid balustrades. Privacy between adjoining balconies is achieved by a combination of blade walls, fixed louvre screens and bi-folding screens.

3G - Pedestrian access and entries	Compliance	Comments
Objective 3G-1		
Building entries and pedestrian access connects to and addresses the public domain	Y	Entries to the buildings are at street level and are identified by change of scale and awning treatment. Each building will have its own street address.
Objective 3G-2		
Access, entries and pathways are accessible and easy to identify	Y	Entries to the buildings are fully accessible at street level with paths of travel from the public domain.
Objective 3G-3		
Large sites provide pedestrian links for access to streets and connection to destinations	Y	Buildings are directly accessible to the streets via the street level lobbies.

3H – Vehicle Access	Compliance	Comments
Objective 3H-1		
Car park access should be integrated with the building's overall facade. Design solutions may include: - the materials and colour palette to minimise visibility from the street	Y	Carpark entry located south of Building 2 and between future residential buildings. Impact on streetscape has been minimised.
Objective 3H-1 [cont]		
minimise voids in the facade - where doors are not provided, the visible interior reflects the facade design and the building services, pipes and ducts are concealed.	Y	Entry is set back from the building line by approximately 13.0m with a perforated roller shutter required for ventilation. Garbage collection and loading is carried out elsewhere. Refer also the Traffic Report prepared by Positive Traffic.

3J - Bicycle and car parking	Compliance	Comments
Objective 3J-1		
Car parking is provided based on proximity to public transport in metropolitan Sydney and centres in regional areas	Y	Refer to Traffic Report prepared by Positive Traffic.
Objective 3J-2		
Parking and facilities are provided for other modes of transport.	Y	Both motorbike and bicycle provision has been made within the residential parking areas. Refer also to commentary within the Traffic Report prepared by Positive Traffic.
Objective 3J-3		
Car park design and access is safe and secure	Y	Residential parking layout is clear and efficient, fully compliant with the requirements of AS2890.1. Ancillary rooms are accessed from circulation or off aisles. Enclosed lift lobbies for each building provided.

Objective 3J-4		
Visual and environmental impacts of underground car parking are minimised.	Y	Other than the vehicle entry, no part of the residential parking is visible. Parking layout is clear and efficient, with a repetitive structural grid and double loaded aisles all fully compliant with the requirements of AS2890.1. Basement level parking will be mechanically ventilated. Shafts and louvres are integrated into the retail podium façade.
Objective 3J-5		
Visual and environmental impacts of on-grade car parking are minimised	NA	All residential parking is provided in basement parking.
Objective 3J-6		
Visual and environmental impacts of above ground enclosed car parking are minimised.	NA	All residential parking is provided in basement parking.

Part 4 DESIGNING THE BUILDING

4A - Solar and daylight access	Compliance	Comments
Objective 4A-1		
To optimise the number of apartments receiving sunlight to habitable rooms, primary windows and private open space.	Y	
Design Criteria 1 Living rooms and private open spaces of at least 70% of apartments in a building receive a minimum of 2 hours direct sunlight between 9am and 3pm at mid winter in the Sydney Metropolitan Area and in the Newcastle and Wollongong local government areas.	Y	79% of apartments receive 2 hours of sun between 9am and 3pm. Refer architectural drawings and Design Report for demonstration of solar access.
Design Criteria 2 In all other areas, living rooms and private open spaces of at least 70% of apartments in a building receive a minimum of 3 hours direct sunlight between 9 am and 3 pm at mid winter.	NA	
Design Criteria 3 A maximum of 15% of apartments in a building receive no direct sunlight between 9 am and 3 pm at mid winter.	Y	Extent of apartments receiving no direct sunlight between 9am and 3pm in mid winter has been restricted to 13%.
Objective 4A-2		
Daylight access is maximised where sunlight is limited.	Y	All apartments have habitable rooms receiving daylight which exceeds to minimum required by the BCA.

4A - Solar and daylight access [cont]	Compliance	Comments
Objective 4A-3		
Design incorporates shading and glare control, particularly for warmer months.	Y	Substantial balcony overhangs and other devices such as fixed louvres and bi-folding screens provide adequate shading and glare control in warmer months. The use of bi-folding screens gives residents a measure of control over their comfort.

4B - Natural ventilation	Compliance	Comments
Objective 4B-1		
All habitable rooms are naturally ventilated	Y	All habitable rooms are provided with typically greater than the 5% of floor area opening required by the ADG and BCA. Building orientation takes advantage of the predominant prevailing breezes from the north and east.
Objective 4B-2		
The layout and design of single aspect apartments maximises natural ventilation.	Y	Apartments depths have been kept to a minimum. The primary living spaces are all within close proximity to openings.
Objective 4B-3		
The number of apartments with natural cross ventilation is maximised to create a comfortable indoor environment for residents.	Y	
Design Criteria 1 At least 60% of apartments are naturally cross ventilated in the first nine storeys of the building. Apartments at ten storeys or greater are deemed to be cross ventilated only if any enclosure of the balconies at these levels allows adequate natural ventilation and cannot be fully enclosed	Y	65% of apartments in the first 9 levels are considered to be cross ventilated. Refer architectural drawings and Design Report for demonstration of compliance.

Objective 4B-3 [cont]		
Design Criteria 2 Overall depth of a cross-over or cross-through apartment does not exceed 18m, measured glass line to glass line	NA	Cross-over apartments not proposed.

4C- Ceiling heights	Compliance	Comments
Objective 4C-1		
Ceiling height achieves sufficient natural ventilation and daylight access	Y	
Design Criteria 1. Measured from finished floor level to finished ceiling level, minimum ceiling heights are: - Habitable rooms - 2.7m - Non-habitable - 2.4m - For 2 storey apartments -2.7m for main living area floor - 2.4m for second floor, where its area does not exceed 50% of the apartment area - Attic spaces - 1.8m at edge of room with a 30 degree minimum ceiling slope - If located in mixed used areas - 3.3m for ground and first floor to promote future flexibility of use		Proposed floor to floor heights facilitate the required ceiling heights.
Objective 4C-2		
Ceiling height increases the sense of space in apartments and provides for well proportioned rooms	Noted	Subject to future design development
Objective 4C-3		
Ceiling heights contribute to the flexibility of building use over the life of the building	NA	

4D - Apartment size and layout	Compliance	Comments
Objective 4D-1		
The layout of rooms within an apartment is functional, well organised and provides a high standard of amenity.	Y	The majority of apartments within the proposal have intentionally exceeded the minimum ADG criteria, in order to provide a superior level of amenity in recognition that the primary competition in the area is the single dwelling project home.
Design Criteria 1 Apartments are required to have the following minimum internal areas: Apartment type / Minimum internal area Studio / 35m2 1 bedroom / 50m2 2 bedroom / 70m2 3 bedroom / 90m2 The minimum internal areas include only one bathroom. Additional bathrooms increase the minimum internal area by 5m2 each A fourth bedroom and further additional bedrooms increase the minimum internal area by 12m2 each	Y	All apartments meet or exceed the minimum ADG area requirements. 59.5% of apartments achieve ADG+10% 33.5% of apartments achieve ADG+20%

4D - Apartment size and layout	Compliance	Comments
Objective 4D-1		
Design Criteria 2 Every habitable room must have a window in an external wall with a total minimum glass area of not less than 10% of the floor area of the room. Daylight and air may not be borrowed from other rooms	Y	Complies

4D - Apartment size and layout [cont]	Compliance	Comments
Objective 4D-2		
Environmental performance of the apartment is maximised	Partial	
Design Criteria 1 Habitable room depths are limited to a maximum of 2.5 x the ceiling height *(in the case of a 2.7m ceiling height, this would be 2.7x2.5 = 6.75m)*	Y	Habitable rooms, other than open planned combined living, dining and kitchen comply with this criteria.
Design Criteria 2 In open plan layouts (where the living, dining and kitchen are combined) the maximum habitable room depth is 8m from a window	Partial	Proposal incorporates combined living, dining and kitchen configurations which in some cases exceeds 8m. Provision of larger apartments and wider than minimum living spaces is considered to offset strict compliance
Objective 4D-3		
Apartment layouts are designed to accommodate a variety of household activities and needs	Y	No bedrooms or bathrooms are accessed directly from living spaces. Majority of all bedrooms are provided with 1.8m length of wardrobe space.
Design Criteria 1 Master bedrooms have a minimum area of 10m2 and other bedrooms 9m2 (excluding wardrobe space)	Y	Complies. In majority of instances bedroom areas exceed minimum criteria.
Design Criteria 2 Bedrooms have a minimum dimension of 3m (excluding wardrobe space)	Y	Complies
Design Criteria 3 Living rooms or combined living/dining rooms have a minimum width of: • 3.6m for studio and 1 bedroom apartments • 4m for 2 and 3 bedroom apartments	Y	Complies. In some cases, minimum widths have been exceeded.

Objective 4D-3 [cont]		
Design Criteria 4 The width of cross-over or cross-through apartments are at least 4m internally to avoid deep narrow apartment layouts	NA	No cross-over or cross-through apartments proposed.

4E - Private open space and balconies	Compliance	Comments
Objective 4E-1		
Apartments provide appropriately sized private open space and balconies to enhance residential amenity	Y	Typically, private open space and balcony areas significantly exceed the minimum criteria.
Design Criteria 1 All apartments are required to have primary balconies as follows: Dwelling type/Minimum area/Minimum depth Studio apartments/4m2/na 1 bedroom apartments/8m2/2m 2 bedroom apartments/10m2/2m 3+ bedroom apartments/12m2/2.4m The minimum balcony depth to be counted as contributing to the balcony area is 1m	Y	Complies
Design Criteria 2 For apartments at ground level or on a podium or similar structure, a private open space is provided instead of a balcony. It must have a minimum area of 15m² and a minimum depth of 3m	Y	Complies
Objective 4E-2		
Primary private open space and balconies are appropriately located to enhance liveability for residents	Y	All primary private open space and balconies are access from living spaces. The majority face north, east or west with long direction facing outwards.
Objective 4E-3		
Private open space and balcony design is integrated into and contributes to the overall architectural form and detail of the building	Y	Balcony design is a significant contributor to the overall aesthetic of the building.
Objective 4E-4		
Private open space and balcony design maximises safety	Y	Balconies and balustrades designed to comply with BCA requirements.

4F - Common circulation and spaces	Compliance	Comments
Objective 4F-1		
Common circulation spaces achieve good amenity and properly service the number of apartments	Y	Common circulation spaces are of generous width and provided with access to light and ventilation.
Design Criteria 1. The maximum number of apartments off a circulation core on a single level is eight.	Partial	Building 1 has 10 apartments for all 5 levels however the corridor is provided with light and ventilation at each end and at the central lift lobby. Building 2 complies.
Design Criteria 2. For buildings of 10 storeys and over, the maximum number of apartments sharing a single lift is 40	N	Building 2 exceeds this limit. Refer to the Vertical Transport consultant's report confirming satisfactory service from the number of lifts provided in each building.
Objective 4F-2		
Common circulation spaces promote safety and provide for social interaction between residents	Y	

4G - Storage	Compliance	Comments
Objective 4G-1		
Adequate, well designed storage is provided in each apartment	Y	Storage as required is accessed from circulation of living spaces.

Objective 4G-1 [cont]		
Design Criteria 1. In addition to storage in kitchens, bathrooms and bedrooms, the following storage is provided: Dwelling type /Storage size volume Studio apartments/4m3 1 bedroom apartments/6m3 2 bedroom apartments/8m3 3+ bedroom apartments/10m3 At least 50% of the required storage is to be located within the apartment	Y	A minimum of 50% of required storage is proposed inside the apartment and other 50% located at basement car parking level.
Objective 4G-2		
Additional storage is conveniently located, accessible and nominated for individual apartments	Y	Additional storage is proposed in the residential parking basement and will be allocated to specific apartments. The majority are adjacent carparkings spaces or in supplementary areas access via common circulation space.

4H - Acoustic privacy	Compliance	Comments
Objective 4H-1		
Noise transfer is minimised through the siting of buildings and building layout	Y	Building separation exceeds the ADG guidelines. Perimeter roads and adjoining uses are not considered a significant issue and can be ameliorated. Refer the Acoustic Report prepared by Acoustic Logic.
Objective 4H-2		
Noise impacts are mitigated within apartments through layout and acoustic treatments	Y	Open plan apartment arrangement groups kitchen and living spaces together. Bedrooms and bathroom spaces generally have offset entries and openings with respects to primary living spaces.

