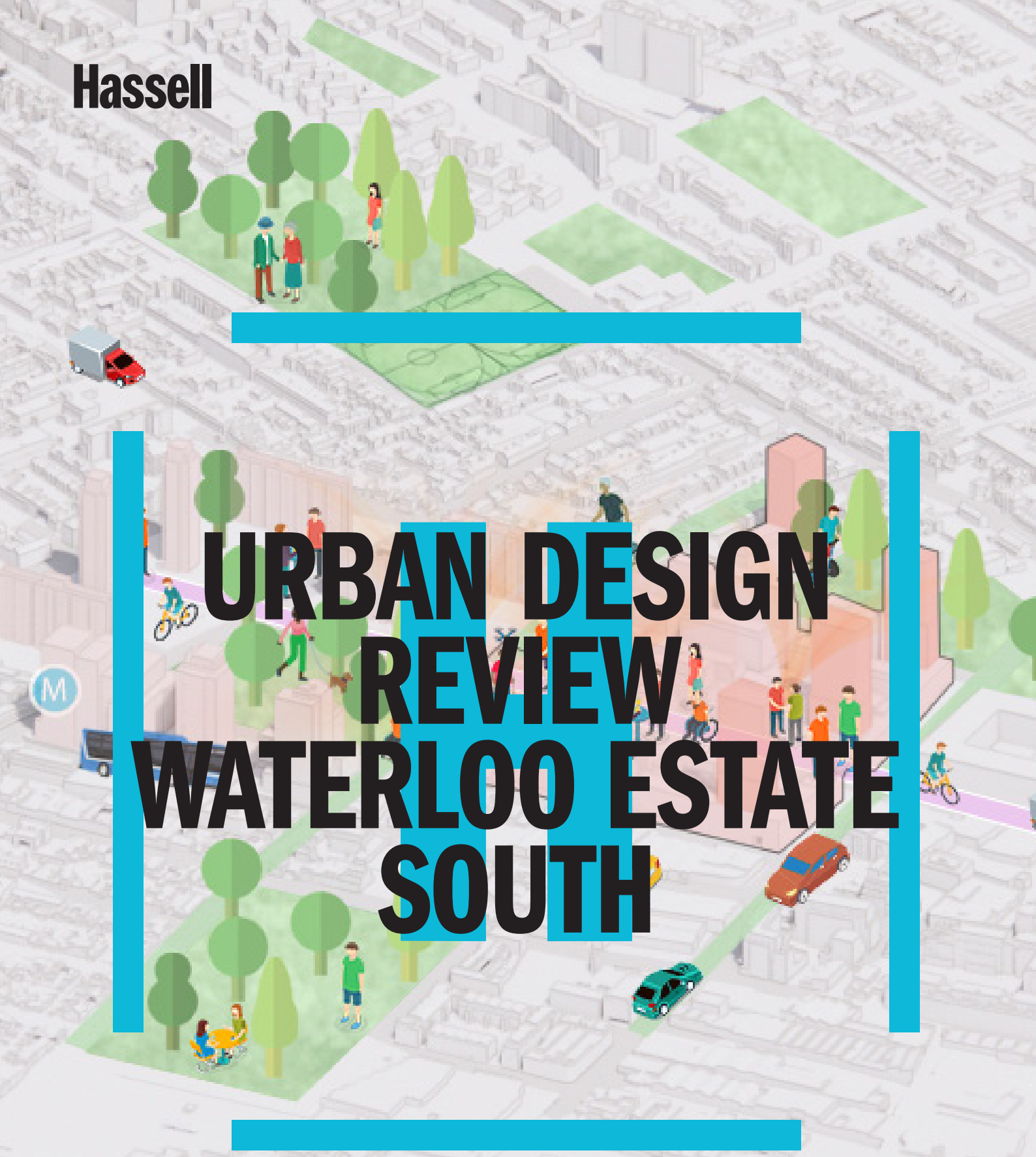
Hassell



URBAN DESIGN REVIEW WATERLOO ESTATE SOUTH

015862
Waterloo Estate South
Urban Design Review

Prepared for
Department of Planning, Industry and Environment

July 2022

Acknowledgment of Country

We acknowledge and respect Traditional Owners across Australia as the original custodians of our land and waters, their unique ability to care for country and deep spiritual connection to it. We honour Elders past, present and emerging whose knowledge and wisdom has, and will, ensure the continuation of cultures and traditional practices.

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Document Control

Rev	Date	Approved By	Description
05	04.02.22	Scott Davies	Updated FSR map at DPE direction.
06	14.7.22	Scott Davies	Post Exhibition Updates

INTRODUCTION

1.0 INTRODUCTION

The Minister for Planning recently appointed the Secretary of Planning as the Principal Planning Authority (PPA) for the Waterloo Estate (South) Planning Proposal (the Planning Proposal).

On 27 April 2021 the PPA lodged the Planning Proposal with the Deputy Secretary for Gateway Determination. The Planning Proposal submitted was prepared by the City of Sydney and endorsed by the Central Sydney Planning Committee and Council.

The Planning Proposal contains a mix of affordable housing, social housing and market housing. The Planning Proposal area also contains private land holdings with the majority of land being in the ownership of the Land and Housing Corporation.

Hassell has been engaged by DPIE to undertake a 'broad and holistic' urban design review of the Waterloo Estate (South) Planning Proposal prepared by the City of Sydney.

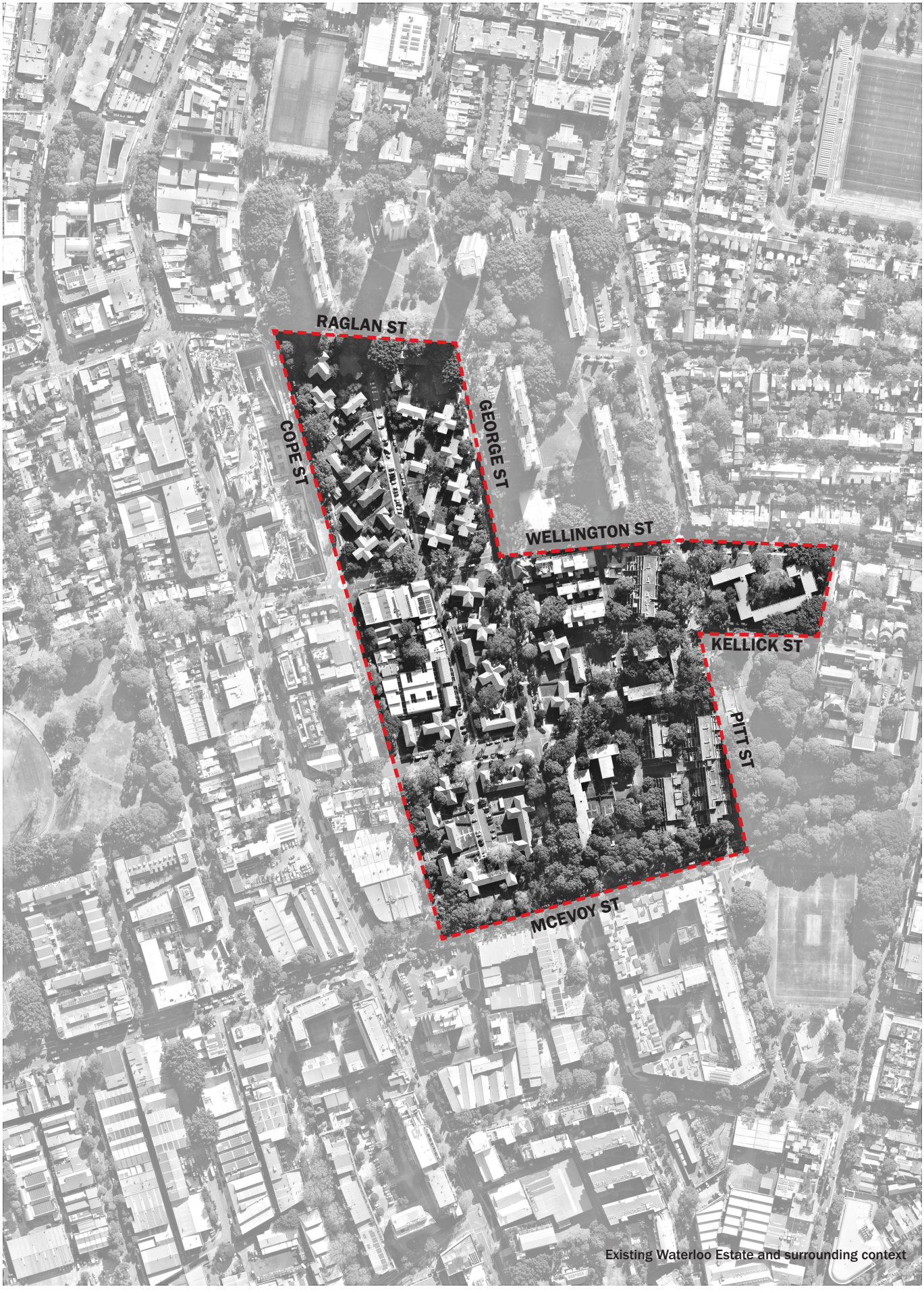
The project brief requires the review to include:

- → Specific individual street blocks as required.
- → Heights and FSRs across the precinct, having regard to retaining the floor space identified within the City of Sydney planning proposal.
- → The proposal's interface with surrounding development, topography, streetscape, heritage items, and public open spaces, including development of the future Metro site.
- → Setbacks and heights across the precinct. Specific attention required along the perimeter of the precinct where it transitions with areas outside, including the eastern-most street block bounded by Pitt, Wellington, Gibson and Kellick streets.
- → Street pattern and layout, with specific attention to the reinstatement of the south portion of Pitt Street (and its interaction with McEvoy Street).
- → Review the Planning Proposal's approach to mapping maximum building heights, particularly in relation to along McEvoy Street.
- → Review relevant recommendations of the Independent Advisory Group (IAG) report and Gateway determination conditions, particularly in relation to George Street massing.
- → Whether Crime Prevention through Environmental Design (CPTED) principles have been integrated into the planning proposal.
- → Open spaces and any changes, with specific attention to the southernmost park accessed off John Street.
- → Building footprints and proximity to established trees, with reference to the Urban Forest Study, with a view to retain mature fig trees where possible and allow adequate provision of deep soil zones for future planting.

1.1 Report Structure

This report is set up in four parts to fulfil the required project deliverables:

- → An analysis of the existing place character.
- → An outline of observations on the planning proposal.
- → Technical analysis of the planning proposal.
- → Recommendations on modifications to the planning proposal.
- → A final peer review report on the urban design of the final Planning Proposal, completed by Hassell Fellow, Ken Maher. The peer review report is presented as an appendix to this report, and reflects Ken Maher's involvement as a part of the Hassell review team.



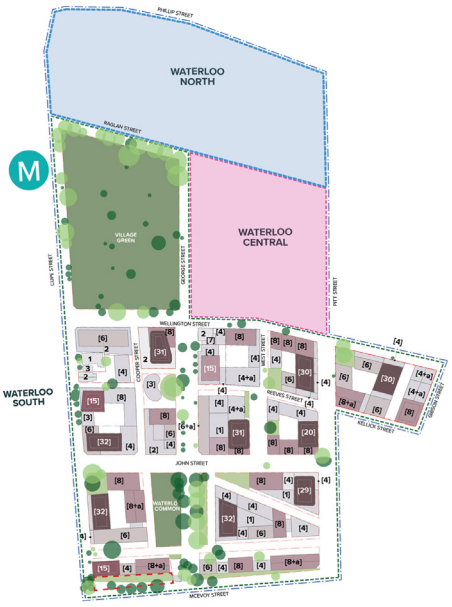
Existing Waterloo Estate and surrounding context

1.2 Waterloo South LAHC Proposal

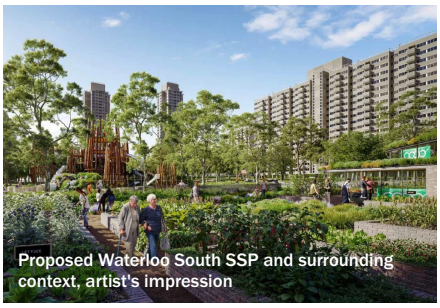
The planning proposal request from the NSW Land and Housing Corporation was for the southern portion of the Waterloo estate only. It sought to enable the development of:

- → Approximately 3,000 dwellings on the land owned by the corporation;
- → A park adjoining Waterloo metro station of more than 2 hectares and another smaller park in the south;
- → About 250,000 square metres of floor space (gross floor area) including retail and community spaces;
- → 9 tower buildings between 20 and 32 storeys;
- → 3 buildings of 15 storeys;
- → Other buildings up to 8 storeys;
- → 25% social, 70% market and 5% affordable housing.