4J - Noise and Pollution	Compliance	Comments
Objective 4J-1		
In noisy or hostile environments, the impacts of external noise and pollution are minimised through the careful siting and layout of buildings	Y	The proposal is not sited adjacent to any major noise sources. Non-residential uses have been located on ground floor to mitigate noise impact and promote street level activation. Refer the Acoustic Report prepared by Acoustic Logic.
Objective 4J-2		
Appropriate noise shielding or attenuation techniques for the building design, construction and choice of materials are used to mitigate noise transmission	Y	Refer the Acoustic Report prepared by Acoustic Logic.

4K - Apartment Mix	Compliance	Comments
Objective 4K-1		
A range of apartment types and sizes is provided to cater for different household types now and into the future	Y	Refer the body of the DA Design Report for a description of the mix and size of one, two, three and 4 bedroom apartments providing a apartment types the suit a variety of potential residents. Apartment configurations provide flexibility for young couples, families and unrelated singles. The required complement of adaptable and liveable apartments has also been provided.
Objective 4K-2		
The apartment mix is distributed to suitable locations within the building	Y	

4L - Ground Floor Apartments	Compliance	Comments
Objective 4L-1		
Street frontage activity is maximised where ground floor apartments are located	NA	No ground floor apartments proposed
Objective 4L-2		
Design of ground floor apartments delivers amenity and safety for residents	NA	No ground floor apartments proposed

4M - Facades	Compliance	Comments
Objective 4M-1		
Building facades provide visual interest along the street while respecting the character of the local area	Y	Refer to the DA Design Report that notes the retail component of the development dominating the street frontage and that there is no established character for the area. The retail podium provides the base to the development. The residential buildings above achieve significant variety and visual interest from the undulating balconies and their balustrades which change material and colour as they move up the buildings. The building forms are well articulated and the solid parts of the façade provide contrast of material and texture.
Objective 4M-2		
Building functions are expressed by the façade.	Y	Building entries at street level are clearly expressed. Corners of the building are emphasised by the balconies wrapping around corners or by strong vertical edges. Individual apartments are clearly delineated by party walls extending to the perimeter of balconies.

4N - Roof Design	Compliance	Comments
Objective 4N-1		
Roof treatments are integrated into the building design and positively respond to the street	Y	Refer the Architectural drawings for elevations.
Objective 4N-2		
Opportunities to use roof space for residential accommodation and open space are maximised		No open space on the residential roofs is proposed. It is considered that more than adequate communal open space is being provided on the podium roof and residents will also have access to the Town Park.
Objective 4N-3		
Roof design incorporates sustainability features	Y	The roof edge follows the profile of the balconies below providing the same level of solar access and shading to the top level apartments as the levels below.

4O - Landscape Design	Compliance	Comments
Objective 4O-1		
Landscape design is viable and sustainable	Y	Refer the Landscape Drawings and Report prepared by Scott Carver.
Objective 4O-2		
Landscape design contributes to the streetscape and amenity	Y	Refer the Landscape Drawings and Report prepared by Scott Carver for implementation of the Oran Park DCP 2007 Public Domain Manual requirements.

4P - Planting on Structures	Compliance	Comments
Objective 4P-1		
Appropriate soil profiles are provided	Y	Refer the Landscape Drawings and Report prepared by Scott Carver. Structure has been designed with setdowns to accommodate the recommended soil profiles.

4P - Planting on Structures [cont]	Compliance	Comments
Objective 4P-2		
Plant growth is optimised with appropriate selection and maintenance	Y	Refer the Landscape Drawings and Report prepared by Scott Carver.
Objective 4P-3		
Planting on structures contributes to the quality and amenity of communal and public open spaces	Y	Refer the Landscape Drawings and Report prepared by Scott Carver.

4Q - Universal Design	Compliance	Comments
Objective 4Q-1		
Universal design features are included in apartment design to promote flexible housing for all community members	Y	The proposal achieves the required 20% silver level liveable apartments.
Objective 4Q-2		
A variety of apartments with adaptable designs are provided	Y	The proposal incorporates 10% adaptable apartments in accordance with the Oran Park DCP 2007 requirements. Refer Accessibility Report prepared by Morris Goding.
Objective 4Q-3		
Apartment layouts are flexible and accommodate a range of lifestyle needs	NA	

4R - Adaptive Reuse	Compliance	Comments
Objective 4R-1		
New additions to existing buildings are contemporary and complementary and enhance an area's identity and sense of place	NA	
Objective 4R-2		
Adapted buildings provide residential amenity while not precluding future adaptive reuse.	NA	

4S - Mixed Use	Compliance	Comments
Objective 4S-1		
Mixed use developments are provided in appropriate locations and provide active street frontages that encourage pedestrian movement	Y	Proposal is for a mixed use retail and residential development as an extension to the existing Oran Park Podium retail centre. Refer to the DA Design Report and Statement of Environmental Effects for detail on the significance of the proposals location as part of the Oran Park Town Centre Masterplan.
Objective 4S-2		
Residential levels of the building are integrated within the development, and safety and amenity is maximised for residents	Y	Residential access is at street level and differentiated from the retail component entries. There is no direct connectivity with the retail centre. All servicing and parking are completely separate. Communal open space on the podium roof is accessible to residents only.

4T - Awnings and Signage	Compliance	Comments
Objective 4T-1		
Awnings are well located and complement and integrate with the building design	Y	Street awnings are provided in conjunction with the retail component of the development residential awnings are differentiated by a change of scale and material.

Part 3 SITING THE DEVELOPMENT

3A - Site Analysis	Compliance	Comments
Objective 3A-1		
Site analysis illustrates that design decisions have been based on opportunities and constraints of the site conditions and their relationship to the surrounding context.	Y	Refer to the body of this report for detailed site analysis.

3B - Orientation	Compliance	Comments
Objective 3B-1		
Building types and layouts respond to the streetscape and site while optimising solar access within the development.	Y	Buildings front Main Street and Central Ave with direct access to lift lobbies. Building 1 street frontage is north facing and there are no buildings to the south. Building 2 frontage is east facing. Orientation and separation between the buildings has maximised solar access.
Objective 3B-2		
Overshadowing of neighbouring properties is minimised during mid winter.	NA	No adjoining residential properties are impacted by the proposal.

3C - Public domain interface	Compliance	Comments
Objective 3C-1		
Transition between private and public domain is achieved without compromising safety and security.	NA	No apartments are located on street level.
Objective 3C-2		
Amenity of the public domain is retained and enhanced	Y	Refer to the Landscape Report and drawings for compliance with the Oran Park DCP 2007 Public Domain Manual.
Objective 3C-2 [cont]		
Amenity of the public domain is retained and enhanced		All apartments are located above the retail podium. Only entries and lift lobbies occupy street frontage. Entries are fully accessible. Mail boxes are integrated into the buildings lobbies. Other than at the vehicle entry parking is not visible from the street. All ventilation is incorporated in the retail façade. Materials adjacent the public domain are predominantly part of the retail component but will has the same requirements for durability.

3D - Communal and public open space	Compliance	Comments
Objective 3D-1		
An adequate area of communal open space is provided to enhance residential amenity and to provide opportunities for landscaping.	Y	Refer the Landscape Drawings and Report for detail of communal open space provision,
Design Criteria 1 Communal open space has a minimum area equal to 25% of the site.	Y	Refer the Landscape Report for the rationale for defining the amount of site area relevant to the residential component against which a minimum 25% of communal open space is proposed.
Design Criteria 2 Developments achieve a minimum of 50% direct sunlight to the principal usable part of the communal open space for a minimum of 2 hours between 9 am and 3 pm on 21 June (mid winter).	Y	

Appendix 3

[Architectural Drawings]

AECOM Imagine it. Delivered.

Greenfields Development Company No.2
27-Sep-2018

Oran Park Town Centre: Revised Master Plan

Traffic Report

Oran Park Town Centre: Revised Master Plan

Traffic Report

Client: Greenfields Development Company No.2

ABN: 31 133 939 965

Prepared by

AECOM Australia Pty Ltd
Level 21, 420 George Street, Sydney NSW 2000, PO Box Q410, QVB Post Office NSW 1230, Australia
T +61 2 8934 0000 F +61 2 8934 0001 www.aecom.com
ABN 20 093 846 925

27-Sep-2018

Job No.: 60340595

AECOM in Australia and New Zealand is certified to ISO9001, ISO14001 AS/NZS4801 and OHSAS18001.

Quality Information

Document	Oran Park Town Centre: Revised Master Plan 60340595
Ref	\\ausyd1fp001\projects\603x\60340595\4. tech work area\4.4 cube town centre update\04 report\180927_oran park town centre revised master plan - traffic report final.docx
Date	27-Sep-2018
Prepared by	Marcel Cruz
Reviewed by	Nick Bernard

Revision History

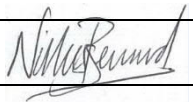
Rev	Revision Date	Details	Authorised	
			Name/Position	Signature
A	24-Aug-2018	Draft	Nick Bernard Associate Director	Original signed
B	27-Sep-2018	Final	Nick Bernard Associate Director	

Table of Contents

1.0 Introduction

AECOM has been commissioned by Greenfields Development Company (GDC2) to prepare a traffic study to assess the traffic and transport impacts from a proposed increased development yield within the Oran Park Town Centre. This increase comprises an uplift in the number of residential dwellings and floor space for commercial use in the Town Centre.

This report will be used to supplement a Planning Proposal submission to Camden Council for the Oran Park Town Centre seeking an increase to building height and reconciliation of zone boundaries.

1.1 Background

Oran Park is a major land release area, located in the south west growth region of Sydney. It was rezoned for urban development and is one of the first areas to be planned under the NSW Government's South West Priority Growth Area (formerly the South West Growth Centre).

Overall, the precinct has an area of 1,120 hectares and has been rezoned to allow for residential, business, industrial, special purpose, recreational and environmental projection uses.

Oran Park is planned to provide approximately 7,500 dwellings with a population of 22,000 people. The Oran Park Precinct Development Control Plan (DCP) was adopted in 2007 by the NSW Department of Planning and Infrastructure (now Department of Planning and Environment) with the intent that the precinct is developed to provide a hierarchy of interconnected streets with safe and convenient public transport, pedestrian and cycleway networks.

1.2 Study objectives

In 2014, AECOM updated the *Oran Park Town Centre: Transport Appraisal* (initially prepared in 2012) to reflect changes to the master plan for the Oran Park Town Centre.

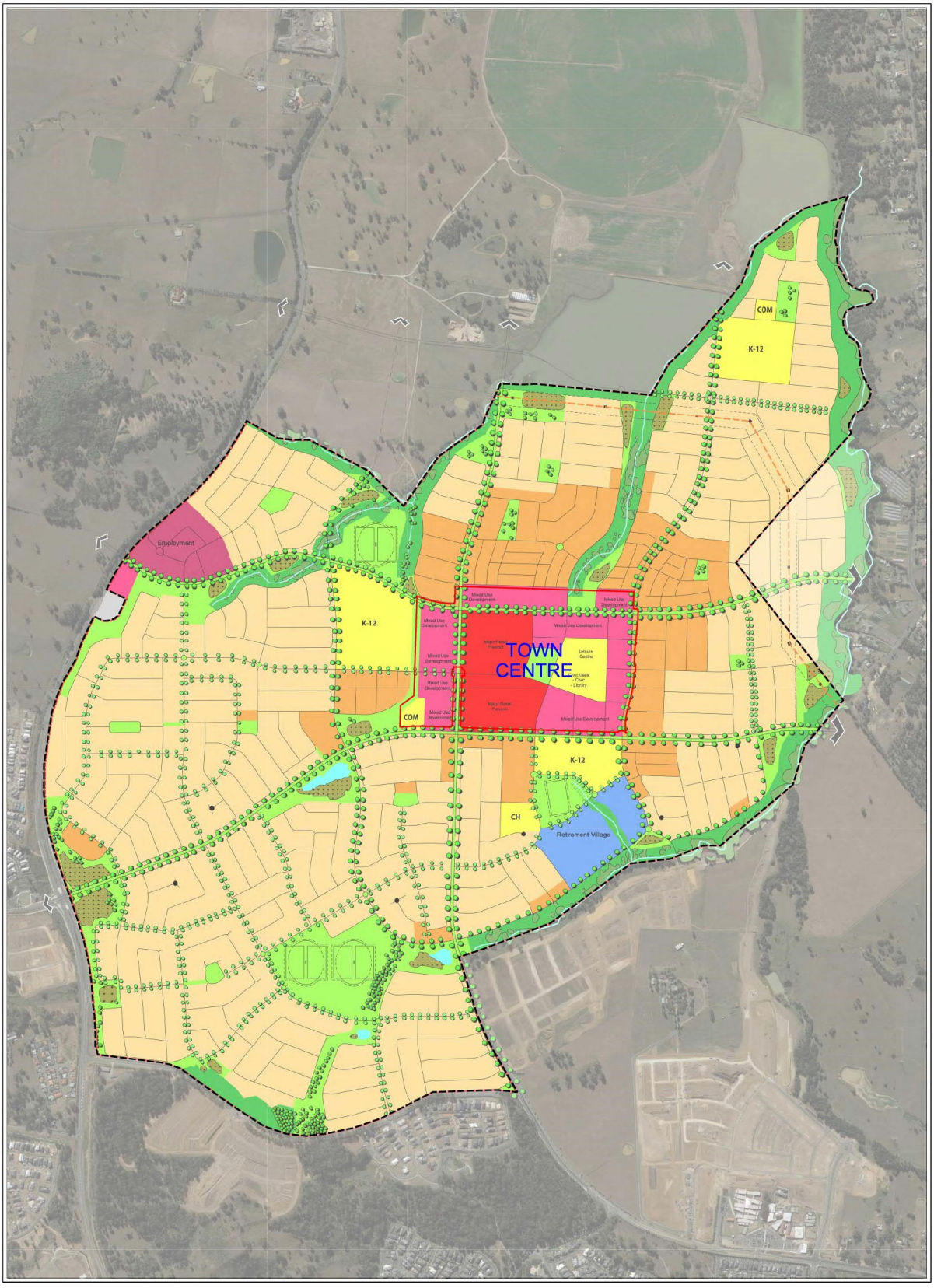
Since 2014, further master planning has taken place, which seeks to alter the development mix for the Town Centre. AECOM has been engaged to assess the traffic and transport impacts of these amendments, and recommend measures to minimise any impacts arising.

1.3 Report structure

The report is structured as follows:

- **Section 2.0** describes the location of the site and provides a strategic review of relevant planning documents and previous traffic and transport studies prepared for the Oran Park Town Centre.
- **Section 3.0** provides a summary of the proposed changes to the development yield for the Oran Park Town Centre.
- **Section 4.0** discusses the traffic implications associated with the changes including the projected trip generation and forecast road network performance.
- **Section 5.0** provides a summary of the assessment.

Figure 1 Oran Park Precinct



Source: Design + Planning, 2018

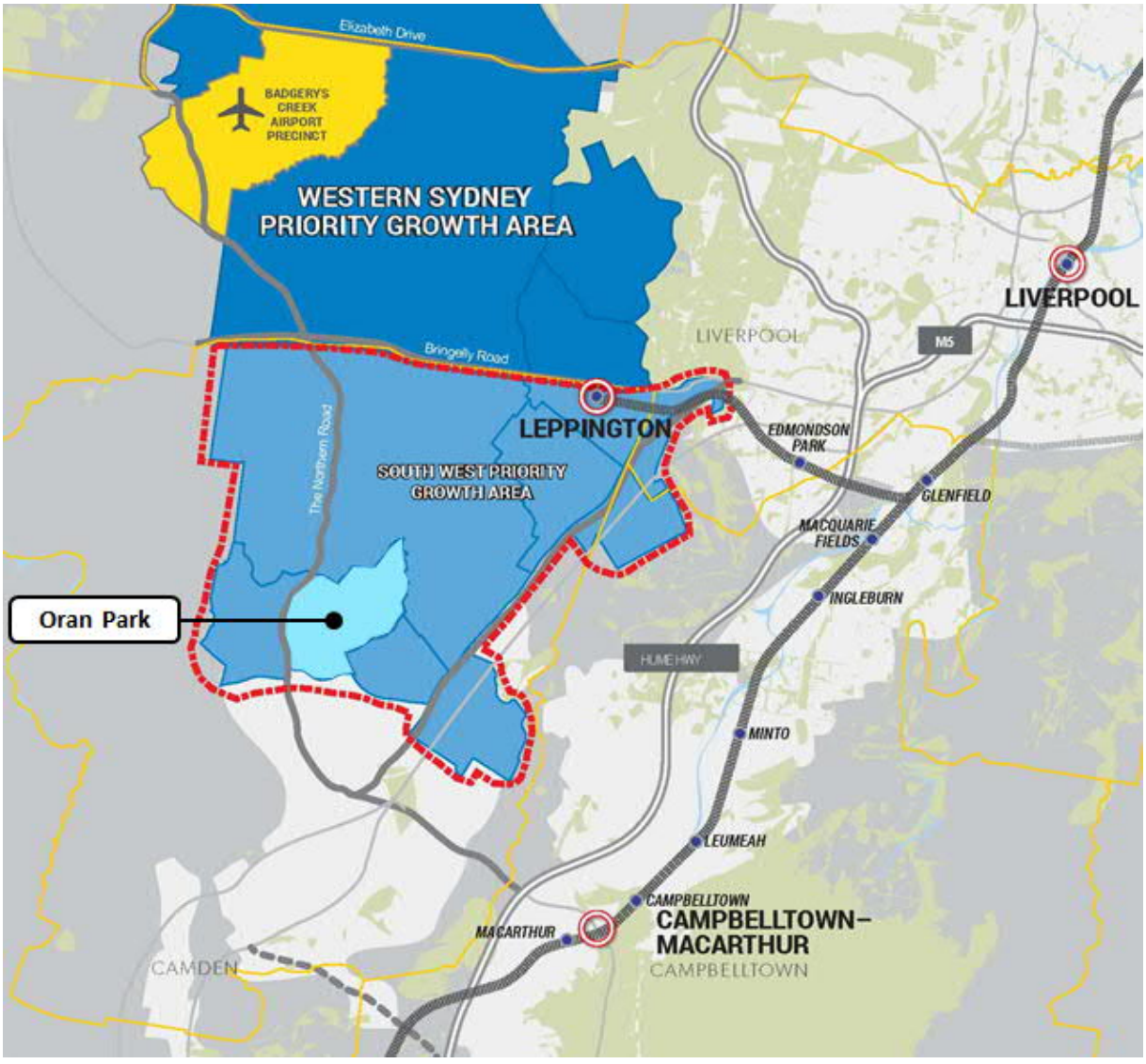
2.0 Planning context

2.1 Site location

Oran Park Town Centre is located in the Oran Park Precinct, approximately 10km from the Campbelltown-Macarthur centre. It is located within the Camden LGA and forms part of the South West Priority Growth Area as shown in **Figure 2**.

The Town Centre is bounded by key roads which provide major transport links for the precinct (further discussed in **Section 3.4**).

Figure 2 Site context



Source: NSW Government, 2018

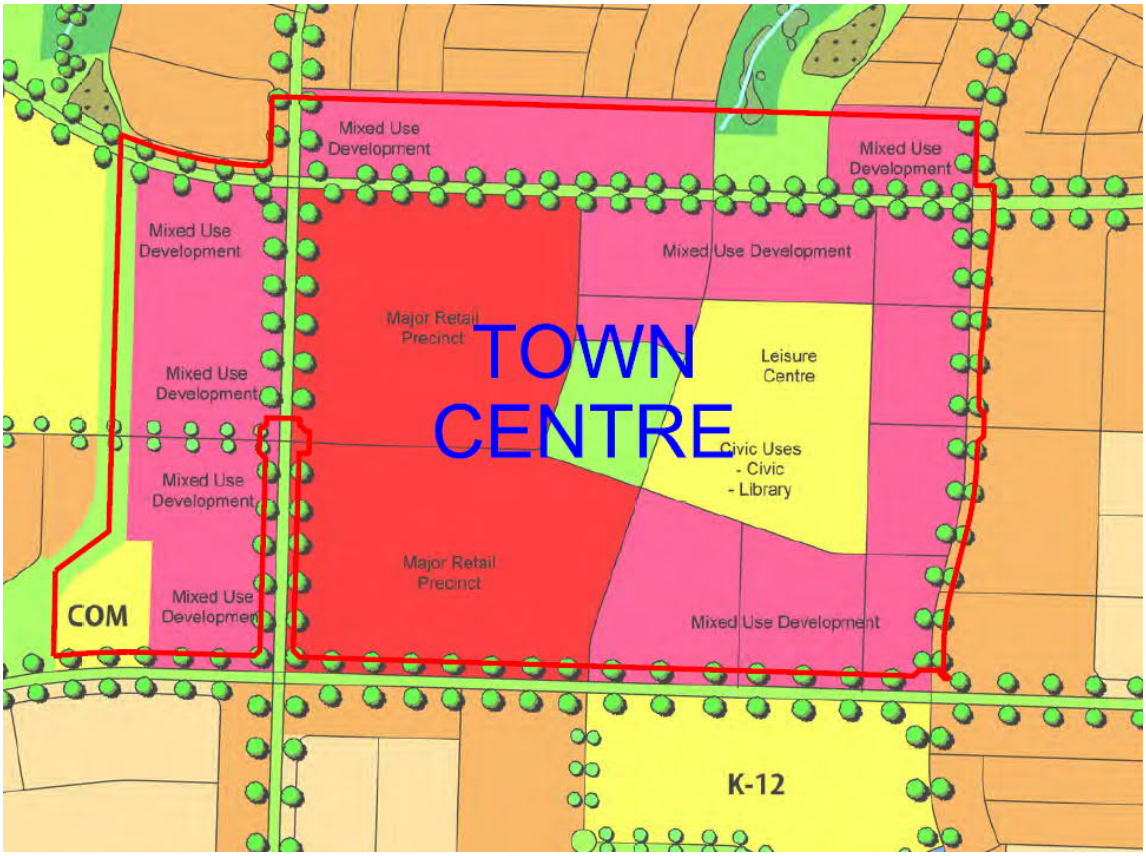
2.2 Indicative Layout Plan

The Indicative Layout Plan (ILP) integrates employment, retail and residential land for the Oran Park Precinct. It is primarily characterised by a mix of low and medium density residential uses and also contains smaller areas of high density residential and employment, commercial and retail uses.

The Town Centre will service the needs of the locality and region and is intended to accommodate a range of retail, civic, community, recreational, commercial, residential and mixed use types, which are generally defined by three interconnected and integrated precincts – a retail precinct, a Civic Precinct and a mixed use precinct. The ILP, illustrated in **Figure 3**, shows the retail core will be the geographical heart of the Town Centre, which will be further strengthened with a Civic Precinct (including a Council building, leisure centre and library), as well as high density housing.

Ultimately, the Town Centre will be a significant development in the South West Growth Centre, second in size only to the proposed Leppington Regional Centre. The Town Centre is also intended to have a bus interchange within easy walking distance of the main street and retail core.

Figure 3 Oran Park Town Centre – Indicative Layout Plan



Source: Design + Planning, 2018

2.3 Development Control Plan

The Oran Park Development Control Plan (DCP) was prepared by the NSW Department of Planning and adopted in 2007. The DCP contains objectives and development controls relating to the overall layout and vision for the future development of the precinct.

The DCP has two parts:

- Part A contains general objectives and controls that apply to development across the whole precinct
- Part B provides site specific DCP's including the Oran Park Town Centre (Part B1). The Oran Park Town Centre Part B1 DCP was adopted in October 2011 and describes the town centre structure, layout design and land use principles.

The development of Oran Park Town Centre is to be generally in accordance with the ILP and other controls within the Oran Park Precinct DCP. The consent authority is administered by Camden Council.

2.3.1 Town Centre planning principles

The principles for the Oran Park Town Centre as described in Part B1 of the DCP are as follows:

1. Incorporate a pedestrian focused main street that acts as the focal point for the retail precinct and provide direct pedestrian access from the Main Street to major retail anchors.
2. Establish a clearly defined Town Centre core and frame differentiated through varying uses and intensity of development.
3. Provide an interconnected street block network with block sizes and connections that promote pedestrian permeability.
4. Provide a street layout that allows easy vehicular and bicycle access to and within the Town Centre while allowing for sub-regional traffic to by-pass the centre.
5. Consider potential future noise and amenity conflicts in the layout and location of Town Centre uses.
6. Provide legibility by emphasising sight lines to local landscape features, places of key cultural significance, civic buildings and public open space.
7. Locate bus stops within easy walking distance of the Main Street and retail core.