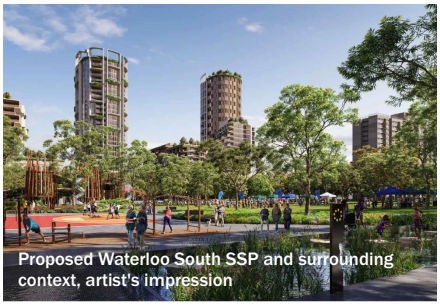
Source: https://www.cityofsydney.nsw.gov.au/development/strategic-plans-planning-controls/plans-policies-places-under-review/planning-proposal-request-waterloo-estate-south



Waterloo Estate, Waterloo South SSP and surrounding context



Proposed Waterloo South SSP and surrounding context, artist's impression



Proposed Waterloo South SSP and surrounding context, artist's impression

Waterloo Public Housing, Matavai and Turunga towers, Waterloo NSW

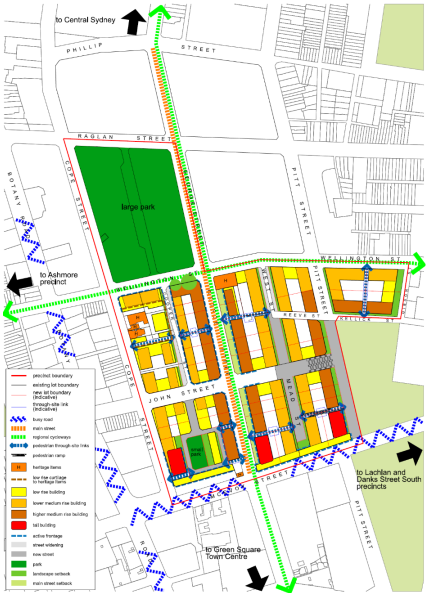
1.3 City of Sydney Planning Proposal

The City of Sydney has assessed the LAHC planning proposal and its associated technical reports. In response, the City has prepared an alternative urban design outcome with the following objectives:

- → enable the orderly redevelopment of Waterloo Estate (South);
- → prioritise the delivery of social and affordable housing, balanced with the provision of market housing;
- → establish a new local centre in the City of Sydney's hierarchy of centres - supported by infrastructure, community facilities and services, open space, and retail;
- → ensure the built form provides high levels of amenity for residents and tenants, to the public domain and to open space; and
- → require high environmental performance standards for buildings to mitigate the effects of climate change.

Together, the proposed planning controls will facilitate the following development outcomes on Waterloo Estate (South):

- → about 3,067 dwellings, including 920 social housing dwellings (30 per cent of all dwellings),
- → 613 affordable dwellings (20 per cent of all dwellings) and 1,534 market dwellings (50 per cent of all dwellings) on LAHC owned sites, plus about 127 additional market dwellings on privately owned sites;
- → 10% or more of the total number of affordable housing dwellings provided in Waterloo Estate (South) is to be provided for Aboriginal and Torres Strait Islander housing, with current proportions of Aboriginal and Torres Strait Islander households being maintained or increased in social housing;
- → a large park adjoining Waterloo Metro station of more than two hectares and a small park in the south of the site;
- → about 249,000 sqm of floor space, including about 13,000 sqm for commercial premises and 5,000 sqm for community facilities, childcare and health facilities;
- → three towers of about 30 storeys and most other building generally around 8 stories (with some 4 stories and others up to 13 storeys where development fronts a park or George Street);
- → new streets and through site links; and
- → a new cycleway along Wellington Street.



City of Sydney planning proposal for the Waterloo Estate (South)

PLACE ANALYSIS

2.0 WATERLOO ESTATE

2.1 Waterloo South

The redevelopment of the Waterloo estate has been in discussion since 2011 and more recently since 2018.

The NSW Land and Housing Corporation has submitted a planning proposal request to redevelop the public and private lands in the southern part of the Waterloo estate (south) by changing the planning controls that apply.

Waterloo south includes land bounded by Cope, Raglan, George, Wellington, Gibson, Kellick, Pitt and McEvoy streets, and has an approximate site area of 12.32 hectares (approximately 65% of the total estate).

It currently comprises 749 social housing dwellings owned by the corporation, 125 privately owned dwellings, and some commercial properties on the south-east corner of Cope and Wellington streets.

Source: https://www.communitiesplus.com.au/major-sites/waterloo, May 2020

Waterloo Metro, Waterloo Estate, Waterloo South SSP and surrounding context
Source: https://www.communitiesplus.com.au/major-sites/waterloo, May 2020

KEY

- The Estate
- Private properties
- Waterloo Metro Quarter
- Waterloo Metro Station
- Sydney Metro alignment
- Waterloo South (subject to this planning proposal)
- Waterloo North (subject to future planning and planning proposal)
- Waterloo Central (subject to future planning and planning proposal)

2.2 Existing building stock

The existing building typologies represented on the site are:

- → a single-storey cottages located on Cooper Street, built in the 1950s and 60s with three or more compact studios in each cottage;
- → two and three storey walk-ups built in the 1950s and 60s with one and two bedroom apartments;
- → infill development built in the 1990s
- → taller buildings up to seven storeys built in the 1980s, including those named 'Dobell' and 'Drysdale' featuring larger three and four bedroom apartments;.
- → commercial and industrial warehouses;
- → four storey private strata residential development;
- → heritage listed Duke of Wellington Hotel, which is currently a strata multi-unit residential development;
- → heritage listed terraces and house at on Cope Street,
- → heritage listed substation at 336 George St, facing McEvoy Street.

Source: City of Sydney Planning Proposal

Implications for the planning proposal:

- → Waterloo exhibits a varied character in bulk, scale, materiality and typology.
- → Variety in street wall and overall height within the planning proposal will reinforce Waterloo's varied character.