2.4 Previous traffic and transport studies

AECOM prepared the *Oran Park Town Centre – Transport Appraisal* in March 2012 which was used to support the Development Application (DA) for the Stage 1 retail development. The report demonstrated how the aims, objectives and controls set out in the DCP would be achieved, as well as documented the design process of the town centre and its integration with the wider precinct. The report detailed the short and long-term arrangements for walking, cycling, public transport and traffic access to the town centre and included:

- Confirmation of how the design of the town centre would achieve the planning principles for each transport mode as set out in the DCP;
- A description of how the planning of the town centre achieved the sustainability objectives set out in the DCP from a transport perspective;
- An assessment of the proposed road infrastructure and related intersection controls.

The transport appraisal included an assessment of the performance of intersections surrounding the town centre which was based on the outputs from the strategic (CUBE) traffic model prepared for the project and assessed the traffic requirements upon full development of Oran Park and adjacent precincts.

The design and planning of Oran Park was further progressed through a number of proposed improvements to the Town Centre. Between 2012 and 2013, a joint exercise in the master planning of the Civic Precinct was undertaken between Camden Council and GDC2. As a consequence of the re-master planning of the Town Centre and the adoption of a revised street and block network, the transport appraisal was revised in 2014 to reflect amendments to the Town Centre master plan.

2.5 North South Rail Line

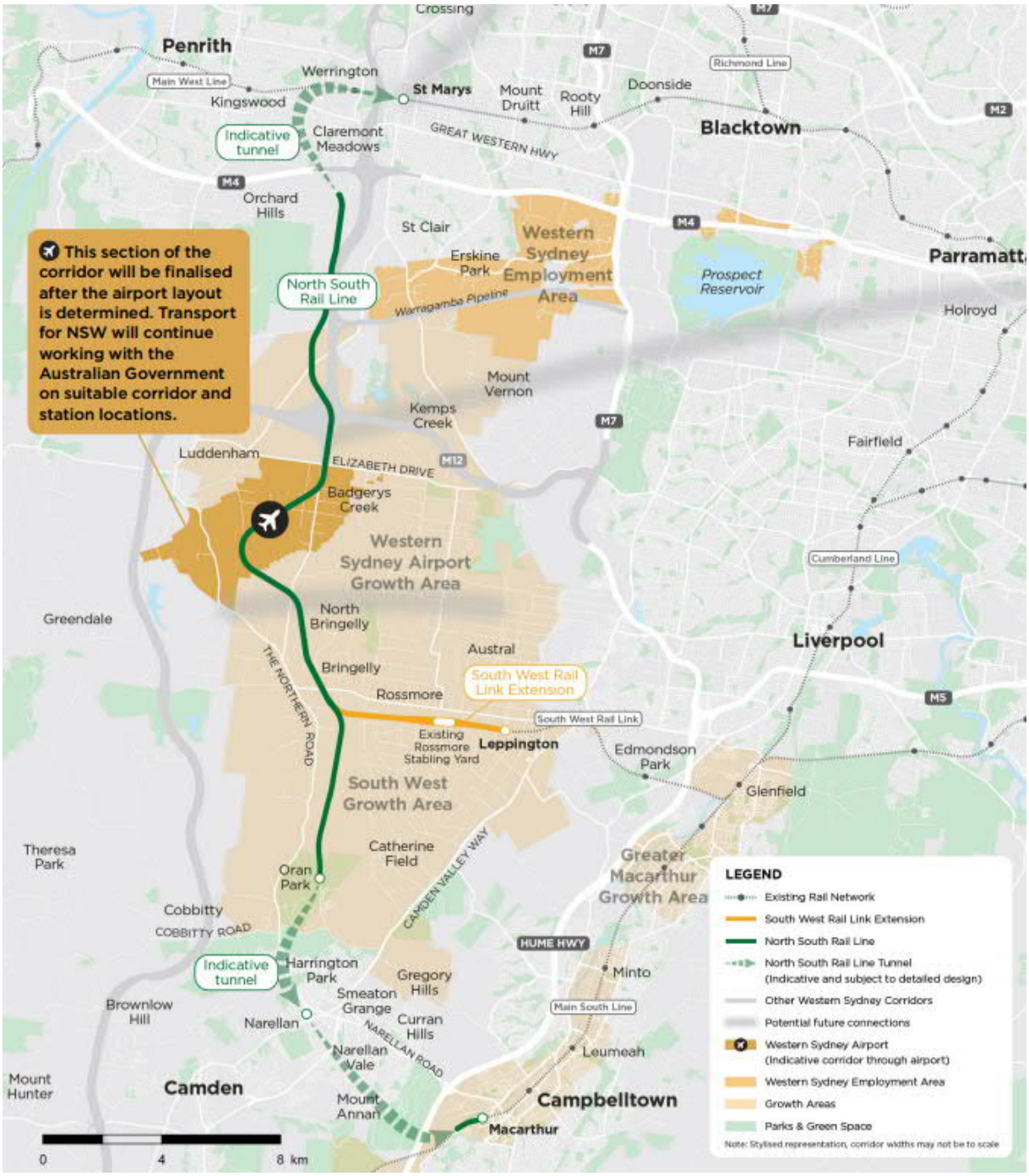
The Australian and NSW Government have undertaken investigations for corridor preservation for additional public transport corridors in Western Sydney. This is to ensure critical public transport services can be delivered in line with the growing needs of Western Sydney, including the South West and North West Growth Centre, the Western Sydney Employment Area and the second Sydney Airport at Badgery's Creek.

In 2018, the Western Sydney Rail Needs Scoping Study- Outcomes Report was released which identifies a long-term Preferred Network and sets out a vision for passenger rail services to serve Western Sydney as a whole.

The Scoping Study identified the need to protect a North South Rail Line corridor to provide a connection between the Main West Line near St Marys and the Main South Line near Macarthur. The proposed corridor for the North South Rail Line has identified a number of core stations including Oran Park as shown in **Figure 4**. The indicative location of the station box for Oran Park is west of Oran Park Drive, opposite the retail precinct.

Note that this study does not consider the impacts of the proposed rail connection at Oran Park as technical investigations are yet to be undertaken. Feedback from the consultation period, which closed in June 2018, will be used to refine the recommended corridors and inform technical investigations.

Figure 4 Recommended corridors for the North South Rail Line and South West Rail Link Extension



Source: NSW Government, 2018

3.0 Oran Park Town Centre

3.1 Revised development yield

The revised development yield seeks to alter the development mix for the Oran Park Town Centre. **Table 1** provides a comparison of the current development mix and the proposed development which is now sought by GDC2 for the Town Centre site.

The revised development yield seeks to:

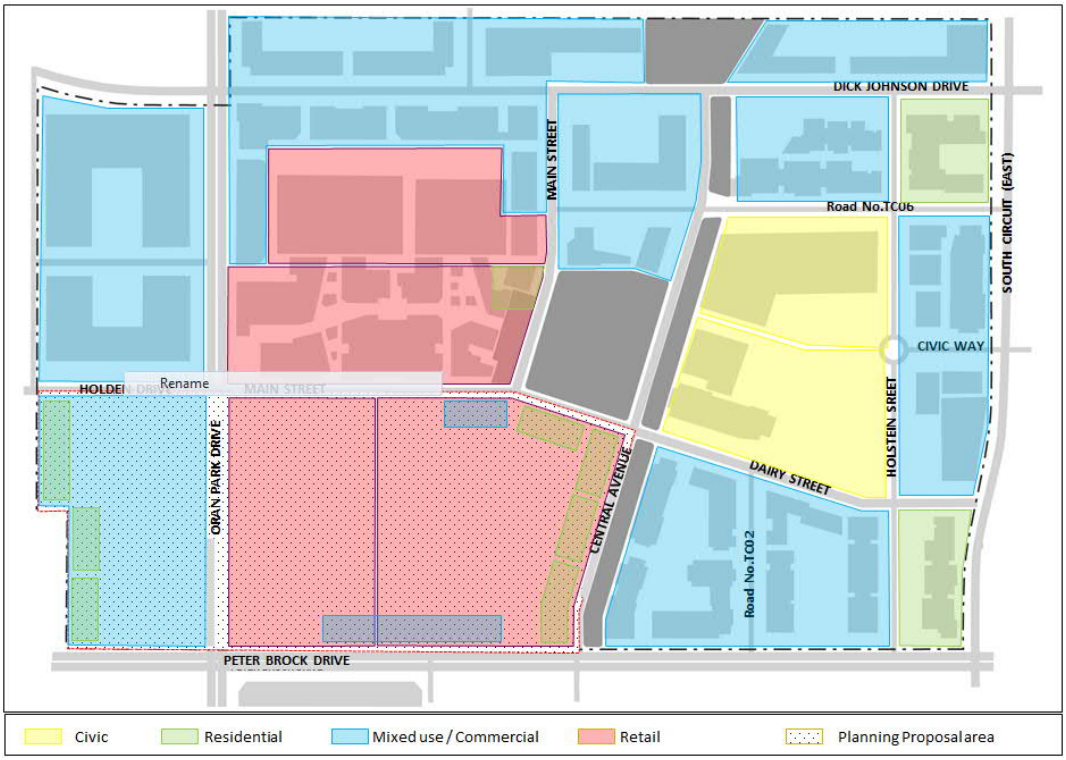
- Increase the commercial (mixed use) floor space to 160,000m^2
- Increase the total number of high density residential dwellings to 1000 units. This includes an additional 56 dwellings caused by the increase in building height at the corner of Main Street and Central Avenue, which is subject of the Planning Proposed submitted by GDC2 .
- Amend the floor space for the civic precinct to reflect the 'actual' built form floor space; previously assumed prior to completion of the buildings (library floor space to 2,500m^2 and leisure floor space to 7,000m^2).

Table 1 Proposed land uses – full development of the Town Centre

Land use	Current floor space	Proposed floor space	Change
Commercial (Mixed Use)	115,000m^2	160,000m^2	+45,000m^2
Retail	50,000m^2	50,000m^2	-
Council	8,500m^2	8,500m^2	-
Library	2,700m^2	2,500m^{2*}	-200m^2
Leisure	9,200m^2	7,000m^{2*}	-2,200m^2
Residential (high density)	300 units	1,000 units	+700 units

* actual floor space

Figure 5 Oran Park Town Centre - proposed land use



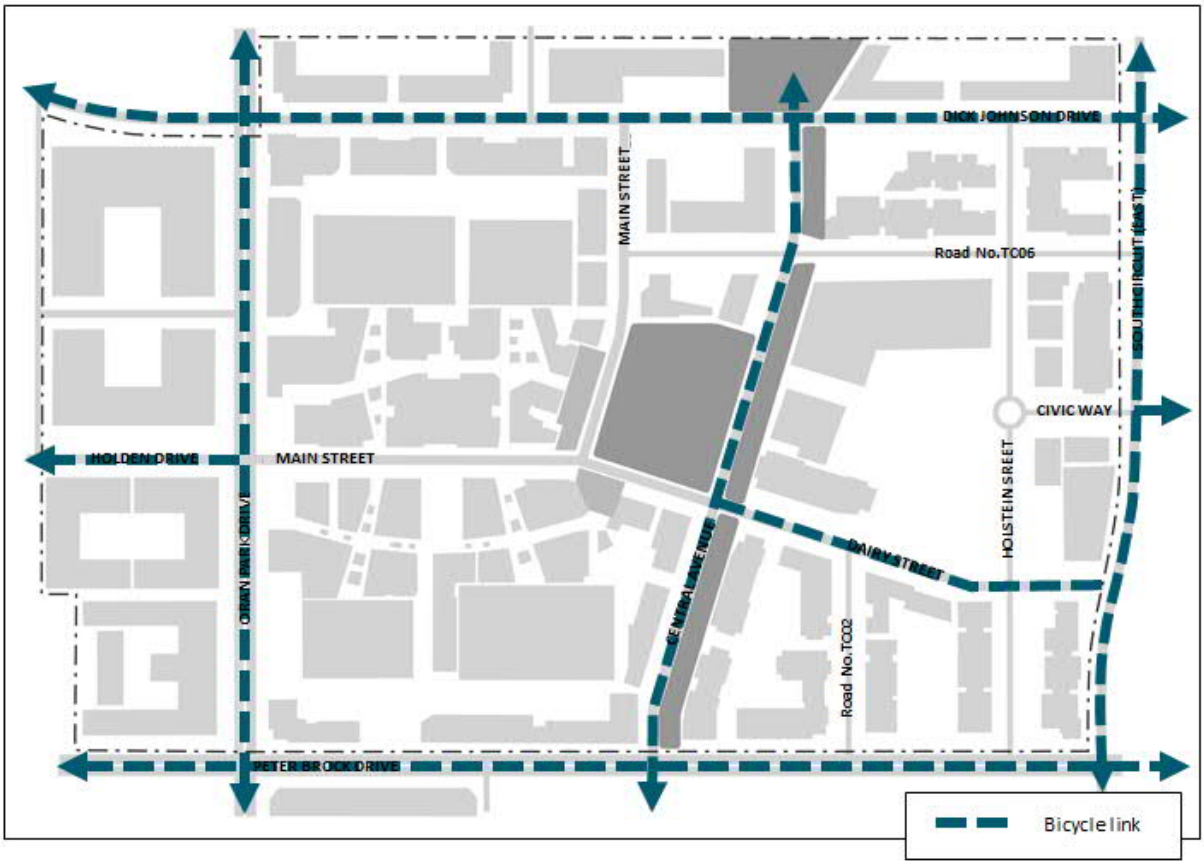
Source: AECOM, 2018

The Oran Park Town Centre Structure Plan incorporates an integrated pedestrian, cycle and public transport network, with linkages to the broader network promoting a high level of pedestrian permeability. No significant changes to the road, public transport, and pedestrian and cycle network are proposed as part of the proposed changes to the development yield, however a brief discussion for each component is provided in the following sections.