Crn, Botany and Henderson, Waterloo NSW

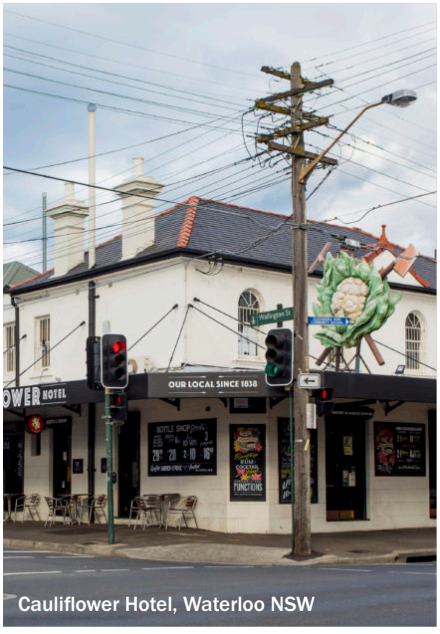

Botany Road, Waterloo NSW

Lawson Street, Redfern NSW

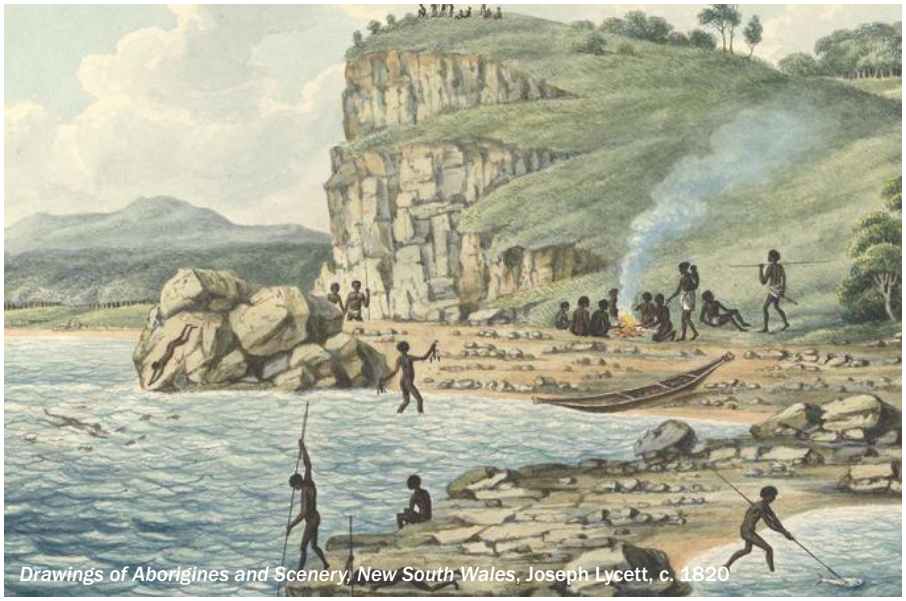

Bottlebrush, Redfern NSW


Waterloo Public Housing, Waterloo NSW

Residential terraces, Waterloo NSW



Cauliflower Hotel, Waterloo NSW

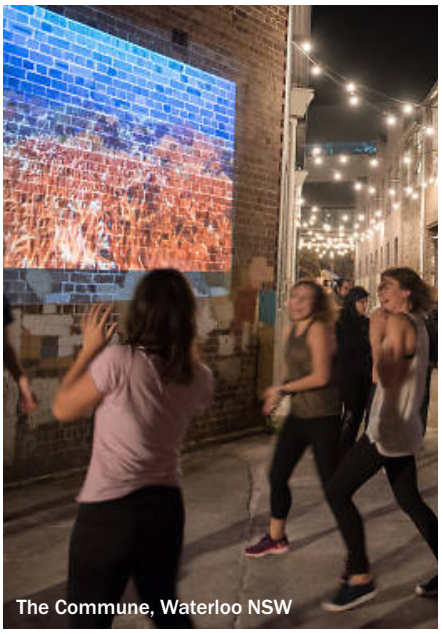


Drawings of Aborigines and Scenery, New South Wales, Joseph Lycett, c. 1820

Community Bike Workshop, Waterloo NSW

Redfern Street, Redfern NSW

Referendum on Indigenous rights protest, Waterloo NSW, 1967



The Commune, Waterloo NSW

Lawson Street, Redfern NSW

Waterloo NSW, c. 1910

Sydney, Carl Milton 2008

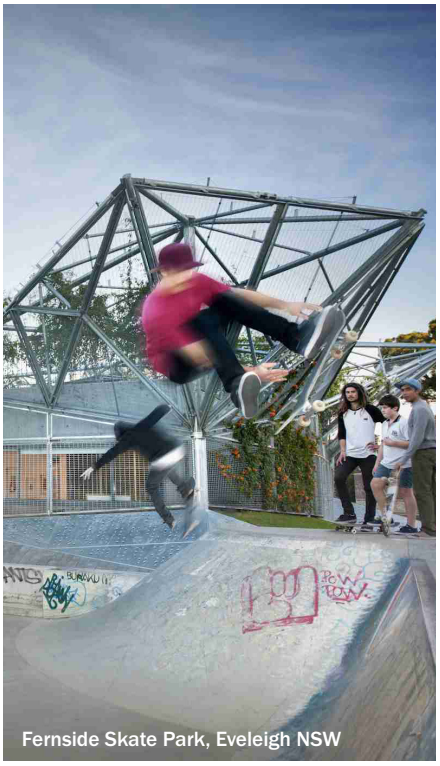
Matarvai, Public Housing, Waterloo NSW

Aerial View, Redfern & Waterloo NSW

Botany Road, Waterloo NSW

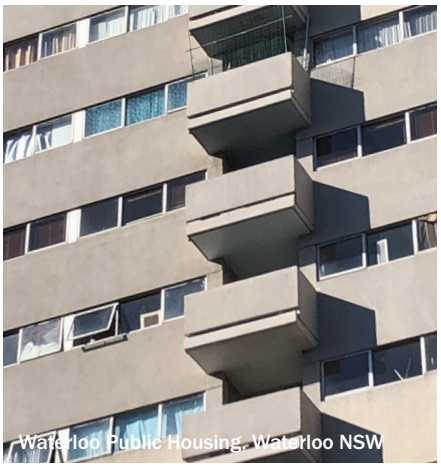
The Block, Redfern NSW

Looking south, Waterloo NSW

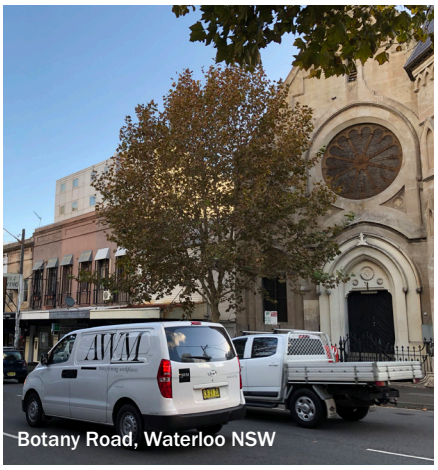


Fernside Skate Park, Eveleigh NSW

NCIE Sports Field, Redfern NSW



Waterloo Public Housing, Waterloo NSW



Botany Road, Waterloo NSW

Botany Road, Waterloo NSW

Botany Road, Waterloo NSW

CONTEXT

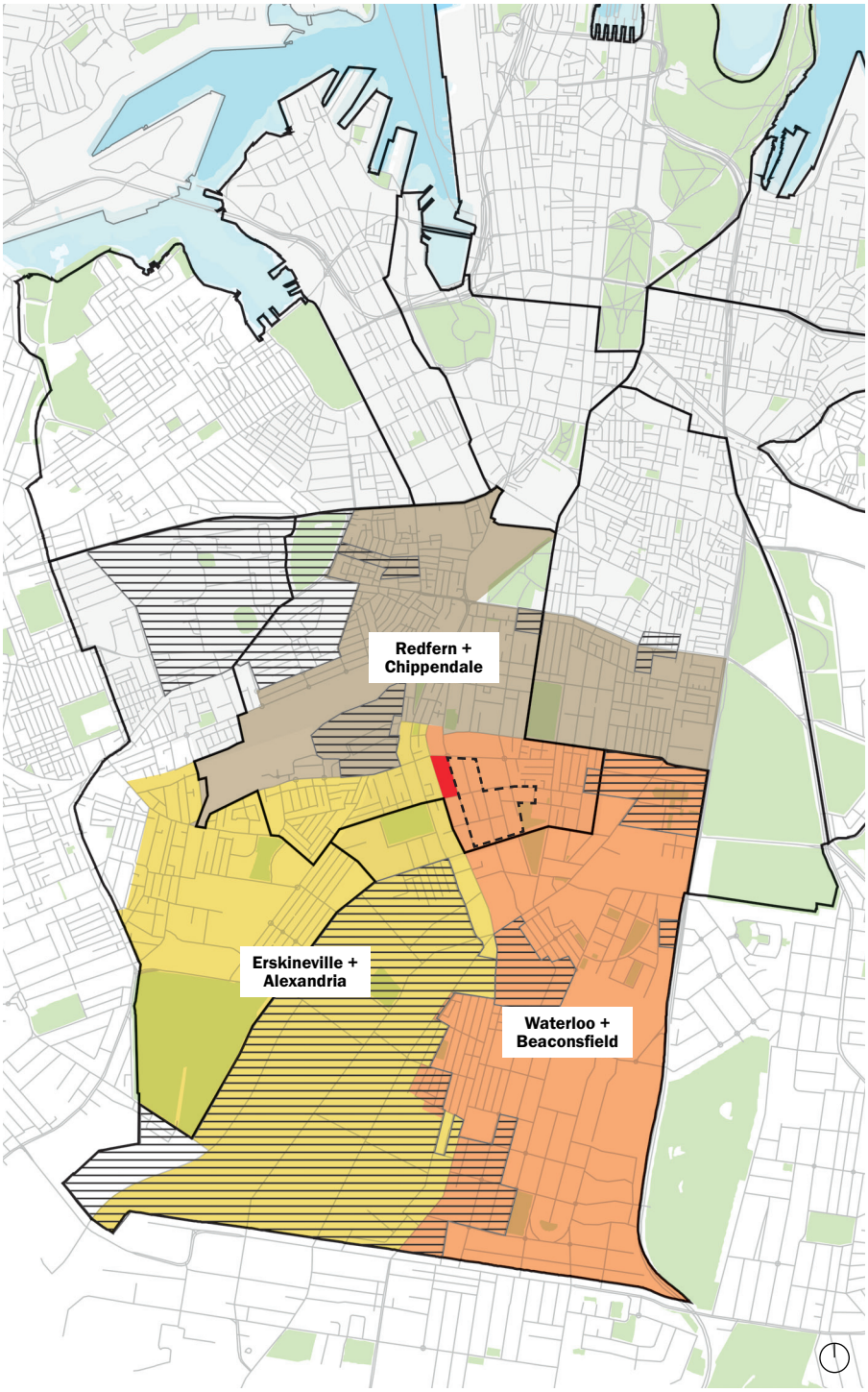
Waterloo South is situated in the intersection of character and identity of four local communities.

2.3 Waterloo's Character

Waterloo South is central to four local communities: Eveleigh to the north-west, Redfern to the north-east, Alexandria to the south-west, and Waterloo to the south-east. These communities are diverse in their demographic, cultural and industry mix. There is an evident existing grain within the surrounding communities and Waterloo South has the opportunity to extend this vibrancy and activation into the network of spaces it has to offer to the existing and future community.

Implications for the planning proposal:

- → Waterloo South plays a role in connecting neighbourhoods, particularly as the metro station is developed.
- → A connected street network with a clear public realm will reinforce this role.



Waterloo - Beaconsfield (current statistics*)

SA2

Statistical Areas Level 2 (SA2s) are a medium-sized general purpose area built up from whole Statistical Area Level 1(SA1s). Their purpose is to represent a community that interacts together socially and economically.
Source: abs.gov.au

Population (overseas %)
37,929 | 53.7%

Median age
31.7 (37.2 Australian average)

Household size
2.2 (2.6 Australian average)

Lone person household
30.3%

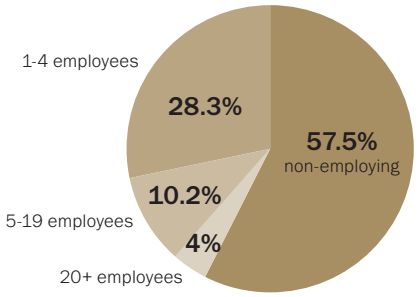
Completed Year 12 or equivalent
72.7% (51% Australian average)

Median weekly household income
$1,176 ($877 Australian average)

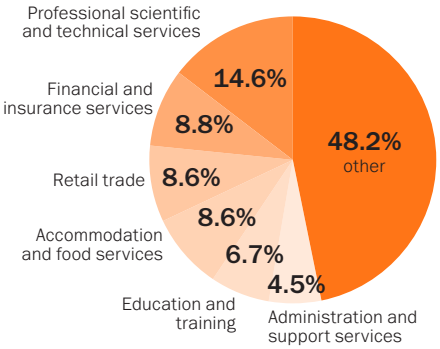
Professionals
34.9%

Main employment industry
Professional scientific and technical services
14.6%

Employment industry business size



Employment industry business type



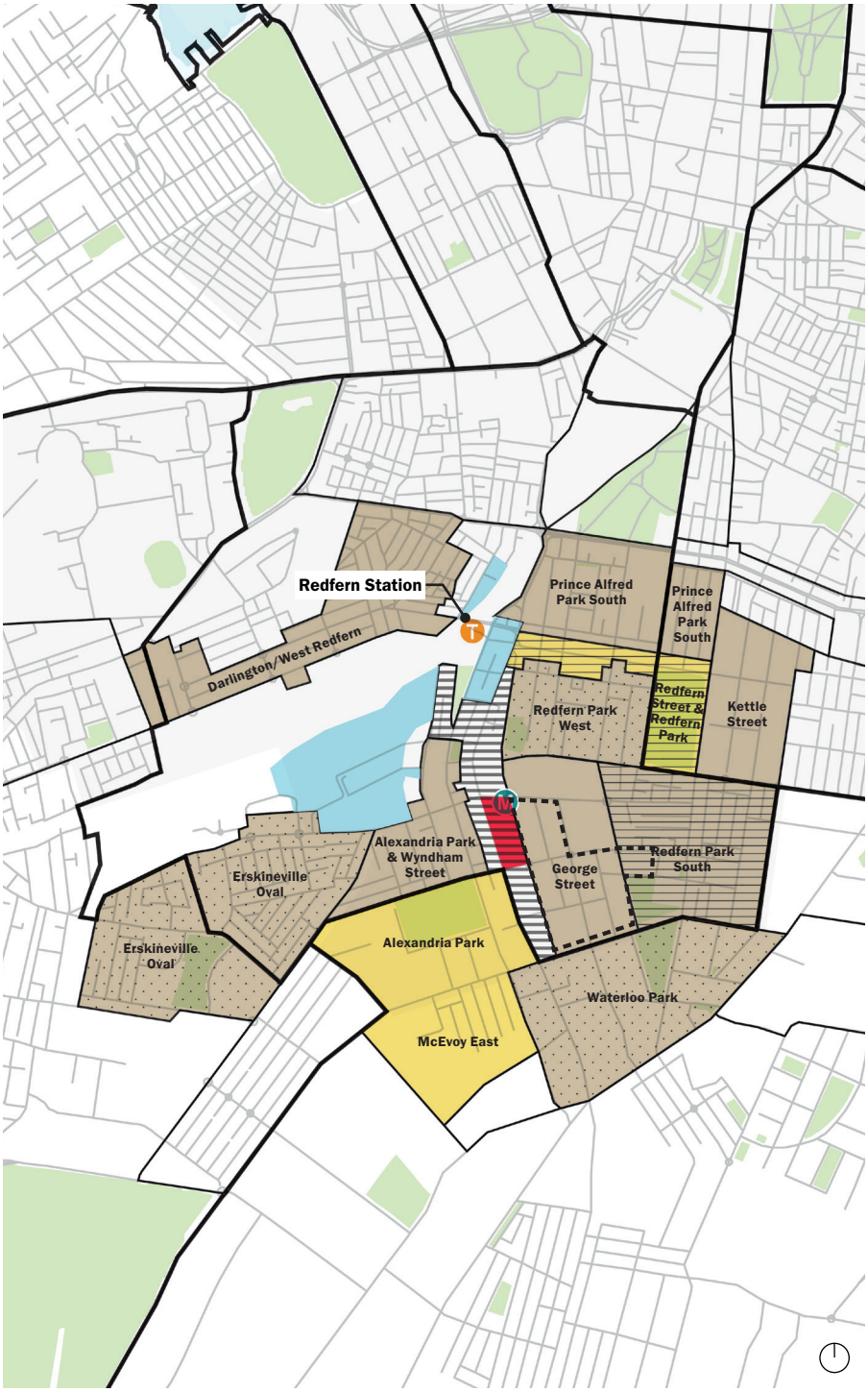
Redfern Village, Redfern NSW

A majority of the neighbourhoods surrounding Waterloo South are residential focused with visions to uplift public amenities and street activation to create pedestrian centric environments.

2.4 Waterloo Neighbourhood

There are a number of intersecting and surrounding neighbourhoods identified in the 2012 City of Sydney DCP which outlines place-specific quality of the neighbourhood. This provides important direction for the development of Waterloo South.

Source: abs.gov.au



2.2

Persons per household (2.6 Australian average)

"Sometimes besieged, always resilient, at Redfern's core is its thriving and dynamic community, home to many of Australia's political and cultural trailblazers."

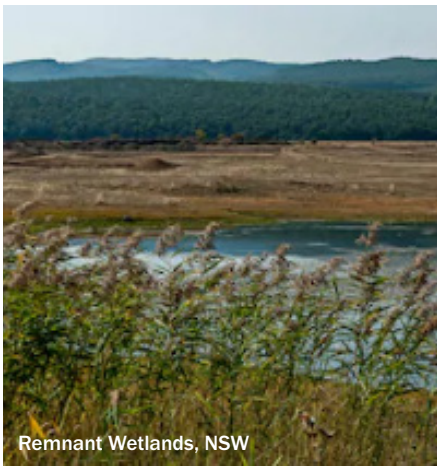
Source: https://www.creativespirits.com

Caroline Street, Redfern NSW

"Eveleigh is the home of a growing community of researchers, entrepreneurs, incubator businesses, start-ups, mature technology companies and education organisations."

Source: atp/com.au


National Centre of Indigenous Excellence teachings in practice, Redfern NSW


Remnant Wetlands, NSW

Adapted industrial built form, Alexandria NSW

53%

Population of 37,929 persons with 53.7% from overseas.

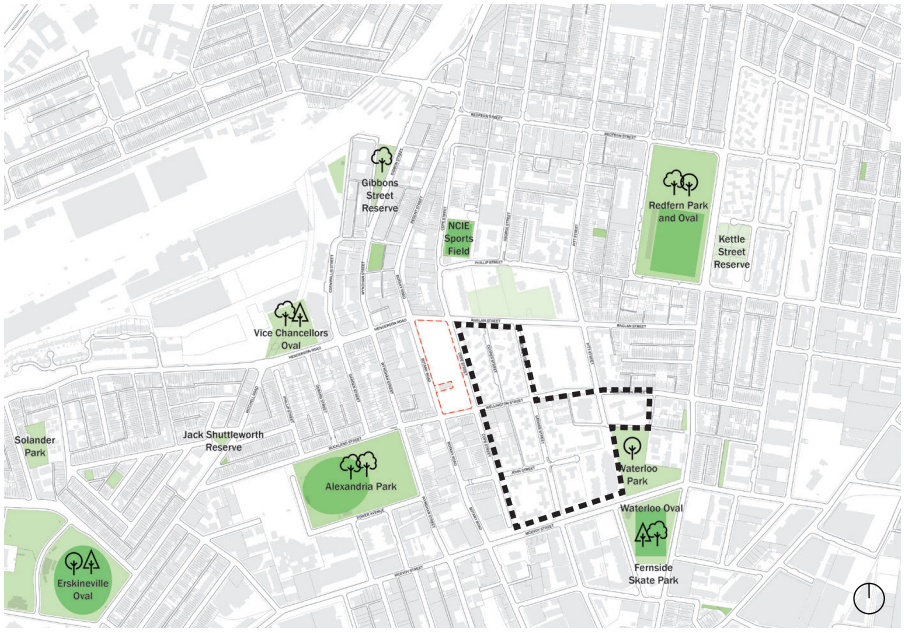
"Sydney's industrial centre, Alexandria, is simmering with an influx of culture. Cafes are sprouting up next to mechanics and inside old warehouses."

Source: domain.com.au

2.5 Outdoor Green Spaces

Key observations: The surrounding suburbs have large parks, well-programmed and well-maintained, with additional green spaces to be created within the Waterloo Estate.

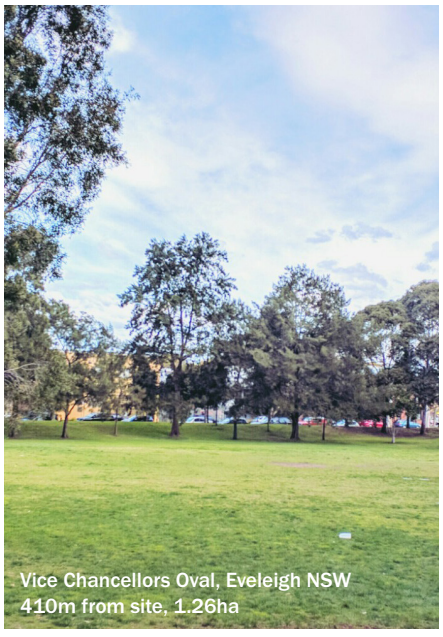
Key insight: The area is well serviced by district open space but under serviced by local open space. Additional space - easily accessed and focused on the needs of locals - is required.



KEY

- Green open space
- Public sports fields

Gibbons Street Reserve, Redfern NSW
550m from site, 0.46ha



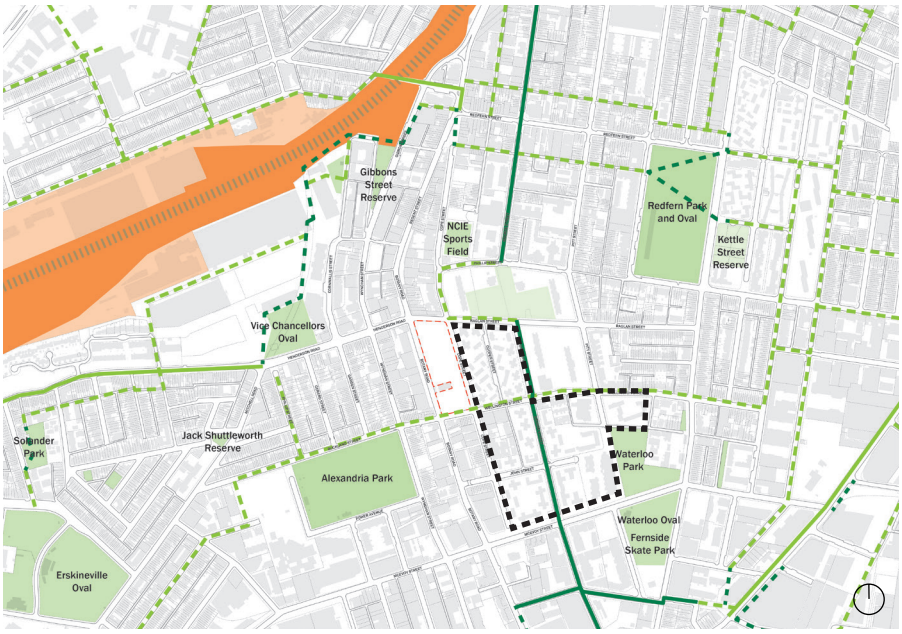
Vice Chancellors Oval, Eveleigh NSW
410m from site, 1.26ha

Alexandria Park, Alexandria NSW
350m from site, 40.46ha

2.6 Pedestrian and Cycle Network

Key observations: An existing local and district pedestrian and cycle network runs near the Metro Quarter, connecting to Central Sydney (north) and Green Square (south).

Key insight: George Street will play an increasingly important function as a cyclist and pedestrian connector, not just to the metro, but to the CBD beyond for Waterloo South and surrounding neighbourhoods.

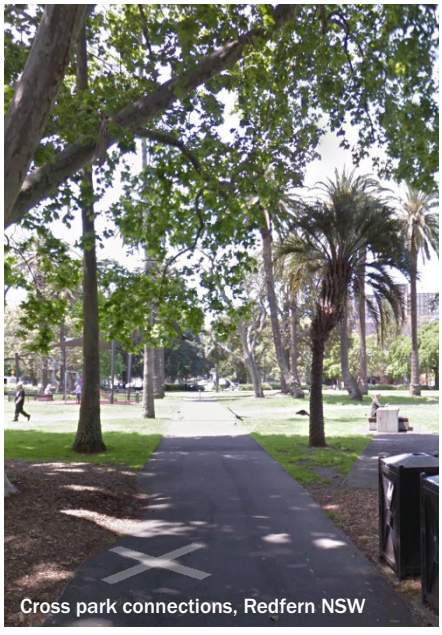


KEY

- Bicycle pathway
- Off road bicycle pathway
- Dedicated bicycle pathway
- Rail corridor


Dedicated path, Waterloo NSW


Road-share path, Redfern NSW

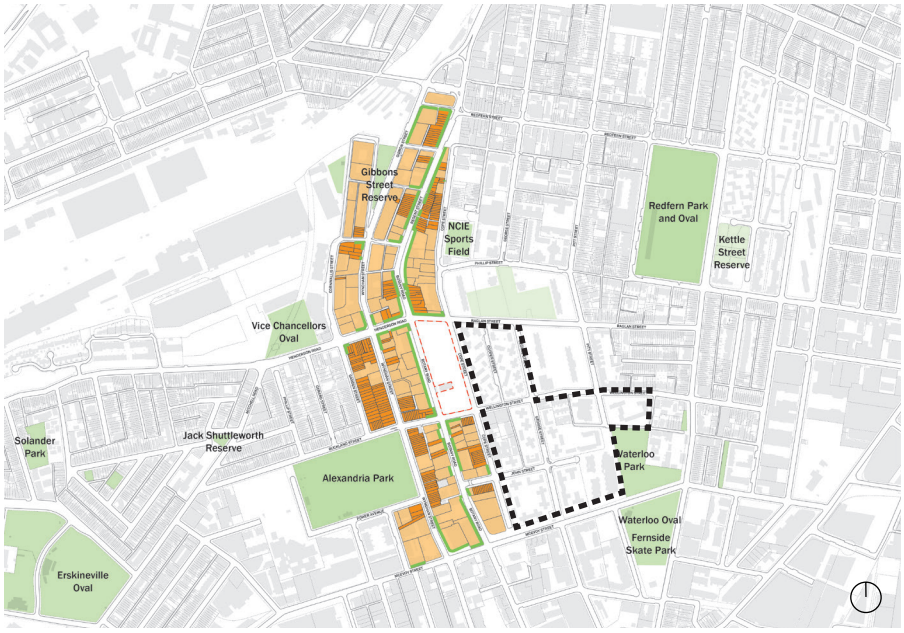

Cross park connections, Redfern NSW

2.7 Lot Building and Grain

Key observations: Botany Road has a mix of small and large lots with focused areas of intensity. Cope Street is characterised by larger industrial lots.

Key insight: Waterloo South can extend the intent of the Waterloo Metro Quarter by embracing a diversity of scales - from larger footprint buildings (such as the Metro Station) and generous community spaces to tightly-packed retail laneways.

KEY
- Active frontages
- Large lots
- Small lots



2.8 Heritage Buildings

Key observations: The broader context has significant heritage items and conservation zones - as well as a strong social and cultural history. Several heritage items sit across intersections from the precinct.

Key insight: Tall built form will sit adjacent to heritage items or conservation areas. The interface to address the change in scale is therefore important.

KEY
- Heritage items
- Heritage conservation zones
- Potential heritage items

Botany Road, Waterloo NSW

Tramsheds, Eveleigh NSW

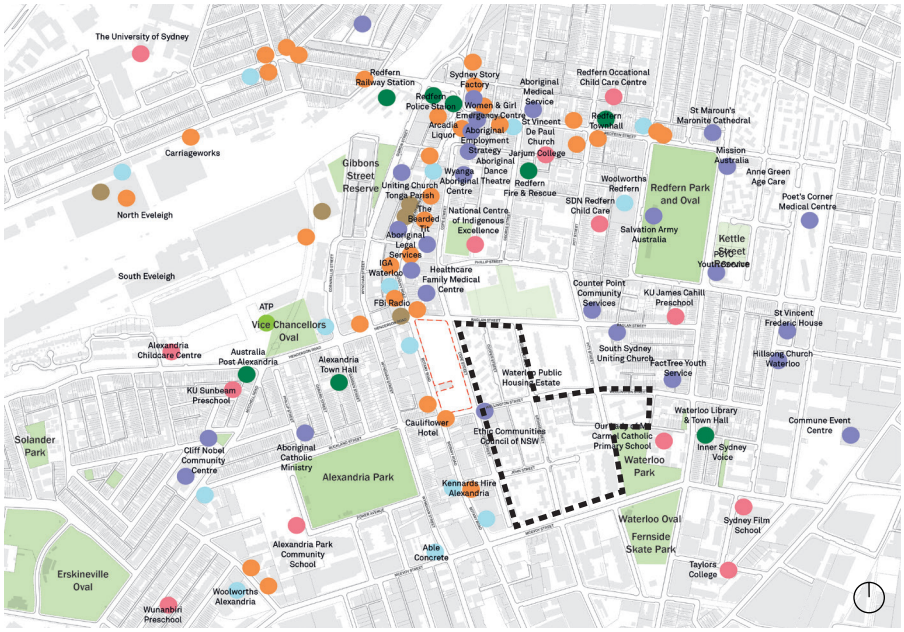
Broome Street, Waterloo, NSW
Mural, Michiel Dolk and Jeff Stewart, 1980

Botany Road, Waterloo NSW

2.9 Community Spaces

Key observations: There is a constellation of community spaces from kindergartens and small factories to small bars, enterprise hubs and social service centres.

Key insight: Waterloo South exists within a gap of community spaces and services - and has potential to become a new, highly-accessible and well-connected hub. George Street, because of its neighbourhood function, should perform this role.



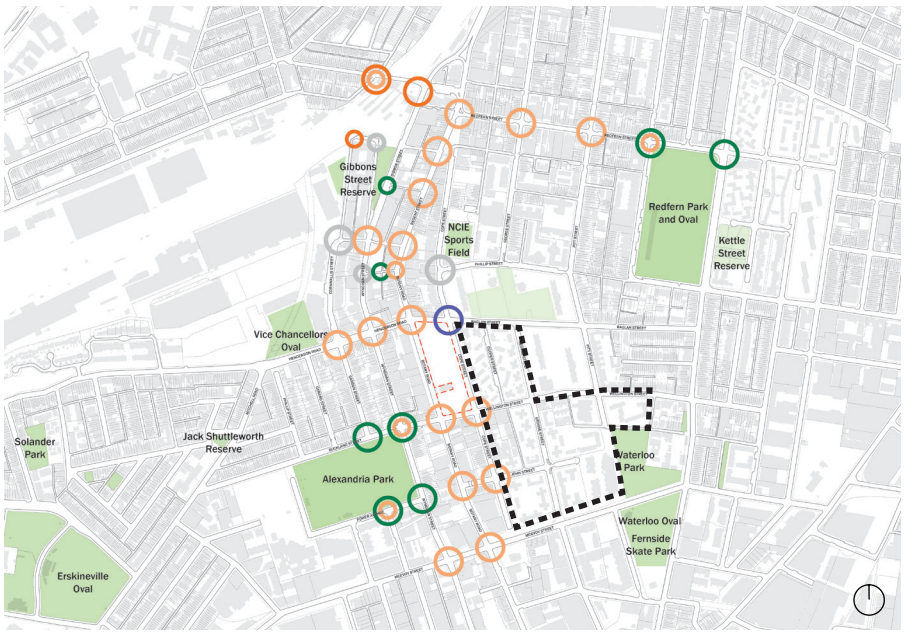
KEY

- Localities
- Community services
- Schools and education services
- Art galleries and museums
- Cafe / bar
- Key stores

2.10 Active Corner Anchors

Key observations: The existing and future corner anchor typologies offer varied ground plane activity and engagement creating a diverse street-scape and pedestrian experience.

Key insight: The scale, materiality and expression of corners is critical.