3.2 Walking and cycling

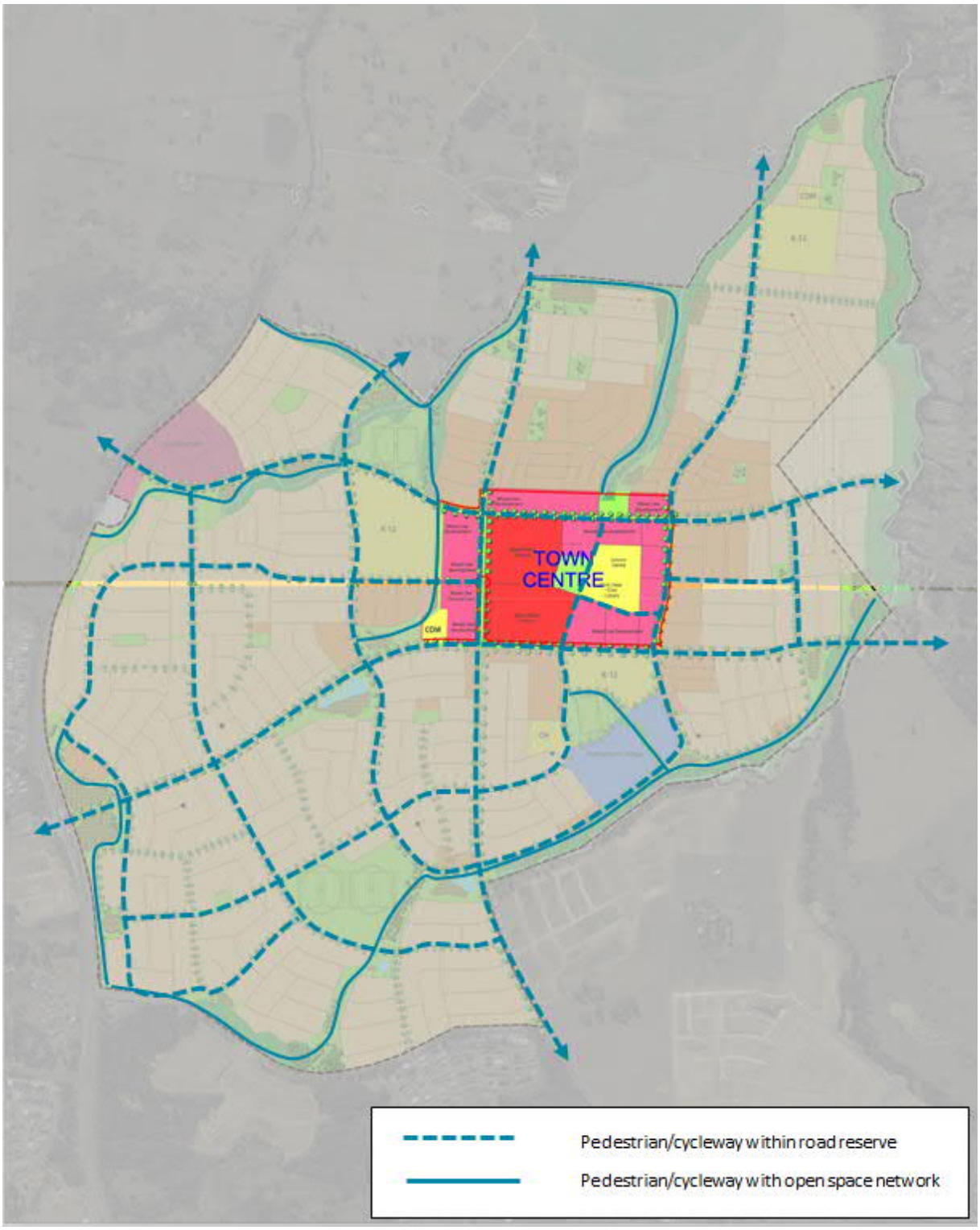
Oran Park Town Centre has been designed to be easily accessible by walking and cycling from the Oran Park precinct and neighbouring areas. The shared pathway network, shown in **Figure 7**, illustrates how the main routes from residential areas will connect to the Town Centre, and subsequently within the town centre via Dairy Street and Central Avenue as shown in **Figure 6**.

Figure 6 Oran Park Town Centre planned bicycle infrastructure



Source: AECOM, 2018

Figure 7 Pedestrian and cycle network



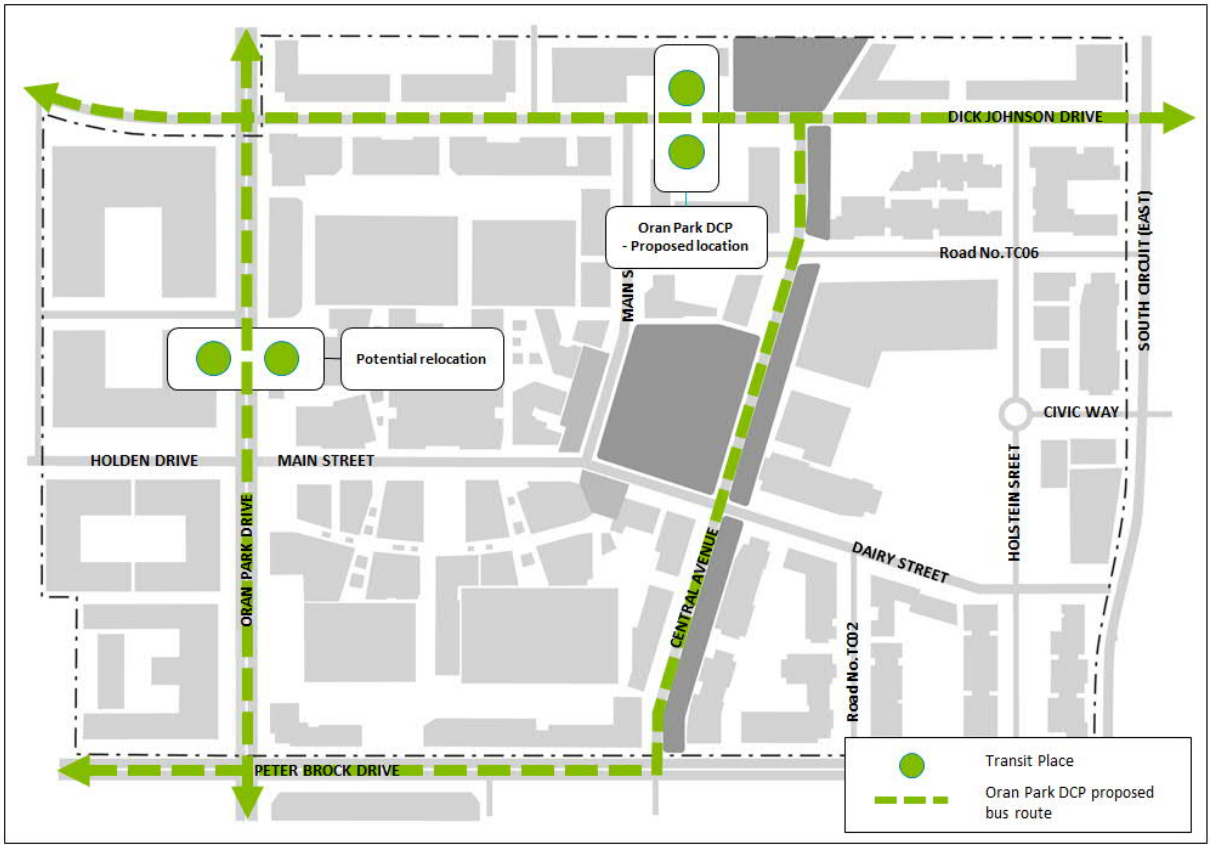
Source: AECOM, 2018

3.3 Public transport

The Town Centre will include a bus interchange providing services to the wider area including Liverpool, Leppington and Campbelltown. The Oran Park DCP identifies Oran Park Drive, Peter Brock Drive and Dick Johnson Drive as accommodating bus routes. All bus-capable roads (including all collector roads) have been designed to accommodate buses. Bus stops (with shelters at key locations) will be provided on-street and not within indented bays. These measures will support the overarching intent that the majority of residential lots will be within 400m walking distance from a bus stop. The inclusion of a highly connected pedestrian network, as described in the previous section, will ensure clear, safe pedestrian links to public transport stops, further encouraging use of this mode of transport.

The Oran Park DCP has identified a 'Transit Place' to be located on Dick Johnson Drive, which would enable the town centre to function as a bus interchange. However, with the future planning for a proposed station at Oran Park, consideration should be given to locate the 'Transit Place' on Oran Park Drive to allow for a future interchange precinct to facilitate the efficient and safe transfer of passengers between modes. **Figure 8** presents the proposed bus routes within the Town Centre and the location of the 'Transit Place'.

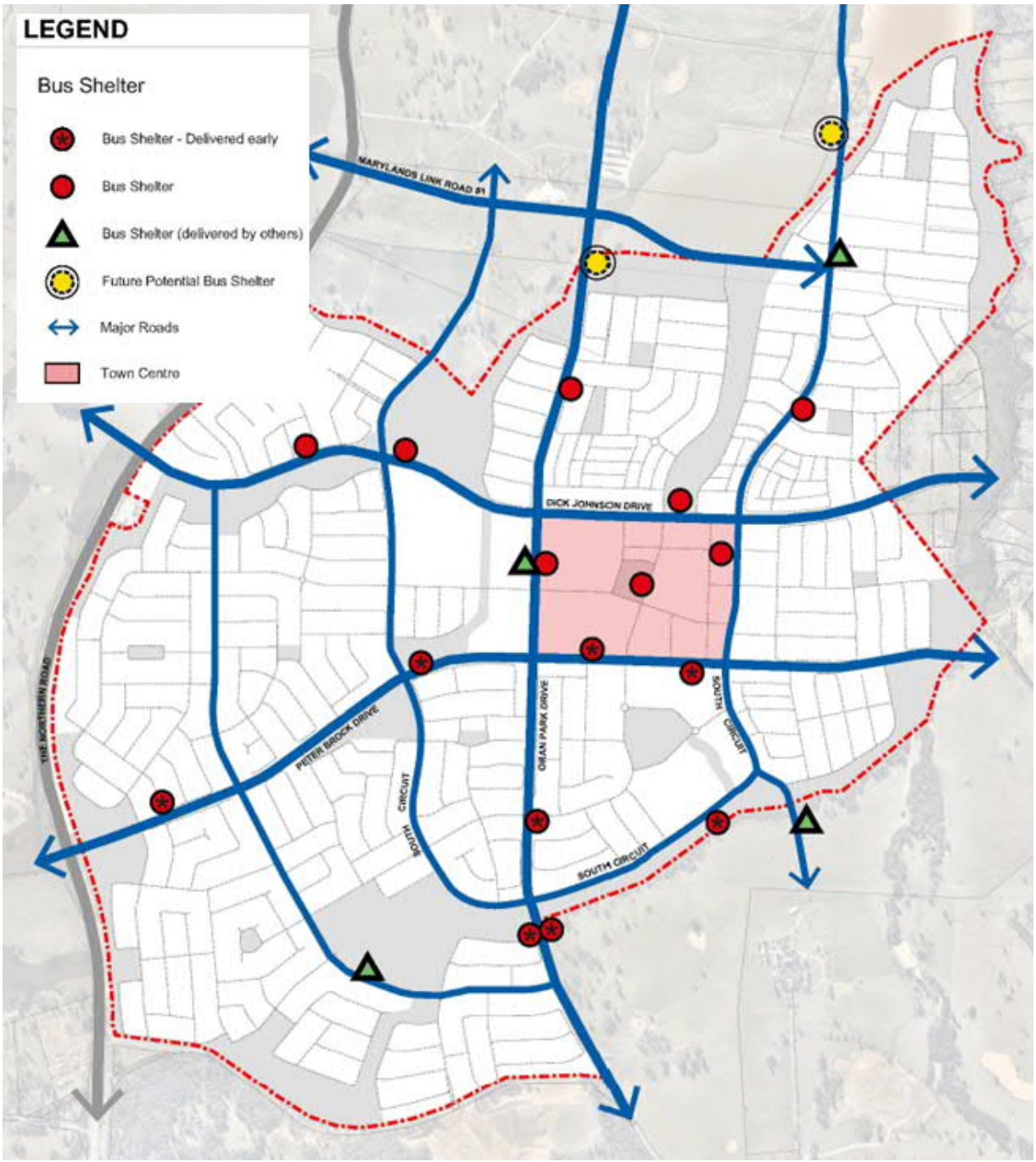
Figure 8 Oran Park Town Centre – public transport routes



Source: AECOM, 2018

Design + Planning have developed a *Bus Services Strategy* for Oran Park to rationalise the location of bus shelters. The proposed locations for bus shelters are presented in **Figure 9**.