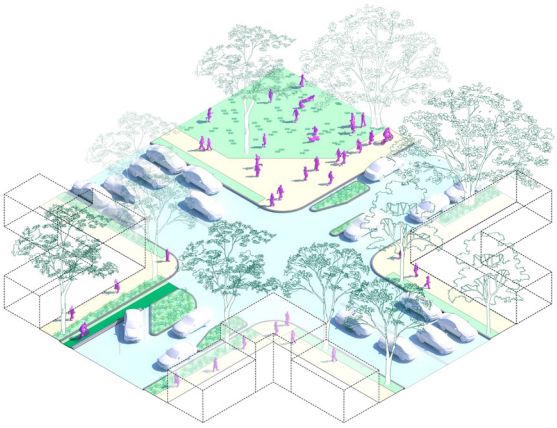


KEY

- Metro Transport anchor
- Rail Transport anchor
- Retail and commercial anchor
- Green open space anchor
- No anchor

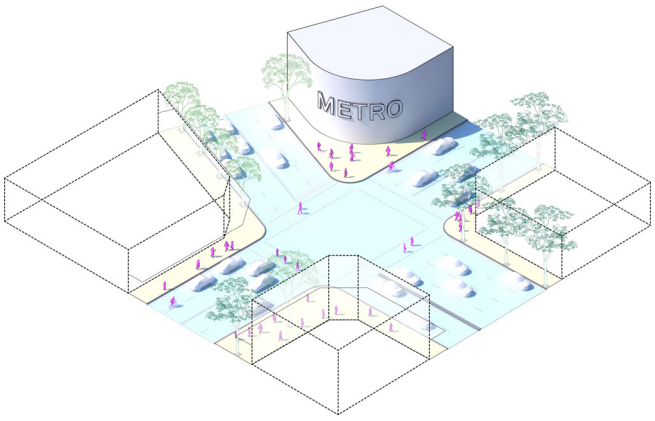
Park anchor

Green open space for both passive and active activity.



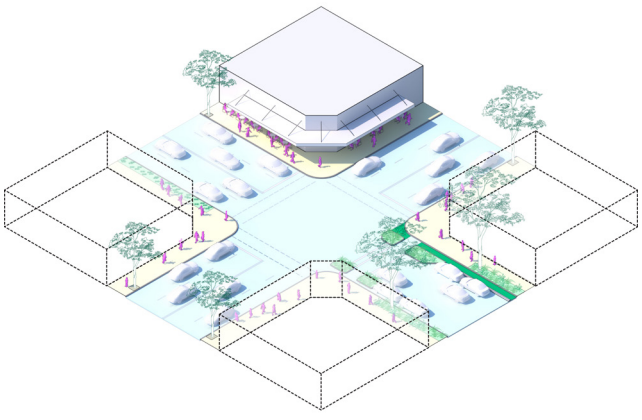
Transport anchor

High-activity point providing regular ground plane engagement.



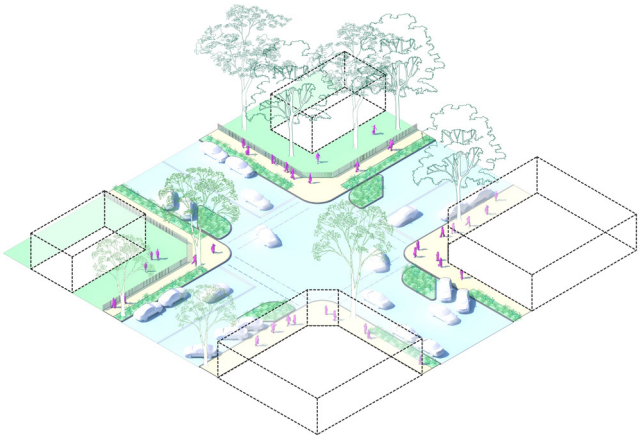
Retail anchor

Active edges for ground plane engagement and activity.



No anchor

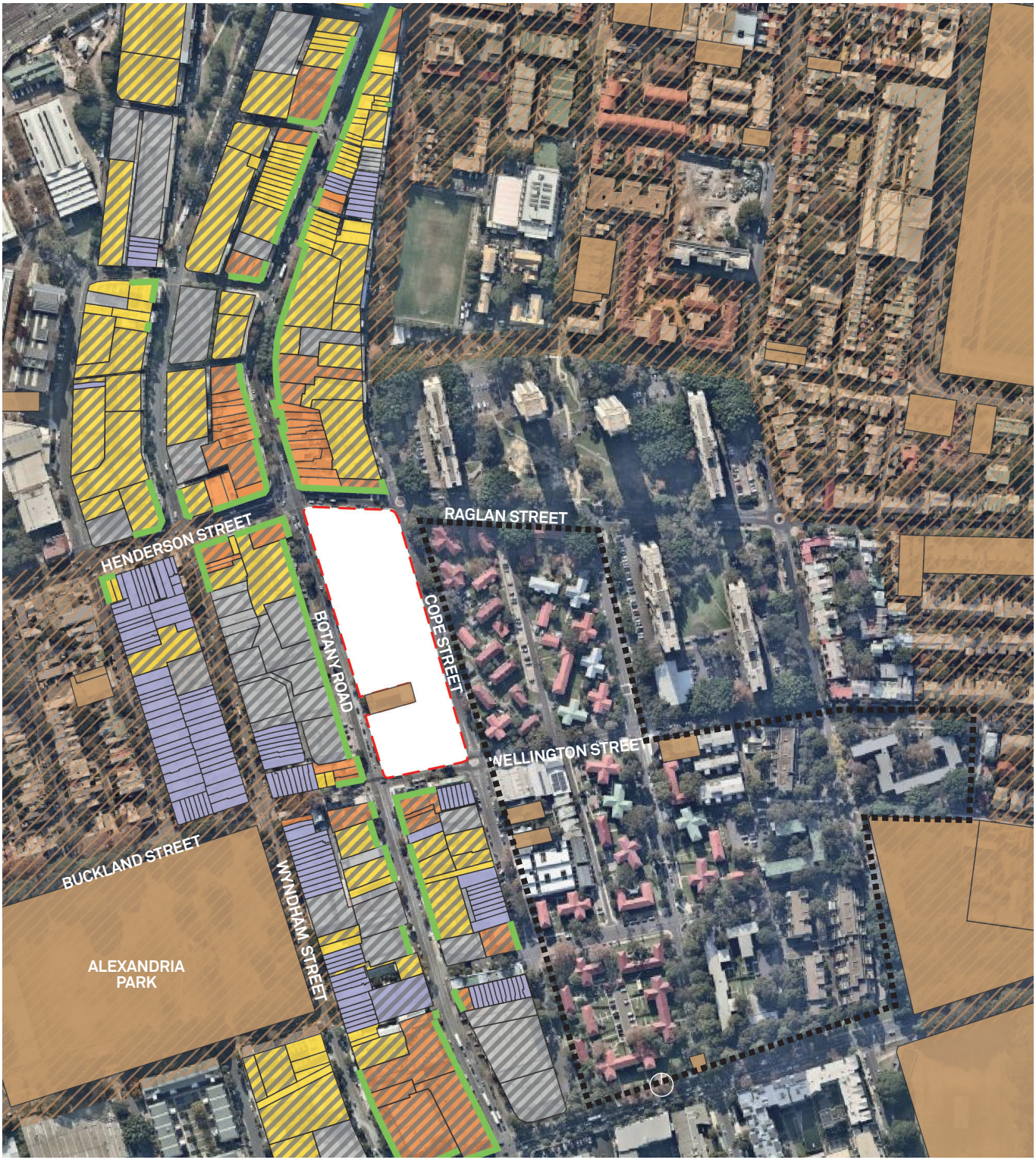
Passive edge providing low level engagement.

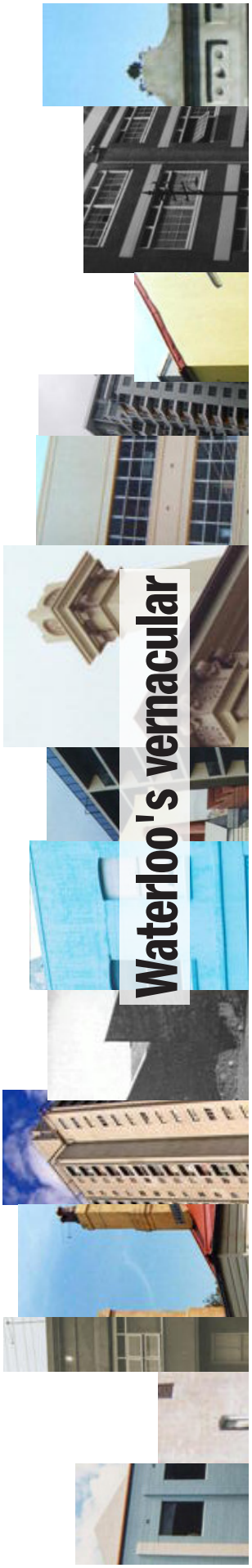


KEY

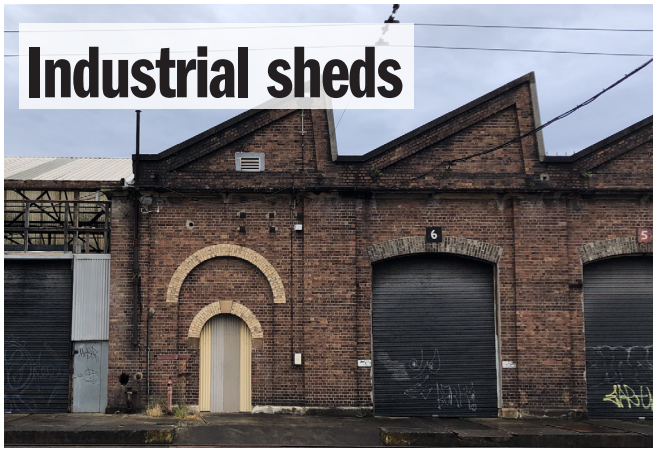
- Waterloo Metro Quarter
- Active ground-plane
- Large lot size
- Retail/hospitality/commercial use
- Residential
- Industrial
- Terrace
- Heritage items
- Heritage conservation zone

Waterloo's urban fabric has been shaped by a history of growth and renewal. This diverse, layered and engaging character inspires the design of contemporary buildings and spaces.





Waterloo's vernacular



Industrial sheds

Workshops & repair yards

Terrace shops & houses

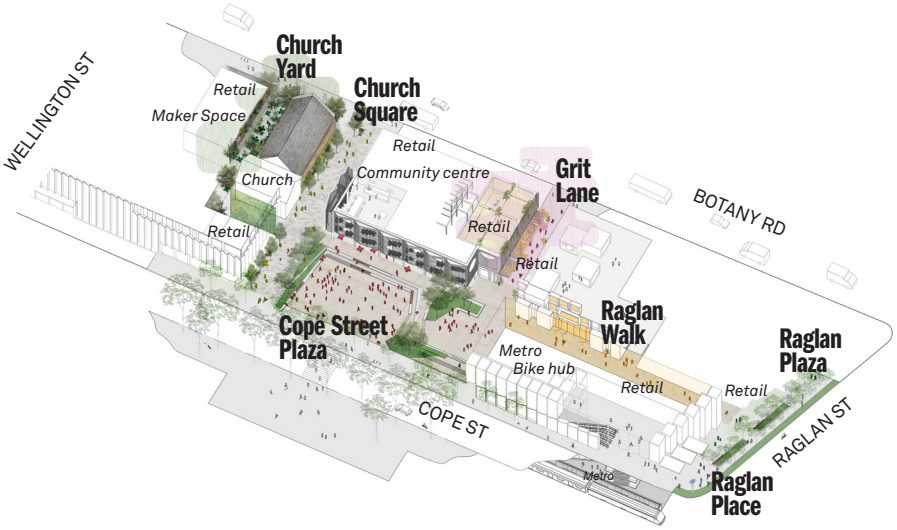
Warehouses

- Street and space-fronting
- Repetition and customisation
- → Vertical expression (lot/terrace/bay)
- Built for adaptation
- Robust, tactile, personal

2.11 Waterloo Metro Quarter

The Waterloo Metro Quarter is being developed adjacent to the Waterloo South precinct. It proposes a mixed use precinct above the Waterloo Metro Station.

Waterloo Metro Quarter will be a place for all, a place of diversity, of unique character and experiences.

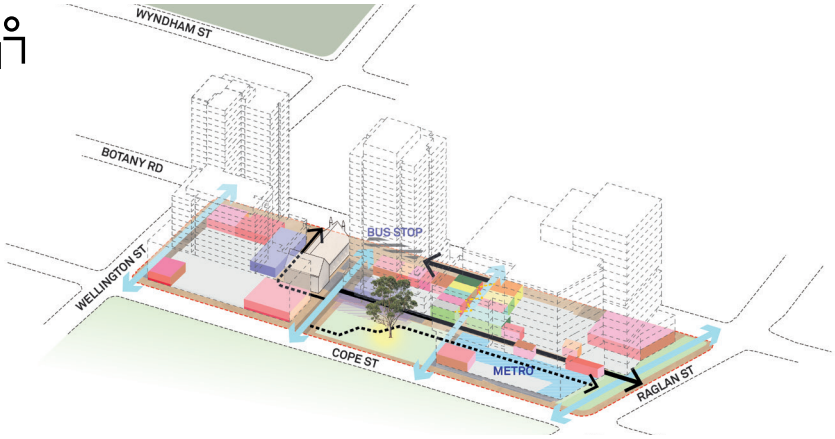


Aerial View of Waterloo Estate and surrounding context

1. An authentically public place

Key points:

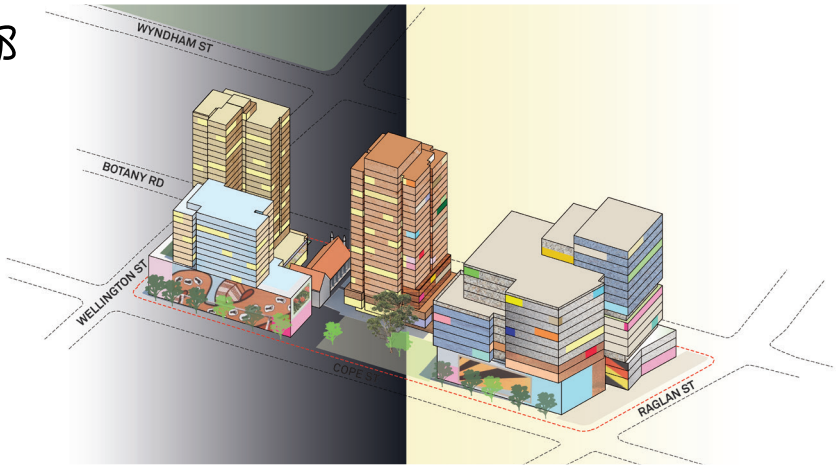
- → A precinct wide network of connections of varying scale, character and access
- → Clustering of community uses, retail and commercial spaces around and adjacent to the main open space.



2. Ultra diversity in use, form, and character

Key points:

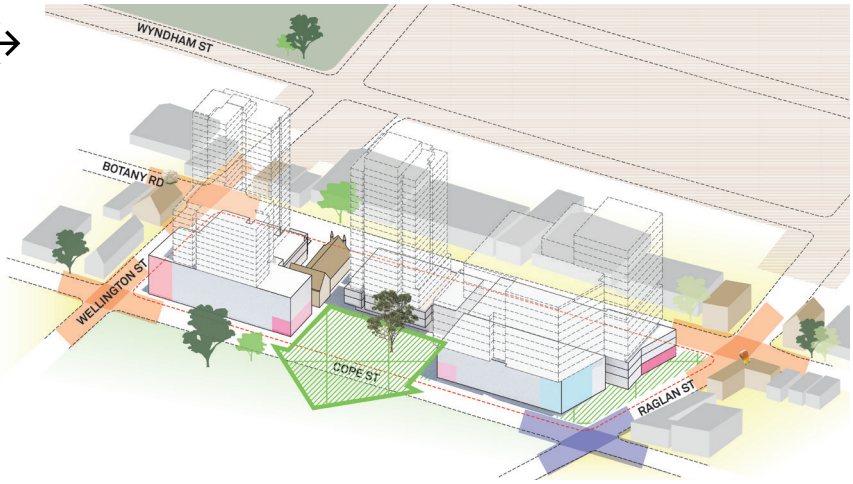
- → Diverse form and materiality through building on and intensifying the richness of the local Waterloo vernacular
- → Day and night activation
- → Diverse ecosystems with a contemporary planting strategy that reflects complexity of original natural systems



3. Responsive to a complex and changing context

Key points:

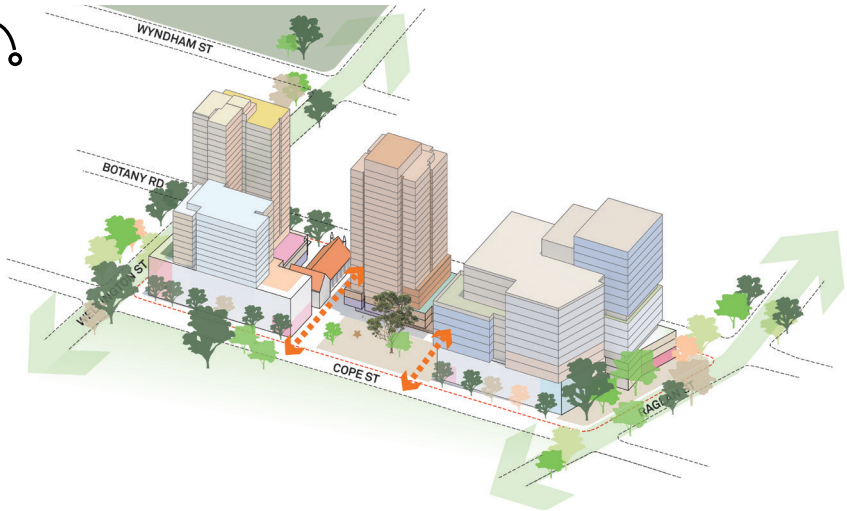
- → Street edge response through consistent street edge with expressed corners, setbacks to match church and insets at entry points.
- → Public amenity on and off site protected through placement and modulation of buildings.



4. A local neighbourhood network

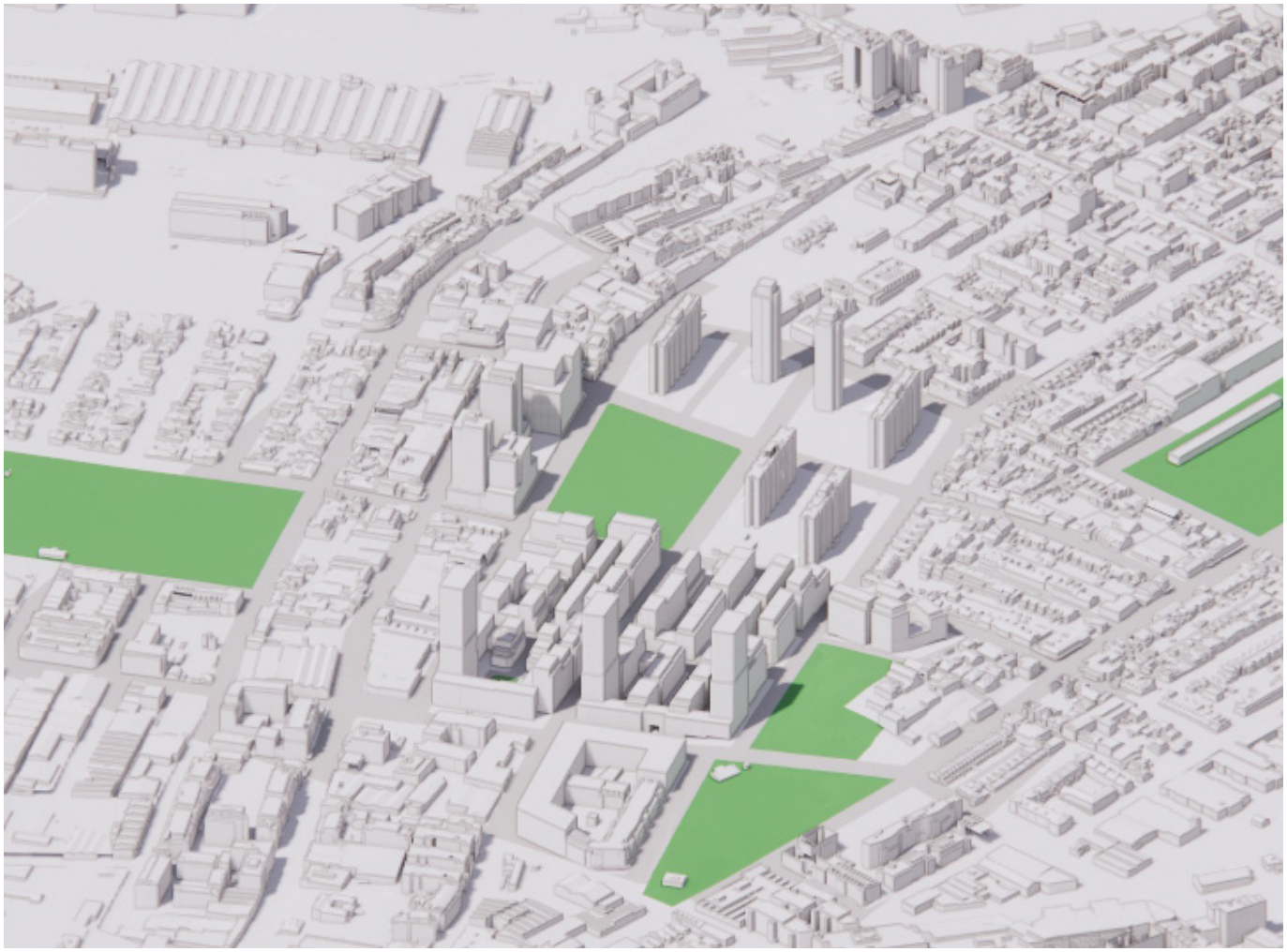
Key points:

- → Landscape integration through generous landscape expression of connections along east-west streets and within open space.
- → Connections through the site create a network of distinct, engaging, surprising spaces.

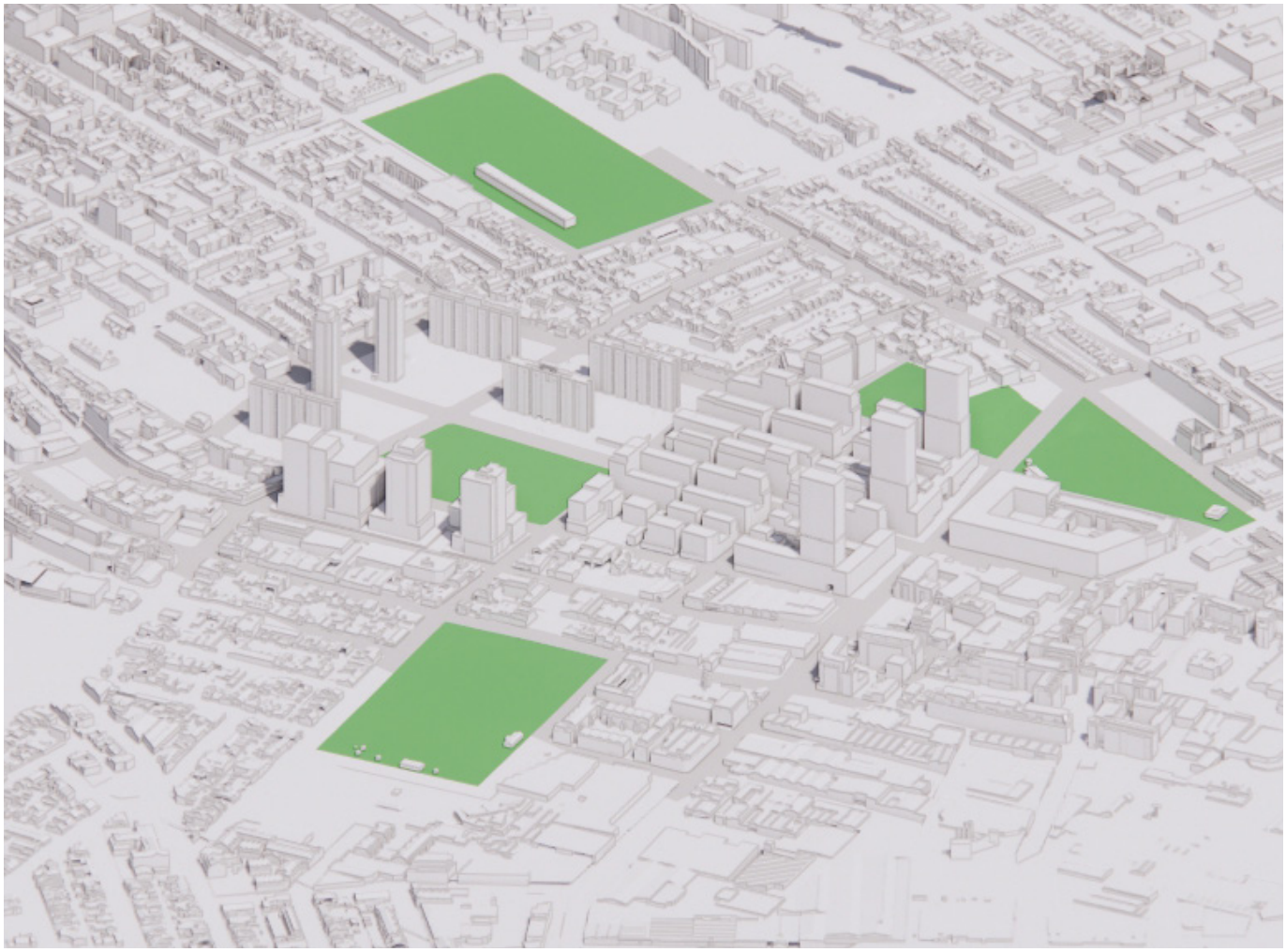


2.12 City of Sydney Planning Proposal and its context

These images show the context of the City of Sydney proposal with the surrounding context.