Figure 9 Oran Park bus services strategy plan



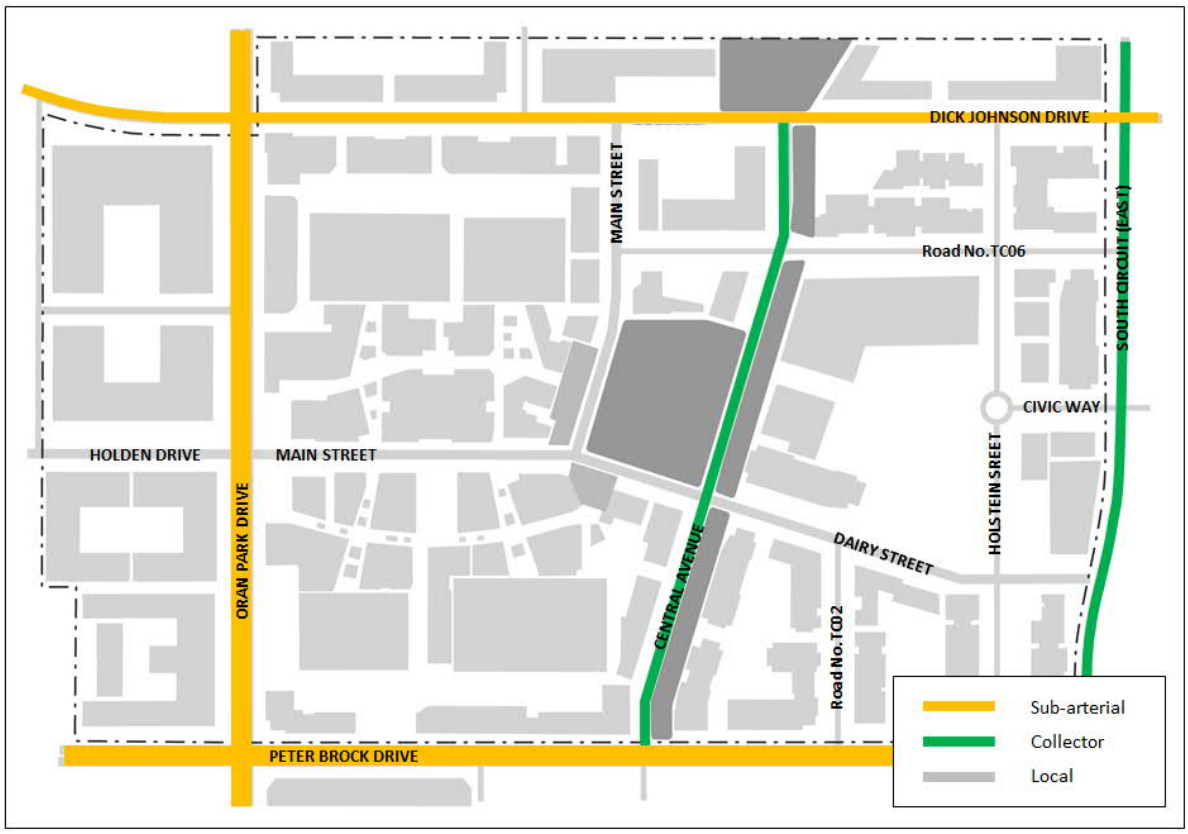
Source: Design + Planning, 2018

3.4 Road network

The design of the precinct caters for a range of transport modes and provides an integrated hierarchy of roads to facilitate residential amenity, traffic efficiency and safety. The Oran Park road network has been designed with a clear hierarchy of streets that are well distributed and enable easy access within and around the Town Centre. Key roads include:

- Oran Park Drive is a sub-arterial road (four lanes) providing access to the wider strategic road network. It is the primary north-south connection through the precinct providing links to Camden Valley Way and the future Pondicherry precinct.
- Peter Brock Drive is a sub-arterial road (four lanes) providing east-west links through the precinct. It provides access to the wider strategic road network through connections to Oran Park Drive, The Northern Road to the west, and ultimately Leppington to the north-east. A planned connection to Springfield Road will also allow access to Camden Valley Way.
- Dick Johnson Drive is a sub-arterial road (four lanes) providing east-west links through the precinct. It also provides a connection to Oran Park Drive and The Northern Road in the west, as well as to Camden Valley Way to the east.
- South Circuit is a collector road (two lanes) and will provide an inner loop through Oran Park. It operates as higher order collector road that serves local and through traffic and provides drivers with a route choice to avoid perceived congestion on the sub-arterial roads adjacent to the Town Centre.
- Central Avenue is a collector road (two lanes) that connects Dick Johnson Drive and Peter Brock Drive through the Town Centre. It will primarily provide access to retail parking and the civic precinct. Central Avenue will provide bus services to the Town Centre through stops located at the northern end of the proposed civic precinct.

Figure 10 Town Centre road network



Source: AECOM, 2018

3.5 Town Centre intersection controls

Site access arrangements for the Town Centre remains the same with intersections along Oran Park Drive, Dick Johnson Drive, Peter Brock Drive and South Circuit (east) providing multiple access points to and from the site.

Figure 11 provides an overview of the proposed intersection controls on the roads adjacent to the Town Centre which consists of signalised, priority and left-in/left-out intersections. These intersections have been included as part of the SIDRA modelling and remain consistent with the current ILP. Key intersections providing access to the Town Centre are presented in **Table 2**.

Table 2 Key intersections controls

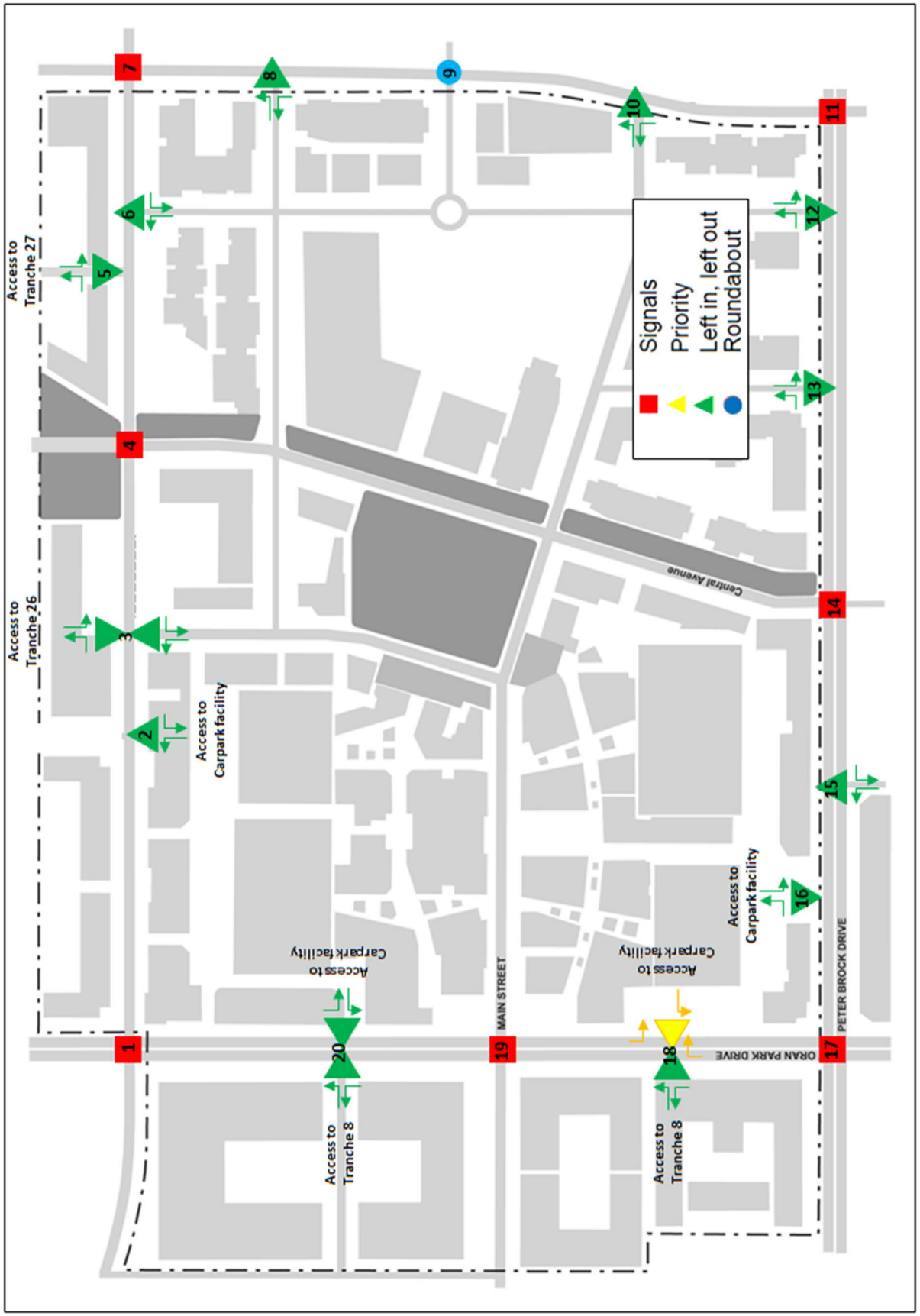
Ref	Intersection	Type	Symbol
1	Oran Park Drive | Dick Johnson Drive	Signals	■
4	Dick Johnson Drive | Central Avenue	Signals	■
7	Dick Johnson Drive | South Circuit	Signals	■
9	South Circuit | Civic Way	Roundabout	●
11	Peter Brock Drive | South Circuit	Signals	■
14	Peter Brock Drive | Central Avenue	Signals	■
17	Oran Park Drive | Peter Brock Drive	Signals	■
18	Oran Park Drive | Car Park | T8	Priority*	▲
19	Oran Park Drive | Main Street	Signals	■

* right turn movements banned except into the retail car park (i.e. northbound right turn movements allowed)

The signalised intersections will provide equitable access for all road users and facilitate connections to the Town Centre for pedestrians and cyclists via the shared paths along key roads of the Town Centre. These connections have been designed to maximise the potential for people to walk and cycle to and from the Town Centre

Supplementary left in / left out accesses are provided for each car park to maximise use of the car park floor plate (spreading demands across the whole car park and adjacent network), and minimise circulation around the town centre. Turn movements at these intersections have been purposefully limited to reduce the number of conflicting movements on sub-arterial roads so that their intended function is not compromised.

Figure 11 Oran Park Town Centre intersection control



Source: AECOM, 2018

4.0 Traffic assessment

4.1 Background

The strategic road network and intersections in the Oran Park Precinct are being designed with long term infrastructure needs in mind, following assessment of traffic requirements upon full development of the Oran Park Precinct (and adjacent precincts). Infrastructure requirements are being determined through use of strategic (CUBE) traffic modelling software and detailed intersection modelling (SIDRA).