South aerial view of Waterloo Estate, Waterloo SPP and surrounding context



East aerial view of Waterloo Estate, Waterloo SPP and surrounding context

OBSERVATIONS ON THE PLANNING PROPOSAL

3.0 PLANNING PROPOSAL REVIEW

3.1 Introduction

This chapter of the report outlines critical urban design observations associated with the planning proposal, its alignment to strategic objectives and key opportunities for review.

The chapter addresses:

- → The objectives of the planning proposal, those of the Independent Advisory Group process and the gateway determination conditions
- → The extent to which the planning proposal addresses alignment with strategic policy
- → General urban design observations.

3.2 Planning Proposal

The City of Sydney planning proposal has the following objectives:

- → Enable the orderly redevelopment of Waterloo Estate (South);
- → Prioritise the delivery of social and affordable housing, balanced with the provision of market housing;
- → Establish a new local centre in the City of Sydney's hierarchy of centres, that is supported by infrastructure, community facilities and services, open space, retail and commercial services, and employment opportunities that meet the diverse needs of the local community;
- → Ensure the built form provides high levels of amenity for residents and tenants, to the public domain and to open space; and
- → Require high environmental performance standards for buildings to mitigate the effects of climate change.

Design Guide - Planning and Design Principles

- → **Diverse land use to support a diverse community**
  - → A mixed-use neighbourhood
  - → Providing a range of dwelling types and housing choices
  - → Responsive to existing local character and its history
  - → Non residential use to accommodate commercial and retail activities, particularly along George Street and additional retail opportunities along McEvoy Street
  - → Alignment with minimal requirement on social housing and affordable housing

- → **The right type, height and scale of buildings for Waterloo**
  - → Building heights respond to streets and public spaces
  - → Building forms, separation and orientation responsive to solar, sky view and wind effect
  - → Minimise overshadowing to public spaces and surrounding residential buildings
  - → Building height and form to respect heritage items
  - → Promote architectural diversity along street blocks
  - → Built form and landuse distribution responding to existing site condition such as noise and pollution
  - → Built form, height and density to be evenly distributed across sites
  - → All residential developments to be of high quality irrespective of tenure

- → **Streets prioritise pedestrians and cyclists**
  - → Fine grain street network
  - → A permeable, connected, accessible and safe site that maximises opportunities for walking and cycling, catering to a multitude of users, needs and traffic and access requirements.
  - → George Street to be the local centre of the community with continuous ground floor retail and awning, as well as large supermarket.
  - → Maintain and build on the City's regional bike network
  - → Street orientation and width to maximise sunlight at street level
  - → High quality street scape with new footpath, tree planting and street furniture

- → **Public parks and community facilities will provide for the community's diverse needs**
  - → A large main community park of over 2 hectares to be located adjacent to Waterloo Metro Station
  - → The large, open, accessible park to provide opportunity for a range of recreational opportunities.
  - → A smaller park to the south of the precinct to provide for smaller scale yet diverse activities
  - → Community facilities to be located close to active public spaces

- → **A green, low-carbon precinct that is resilient to climate change**
  - → Retain and protect established trees and plant new trees to provide shade and good amenity
  - → Landscape design to assist in storm water quality management
  - → Strong and consistent landscape character throughout the precinct
  - → Building form and design to be resilient, sustainable and maximises amenity.

3.3 Summary of IAG Redevelopment Principles

- → The redevelopment must provide the full range of housing tenures to ensure a diverse community into the future.
- → To accommodate the proposed density of development, the precinct must be developed with the highest urban amenity and design quality.
- → Every effort must be made to ensure that the existing communities on site are supported through the redevelopment process and, should they wish, be enabled to remain in the suburb after the development has taken place.
- → Public benefits and infrastructure are to be provided by the successful tenderer to ensure that a high quality urban neighbourhood is achieved for this development.

3.4 Gateway Determination

Key items for further assessment

- → Enable the orderly redevelopment of Waterloo Estate (South);
- → Study & confirm affordable housing % to ensure project feasibility
- → Heritage assessment - relationship between proposed building envelopes and adjacent heritage and conservation areas
- → Urban tree canopy - study additional opportunity for tree retention on site
- → Opportunities to mitigate urban heat island effect through design
- → Provide flexibility in the definition of height of building. Current HOB map prescribes a particular development concept to be carried out rather than providing flexibility to encourage innovation
- → Review bulk and scale of the buildings to achieve better place and urban design outcome.
- → Review B2 centre as proposed and its potential impact to the hierarchy of other centres
- → Review proposed FSR - suggest to increase base FSR to 2:1 with access to bonus FSR through competitive design process
- → Outline how the proposed/ recommended building envelopes address level change, particularly towards the north east.
- → Flood study
- → Detailed study on appropriate GBA:GFA:NSA efficiency for feasibility calculation

3.5 OBSERVATIONS

Key themes

Through the review of the Planning Proposal against the key principles and objectives outlined in the design guide, IAG report and Gateway Determination, the below key themes are set up to provide clarity to the observations:

- → **Block structure**
- → **Height and density**
- → **Building typology and diversity**
- → **Lot sizing and packaging**
- → **Character**
- → **Topography**
- → **Urban comfort and activation**
- → **Setbacks**
- → **Urban tree canopy and tree retention**
- → **Connectivity and permeability**
- → **Open spaces**
- → **Apartment amenity**
- → **CPTED principles**
- → **Car parking**

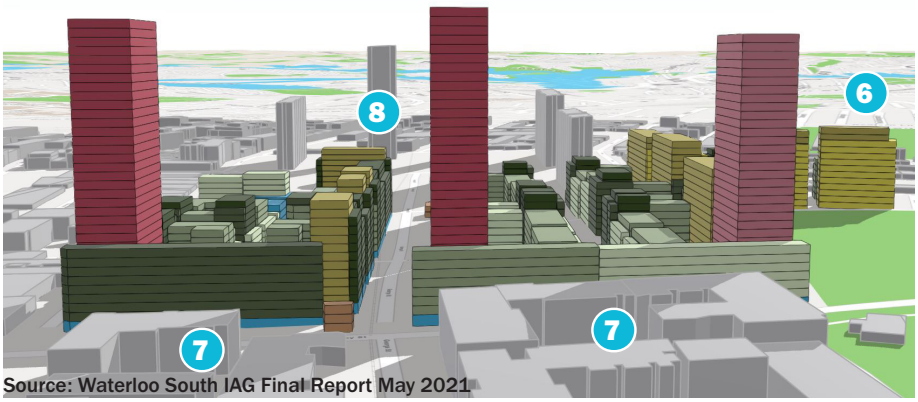
Source: Waterloo South IAG Final Report May 2021

3.6 HEIGHTS & DENSITY

The height and density of the future development will need to ensure high quality amenity outcome for the built form, public domain and its future users.

Key Observations

1. Proposed HOB map is very detailed and prescriptive, creating a framework that will result in a particular urban concept, limiting flexibility for design innovation and response to future changes/ challenges.
2. A 3 metre height is applied to areas of setbacks along streets and within courtyards. Potential for simplification to eliminate confusion of built form within these areas.
3. Typically, perimeter block apartment buildings are between 4 - 9 storeys. The proposed heights in the planning proposal are predominately between 8 - 13 storeys. Taller heights can impact apartment amenity (solar access) and public domain amenity.
4. Typically in the perimeter block model, streets are wider to allow solar access at ground level.
5. Potential opportunity to allow for another tower to balance GFA and reduce street wall heights throughout the precinct.
6. Building massing on the corner of Kellick Street and Pitt Street will create overshadowing to the adjacent park. The approach provides for 50% of the park receiving 4 hours sunlight during mid winter.
7. McEvoy Street massing presents a uniform street wall and long southern frontage.
8. Building massing along George Street ranges between 11-13 storeys, creating tall street walls to the main retail/commercial activity below.
9. Height of buildings to the west of Duke of Wellington Hotel is 13 storeys, a dramatic height increase from the 2 storey heritage building. Whilst the street offers separation, opportunity to explore datum expression can be explored in the design guidelines.
10. The west end of Wellington Street interfaces with existing terrace houses, where a 35m building height is proposed. Transition to a two storey height matches the terrace house height condition.



Source: Waterloo South IAG Final Report May 2021

Height in Storeys Source: Draft Waterloo Estate (South) Design Guide 2021

Maximum Building Height (m)

A	3
E	6
J	9
O	15
P	18
Q	20
R	22
S2	24
T3	28
U1	30
U2	33
V	35
W1	40
W2	42
X2	47

Maximum Building Height (m)
Heights shown on map in RL (m)

	120 - 130

Height of Building Source: Draft Waterloo Estate (South) Design Guide 2021

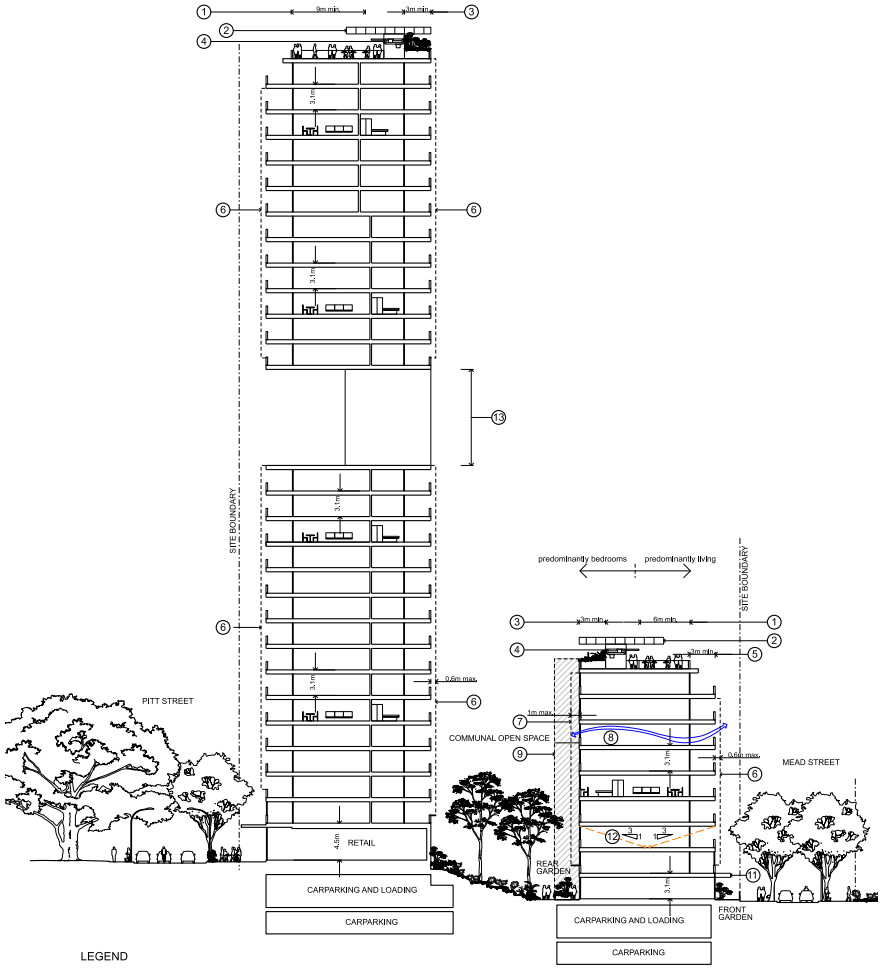
3.7 BUILDING TYPE & DIVERSITY

The master plan and envelope need to provide flexibility to encourage diversity in built form, architectural articulation and urban environment.

Key Observations

1. Potential to explore other options in mitigating wind impact from tower. The solution within design guideline is prescriptive that defines a particular architectural response rather than allowing design innovation.
2. Utilise topography to drive diversity in height and built form.
3. Interface character with existing context - contextually responsive
4. Perimeter building block typology prescribed in the height of building limits the potential for diversity in built form response.

Figure 16: Typical clear horizontal breaks in tall buildings



Proposed tower section Source: Draft Waterloo Estate (South) Design Guide 2021

Source: Waterloo South IAG Final Report May 2021

3.8 LOT SIZING & PACKAGING

The land parcel break up must ensure a diverse built form and architectural authorship while balancing flexibility and development efficiency.