AECOM have developed a strategic CUBE model for the Oran Park Precinct. The model has been used to inform the design and planning of the precinct. It was prepared to represent a long term scenario, based on future forecasts where the development of Oran Park would be completed and the development of surrounding regional areas would have taken place. The modelling incorporates the most up-to-date information on the characteristics of the road network, the proposed nature, mix and location of land uses and the likely timing of their implementation.

This modelling has been progressively developed over many years to reflect changes proposed to the precinct. It has been presented and discussed at various stages with Camden Council, the NSW Roads and Maritime Services and Department of Planning and Environment to agree the appropriateness of inputs, assumptions and consequent infrastructure requirements.

Intersections surrounding the Oran Park Town Centre have been assessed with the aid of SIDRA. The SIDRA models have been developed as a network to inform the key road network and intersection requirements surrounding the Town Centre site.

4.2 Updates to the CUBE Model

The Oran Park CUBE model has been refined to better reflect future demand for travel. These changes include:

- Network inputs – the network structure has been updated to reflect the latest road network layout and intersection control for the Oran Park Precinct including the proposed increased development yield within the Town Centre. The zoning system and centroid connectors were also updated to reflect the latest structure plan.
- Demand inputs – land use inputs have been updated to reflect the latest residential and non-residential land use projections for the Oran Park Precinct including the Town Centre and assist in the demand generation process.
- Modelling procedure – the coding of roads to better distribute traffic to and from zones and assignment procedure to produce more reasonable volume-delay results across the facility types.

Outputs from the CUBE model were used as traffic volume inputs to the SIDRA modelling to determine the performance of the road network adjacent to the Town Centre during the 2036 AM and PM peak hour.

4.3 Traffic generation

The trip rates adopted and approved in the traffic modelling undertaken as part of the Transport Appraisal prepared in 2014 were retained to forecast the additional amount of trips likely to be added to the road network as a result of the proposed revised master plan.

Roads and Maritime's *Guide to Traffic Generating Developments* (October 2002) and the subsequent *Technical Direction* (May 2013) were used to determine the peak hour trip generation at Oran Park Town Centre. The following peak hour trip rates were used:

- Commercial – 1.62 trips / 100m² GFA
- Retail – 3.7 trips / 100m² GFA
- Council – 3 trips / 100m² GFA
- Library – 2 trips / 100m² GFA
- Leisure – 1.62 trips / 100m² GFA
- Residential (high density) – 0.23 trips / dwelling.

Table 3 shows 5,091 vehicle trips are expected to be generated during the peak hour by the Town Centre, an additional 850 trips as shown in **Table 4**.

Table 3 Oran Park Town Centre trip generation

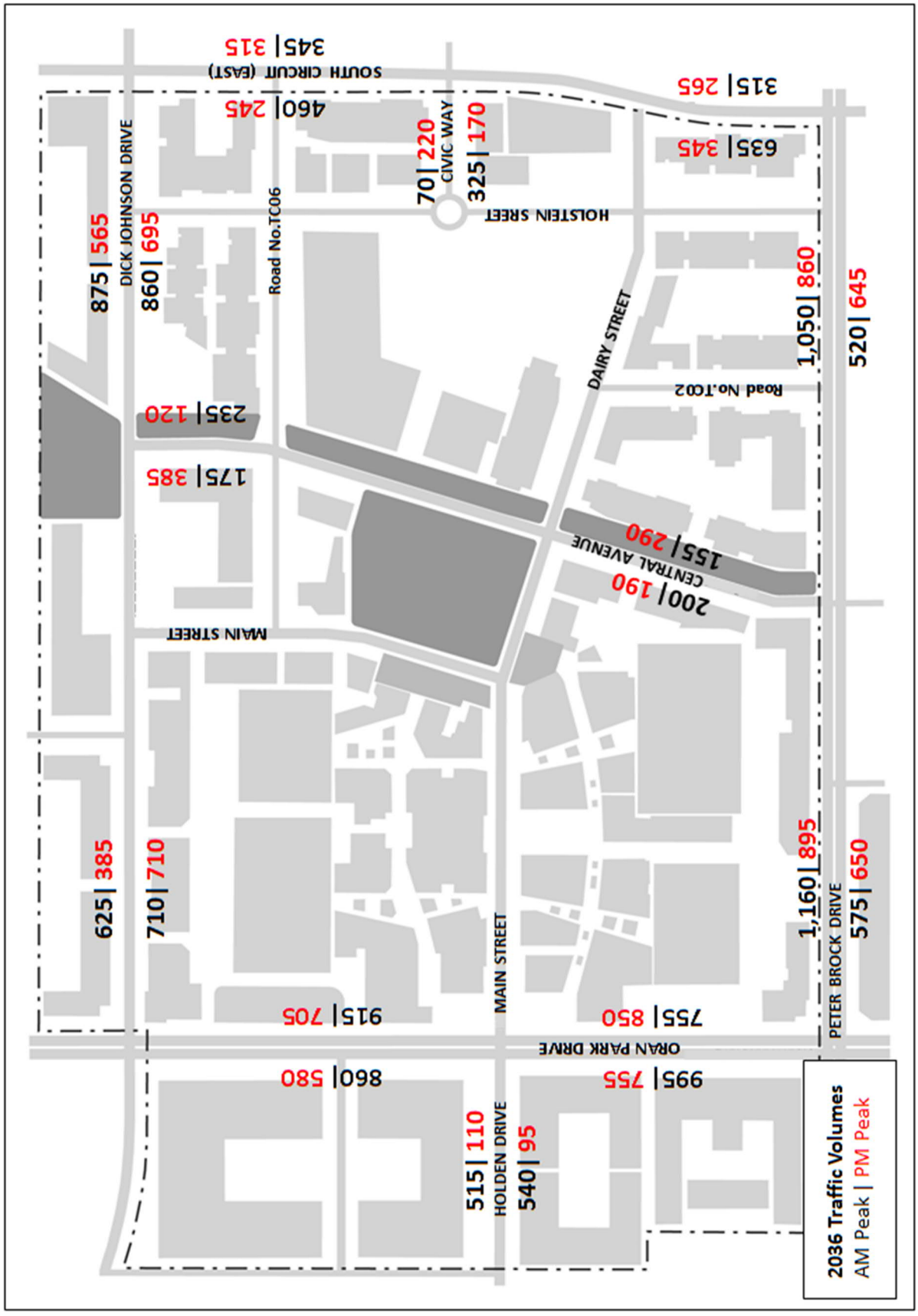
Land use	Revised yield	Trip rate	Peak hour trips
Commercial (Mixed Use)	160,000m^2	1.62 trips / 100m^2 GFA	2,592
Retail	50,000m^2	3.7 trips / 100m^2 GFA	1,850
Council	8,500m^2	3 trips / 100m^2 GFA	255
Library	2,500m^2	2 trips / 100m^2 GFA	50
Leisure	7,000m^2	1.62 trips / 100m^2 GFA	114
Residential (high density)	1,000 units	0.23 trips / dwelling	230
		Total	**5,091**

Table 4 Increase in trip generation

Land use	Change in yield	Trip rate	Increase in trips
Commercial (Mixed Use)	+45,000m^2	1.62 trips / 100m^2 GFA	729
Retail	-	3.7 trips / 100m^2 GFA	0
Council	-	3 trips / 100m^2 GFA	0
Library	-200m^2	2 trips / 100m^2 GFA	-4
Leisure	-2,200m^2	1.62 trips / 100m^2 GFA	-36
Residential (high density)	+700 units	0.23 trips / dwelling	161
		Total	**850**

The forecast 2036 AM and PM peak hour midblock traffic volumes for the Town Centre are presented in **Figure 12**. Assuming a lane capacity of 900 vehicles per hour on sub-arterial and collector roads at level of service D (*Guide to Traffic Generating Developments*, Roads and Maritime 2002), no capacity issues are envisaged on any of the roads in this area of the precinct in 2036.

Figure 12 2036 forecast traffic flows at Oran Park Town Centre



Source: AECOM, 2018

4.4 Intersection performance

Intersection analysis, including the determination of proposed layouts and anticipated performance, was undertaken for key intersections providing access to the Town Centre with the aid of SIDRA Intersection 8.0.

Forecast turning movements for each intersection highlighted in **Figure 11** were extracted from the CUBE model and assessed in SIDRA as a network model to understand the impacts on the road network. A network cycle time of 100 seconds was applied in both peak periods which was based on previous modelling undertaken by AECOM. The geometric layout for each intersection was based on the latest intersection design provided by GDC2.

A summary of the performance results for key intersections is provided in **Table 5**, which compares the "Base" 2014 (TRANSYT) modelling results against the "Revised" 2018 (SIDRA) modelling results. It should be noted that comparison of intersection performance is limited due to the different software packages used and updates to the CUBE model as discussed in **Section 4.2**.

The left-in/left-out intersections were also modelled in SIDRA, however minimum delays are forecast to be experienced at these intersections and as a result the modelling results have not been reported.

Table 5 Intersection performance results (2036 AM and PM peak hour)

Ref	Intersection	Peak hour	Degree of Saturation (DoS)	Level of Service (LoS)	Average Delay (sec/veh)
1	Oran Park Drive | Dick Johnson Drive	AM base	0.850	D	44.4
		PM base	0.830	C	39.5
		AM revised	0.691	C	37.0
		PM revised	0.528	B	24.1
4	Dick Johnson Drive | Central Avenue	AM base	0.400	A	10.5
		PM base	0.250	A	9.6
		AM revised	0.546	B	26.0
		PM revised	0.597	C	32.3
7	Dick Johnson Drive | South Circuit (East)	AM base	0.640	C	29.8
		PM base	0.740	C	34.3
		AM revised	0.858	C	36.4
		PM revised	0.561	C	32.2
9	South Circuit | Civic Way	AM base	0.350	A	10.8
		PM base	0.250	B	15.0
		AM revised	0.549	A	11.8
		PM revised	0.321	A	10.3
11	Peter Brock Drive | South Circuit (East)	AM base	0.850	C	31.1
		PM base	0.650	B	21.4
		AM revised*	0.925	D	48.0
		PM revised*	0.616	B	27.0

Ref	Intersection	Peak hour	Degree of Saturation (DoS)	Level of Service (LoS)	Average Delay (sec/veh)
14	Peter Brock Drive | Central Avenue	AM base	0.770	B	23.5
		PM base	0.630	B	18.9
		AM revised	0.668	B	24.8
		PM revised	0.581	B	27.7
17	Oran Park Drive | Peter Brock Drive	AM base	0.950	D	48.4
		PM base	0.760	C	38.4
		AM revised	0.875	D	42.9
		PM revised	0.799	D	43.9
18	Oran Park Drive | Retail Car Park | Tranche 8 Access Road	AM base	N/A		
		PM base	N/A		
		AM revised	0.421	A	9.6
		PM revised	0.353	A	9.8
19	Oran Park Drive | Main Street	AM base	0.880	D	48.3
		PM base	0.660	B	26.0
		AM revised	0.710	C	28.7
		PM revised	0.383	B	18.8

* upgrades identified at the intersection of Peter Brock Drive | South Circuit (east) to operate at LoS D or better

Source: AECOM, 2018

The full development of the Town Centre is not forecast to have major impacts on the key intersections on the surrounding road network.

Under the 2036 ultimate development traffic flows, the modelling results indicate that the key intersections for the Town Centre are expected to perform acceptably at LoS D or better, with the exception of Peter Brock Drive | South Circuit (east).

The modelling has identified the following upgrades are required at the intersection of Peter Brock Drive | South Circuit (east) to operate at a satisfactory level of service (LoS D as shown above):

- Extension of the northbound right turn bay from 30m to 60m
- Extension of the westbound right turn bay from 40m to 70m.

Without the proposed upgrades above, the intersection of Peter Brock Drive | South Circuit (east) operates at a LoS E in the AM peak hour and an average delay of 57.1 seconds. These upgrades are expected to be required when Peter Brock Drive is extended east providing connections to Springfield Road.

The intersections operating close to capacity, 0.9 or greater, are Peter Brock Drive | South Circuit (east), with the upgrades identified above, and Oran Park Drive | Peter Brock Drive. However, both have an acceptable level of average delay.

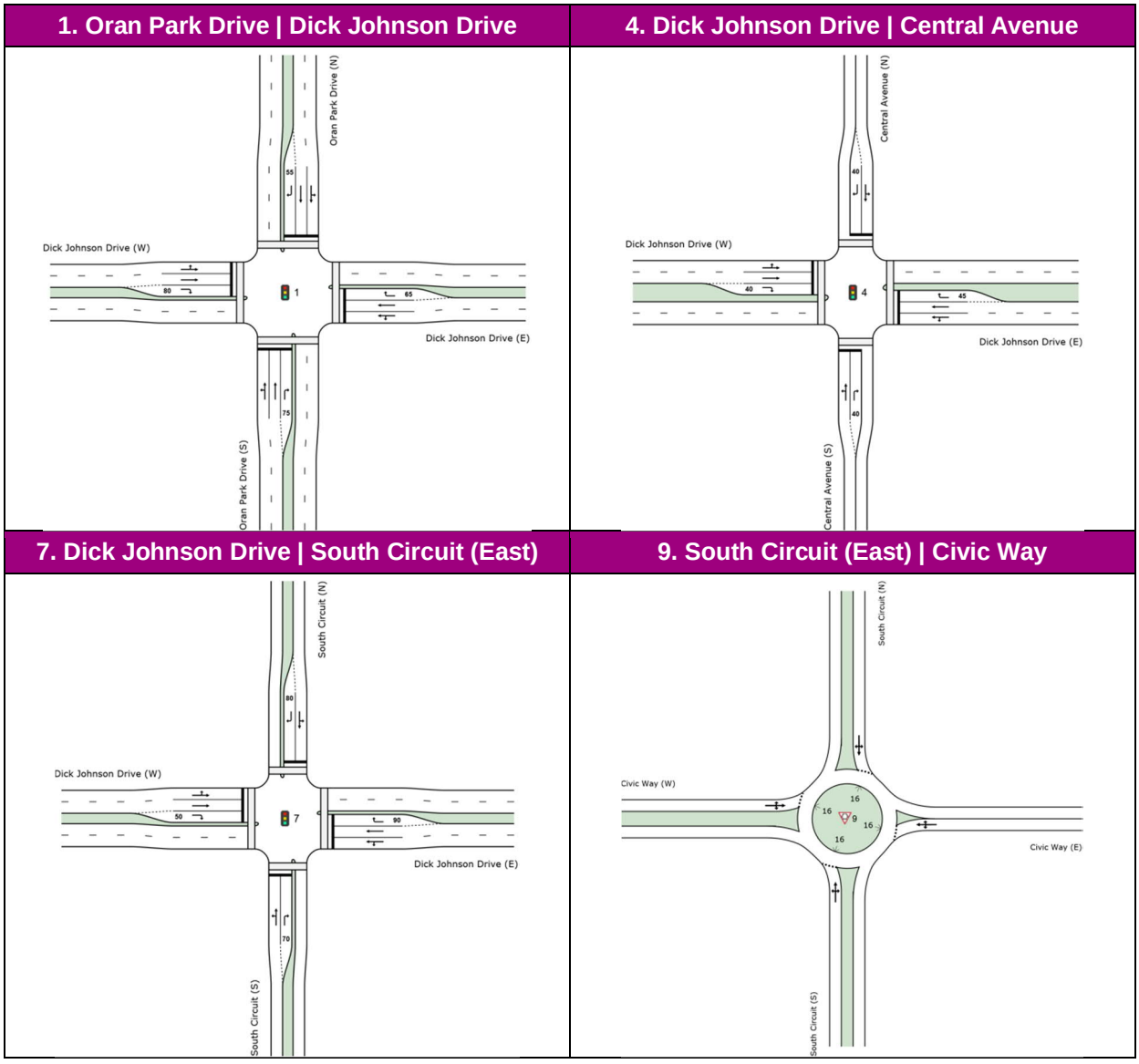
The intersection of Oran Park Drive | Retail Car Park | Tranche 8 Access Road (intersection 18) allows for the northbound right turn movements into the Retail Car Park. The modelling indicates the right turn movement into the car park would be able to find gaps in traffic to enter the intersection. The performance of this intersection should be monitored, and if significant delays and queuing are experienced, consideration should be given to banning the right turn movement. The retail car park access on Peter Brock Drive would provide motorists with an alternative point of access.

Based on the modelling results the following intersections are shown to operate satisfactorily without left turn slip lanes as reported in the *Oran Park Town Centre: Transport Appraisal (2014)*:

- Dick Johnson Drive | South Circuit (East)
- Peter Brock Drive | South Circuit (East)
- Oran Park Drive | Peter Brock Drive

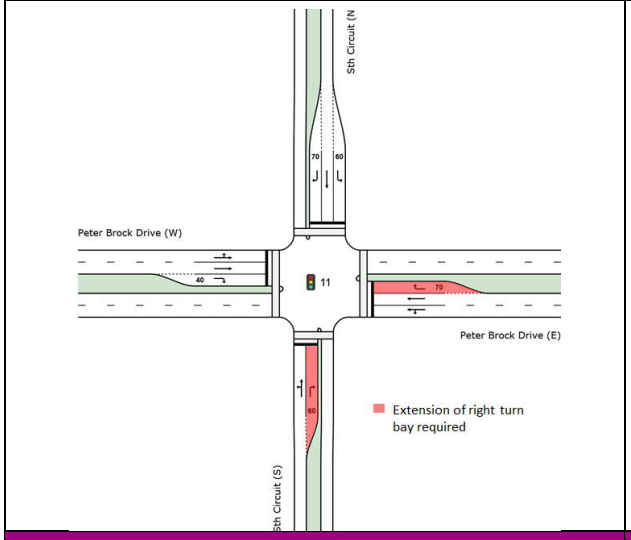
The intersection layouts required to accommodate the forecast level of traffic in 2036 are shown in **Figure 13**. Allowance should be made within the road reserve to ensure that sufficient space is provided if these intersections are required to be developed to this extent.

Figure 13 Proposed Town Centre intersection layouts

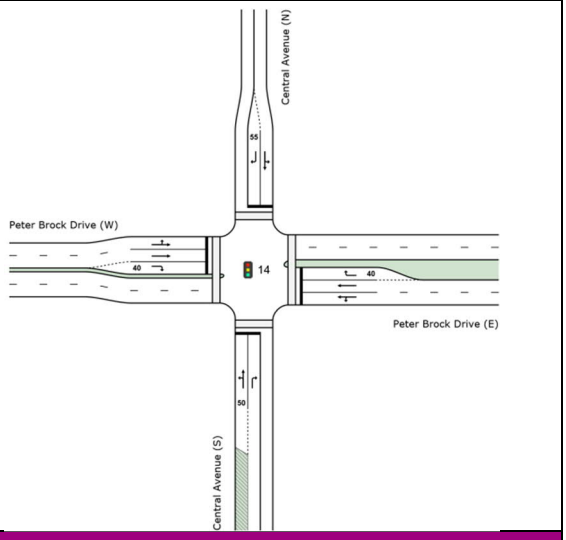


Source: AECOM, 2018

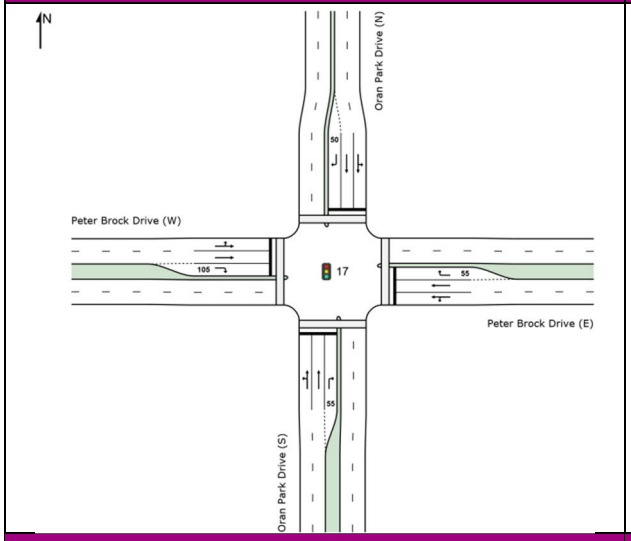
11. Peter Brock Drive | South Circuit (East)



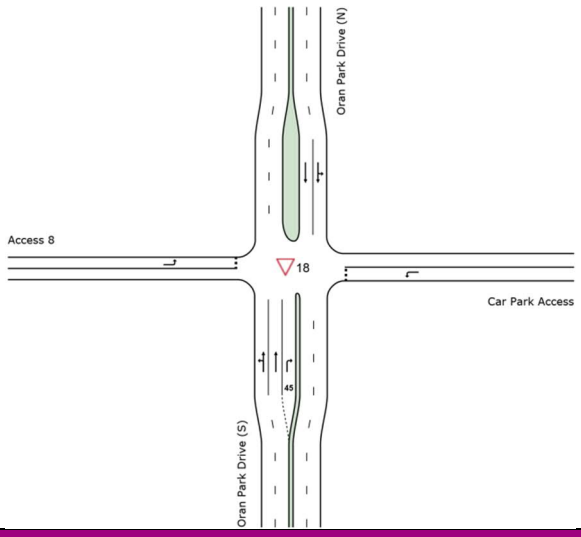
14. Peter Brock Drive | Central Avenue



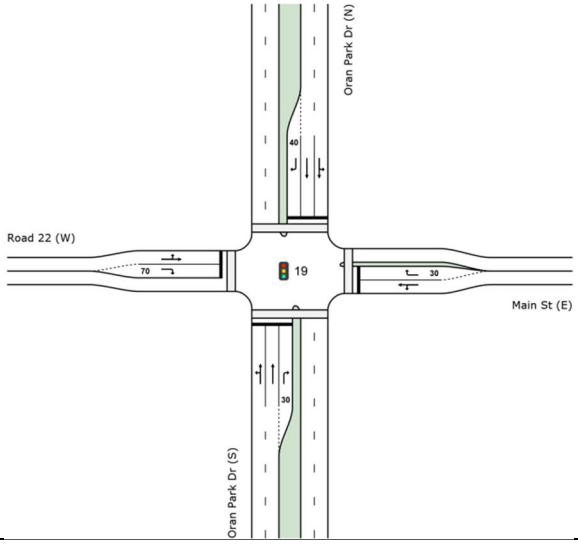
17. Oran Park Drive | Peter Brock Drive



18. Oran Park Drive | Retail Car Park | Tranche 8 Access Road



19. Oran Park Drive | Main Street



Source: AECOM, 2018

5.0 Summary

AECOM has been engaged by GDC2 to update the traffic modelling previously undertaken as part of the *Oran Park Town Centre: Transport Appraisal* to support the proposed increase to the development yield for the Oran Park Town Centre.

The report will be used to supplement the Planning Proposal submission to Camden Council for the Oran Park Town Centre seeking to increase building height and reconcile zone boundaries.

Development yield amendments include:

- Increasing the commercial (mixed use) floor space to 160,000m^2
- Increasing in the total number of high density residential dwellings to 1000 units. This includes an additional 56 dwellings at the corner of Main Street and Central Avenue, which is subject of the Planning Proposal submitted by GDC2.
- Amendments to reflect the 'actual' built floor space for the civic precinct (library floor space to 2,500m^2 and leisure floor space to 7,000m^2)

In keeping with the planning principles described in Part B1 of the DCP, no significant changes are proposed to the road, public transport, and pedestrian and cycle network for Oran Park Town Centre, with the exception of the potential relocation of the 'Transit Place' from Dick Johnson Drive to Oran Park Drive to allow for a future transport interchange as a result of the proposed station at Oran Park.

The CUBE model developed used to inform the design and planning of Oran Park Precinct has been updated to reflect the amendments for Oran Park including the Oran Park Town Centre and refined to better reflect future demand for travel. SIDRA intersection modelling was used to inform the key road network and intersection requirements surrounding the Town Centre site.

The modelling results indicate that the increase in forecast traffic generated by the changes to the development yield can be accommodated by the proposed road network in 2036 under ultimate development. Key roads surrounding the Town Centre have sufficient capacity to meet forecast traffic demands. In addition, the key intersections assessed for the Town Centre are shown to operate at an acceptable level of service (LoS D or better) during the AM and PM peak hours, with minor upgrades required at Peter Brock Drive | South Circuit (east).

The modelling has identified the following upgrades are required at the intersection of Peter Brock Drive | South Circuit (east) to operate at a satisfactory level of service:

- Extension of the northbound right turn bay from 30m to 60m
- Extension of the westbound right turn bay from 40m to 70m.

Without the proposed upgrades above, the intersection of Peter Brock Drive | South Circuit (east) operates at a LoS E in the AM peak hour. These upgrades are expected to be required when Peter Brock Drive is extended east providing connections to Springfield Road.

A summary of the geometric layout required for each intersection has been provided. Allowance should be made within the road reserve to ensure that sufficient space is provided if these intersections are required to be developed to this extent.