Key Observations

1. The break up of land parcels for future developments provides a framework for diversity within the precinct, allowing a variety of authorship along each street block to ensure diversity in architectural character and facade.
2. Land parcel break up also respond well to the urban grid and street structure to ensure a cohesive precinct.

Street Blocks Source: Draft Waterloo Estate (South) Design Guide 2021

Competitive Design Process Sites Source: Draft Waterloo Estate (South) Design Guide 2021

3.9 CHARACTER

The existing site is layered with rich and complex history through it occupants, built form and natural environment.

Key Observations

1. A very different product to Waterloo's existing character - fine grain and low scale - lower levels and ground plane will be critical in achieving a contextually responsive design.
2. Complex site interfaces that call for a considered contextual response - interface with surrounding development, topography, street scape, heritage items, public open space and future metro site.
3. No retention or adaptive reuse proposed for any existing buildings.
4. Potential for adaptive reuse of existing buildings for public and community use to retain a sense of place, identity and history of the site. Opportunity within the RE1 zone.
5. Existing vegetation contributes to the natural environment of the site, promoting a strong sense of community. The future development should seek to maximise retention of existing trees.

Existing Waterloo Estate and surrounding context

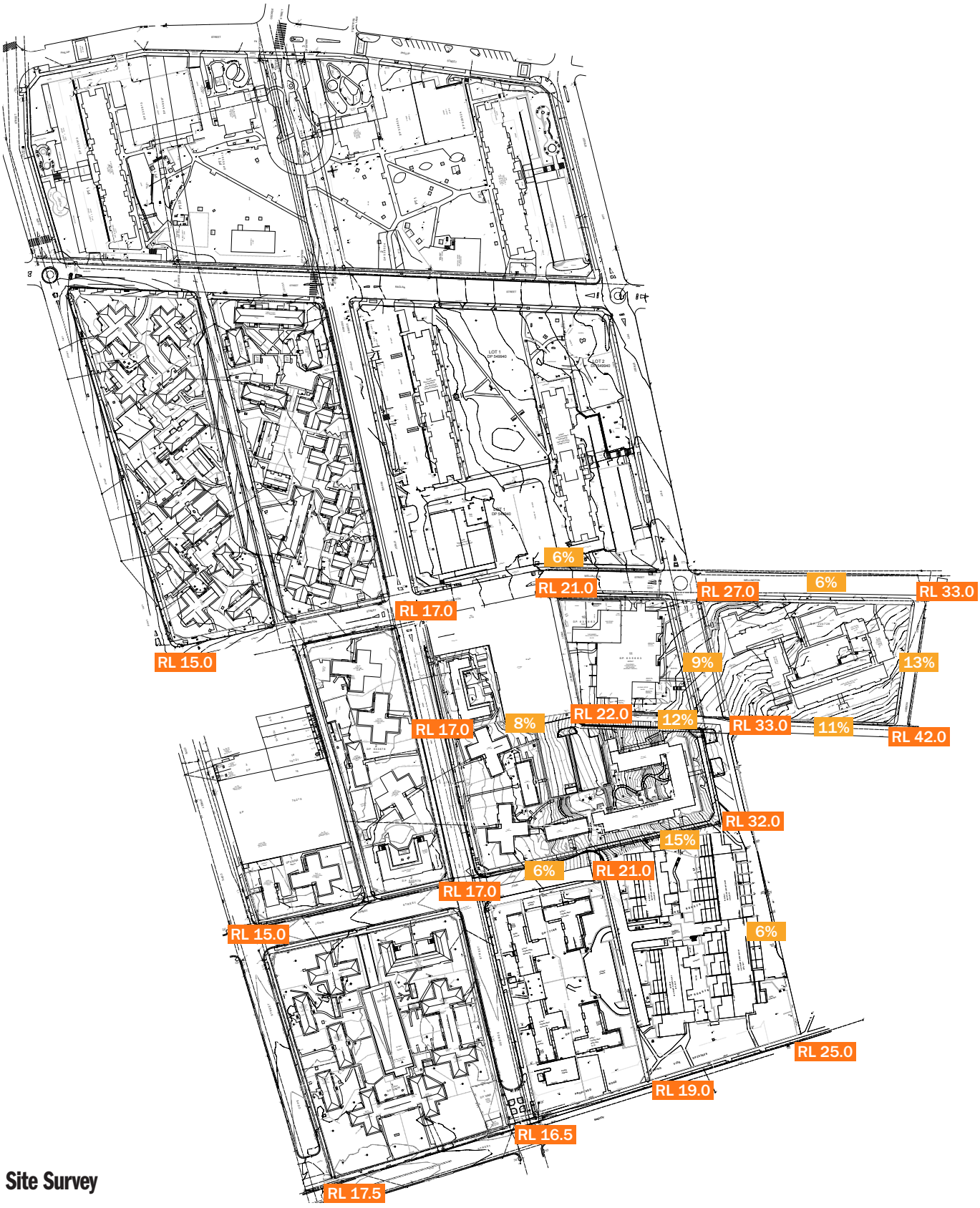
3.10 TOPOGRAPHY

The existing topography presents a collection of varied site conditions.

Key Observations

1. The steepest incline within the site is to the eastern end of John Street with an elevation difference of 11m. Pedestrian only access is proposed here. No public lift proposed in this location.
2. Building typology and ground floor condition to respond to the steep nature of the north eastern part of the site.
3. Building height to respond to the topography of the site to minimise overshadowing to open spaces and apartments.
4. Open space design and character to respond to the topography.

Source: Council Planning Proposal Waterloo Estate South


RL 15.0
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RL 21.0
RL 17.0
RL 15.0
6%
RL 25.0
RL 19.0
RL 16.5
RL 17.5

Site Survey

3.11 URBAN COMFORT & ACTIVATION

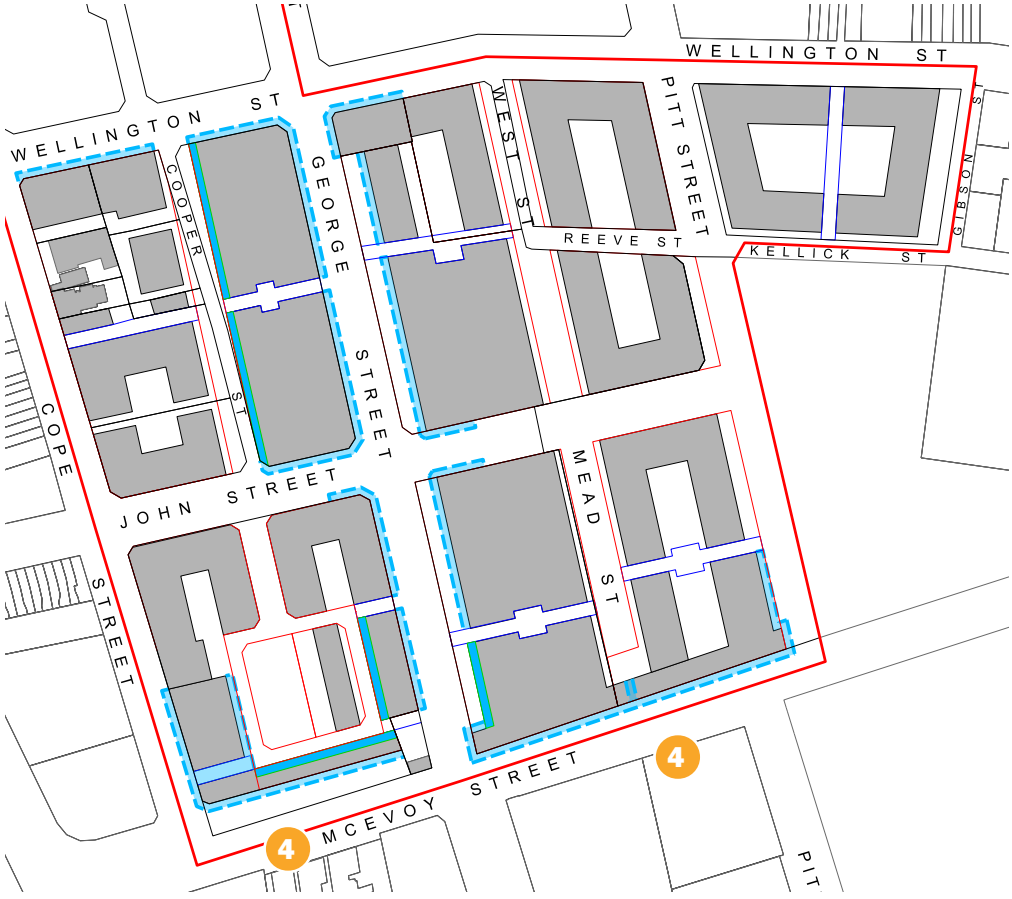
A comfortable and activated public domain will contribute to the wellbeing and safety of its users to nurture a socially and environmentally sustainable place for people.

Key Observations

1. Extension of active frontage of the 2 lane ways to the east of George Street does not connect to the street beyond.
2. Active frontage east of McEvoy Street is very close to the busy road.
3. No active frontage to the built form adjacent to the small south east park.
4. Awning are allocated below tower to levitate the effect of down draft wind.
5. Solar access to open spaces (streets, parks, courtyards etc) within in the precinct could be compromised by tall and long buildings, creating cold and dark conditions during winter.

Proposed George Street activation and character.
Source: City of Sydney Urban Design Report.

Active Frontage Source: Draft Waterloo Estate (South) Design Guide 2021



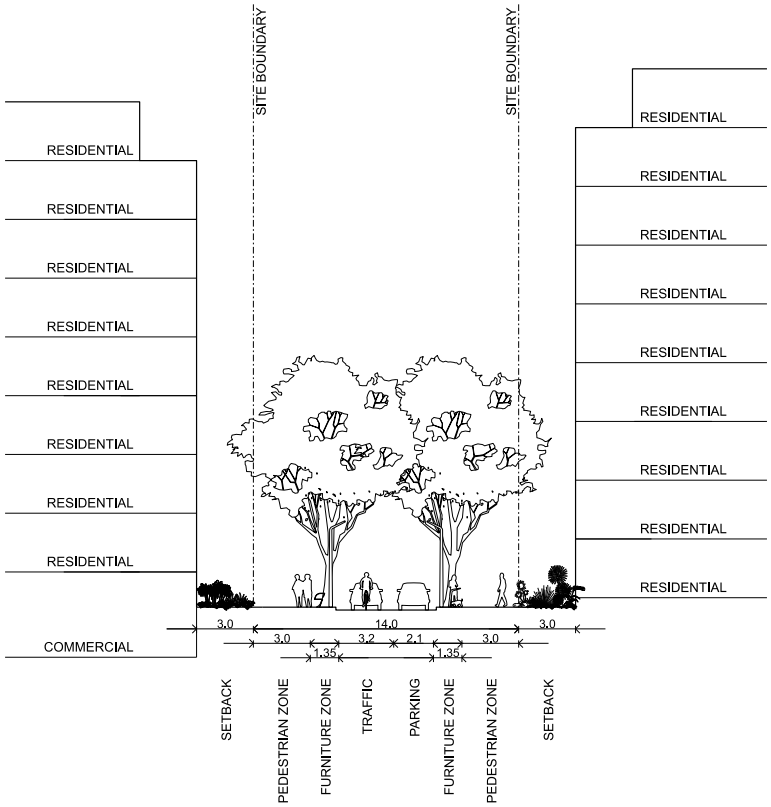
Awnings & Colonnades Source: Draft Waterloo Estate (South) Design Guide 2021

3.12 SETBACKS

Setbacks to streets and built form to consider use, pedestrian comfort, visual impact, overshadowing, and opportunity for tree retention, to ensure a comfortable urban environment and legibility of built form and streets.

Key Observations

1. Setbacks should relate to use, thermal comfort, opportunities for existing tree retention etc.
2. Inconsistent application along Pitt Street
3. East and west blocks of McEvoy Street have inconsistent setbacks. No setback provision to the eastern block to allow tree retention.
4. No setback provision along Wellington Street, particularly on the eastern end of the site where development interface with existing terrace houses.
5. Review setback on the western block, corner of John and Cope Street.
6. The prescriptive nature of the HOB provision and the inconsistent setback provision further limits flexibility and legibility of the precinct.
7. Setbacks on the upper level are in place to reduce the bulk and scale of the building. This require further investigation together with the height of building.
8. Further clarity required for the upper level setback provision.
9. Ground level setback and relationship to tree retention



Mead Street section Source: Draft Waterloo Estate (South) Design Guide 2021

Ground Setback Source: Draft Waterloo Estate (South) Design Guide 2021

Upper Level Setback Source: Draft Waterloo Estate (South) Design Guide 2021

3.13 URBAN TREE CANOPY & TREE RETENTION

Due to the use and existing built form of the site, a significant number of large established trees occupy the precinct, creating a distinct urban and environmental character.

Key Observations

1. A large number of existing trees are retained along George Street with the provision of setback within the CoS Planning Proposal
2. On the corner of McEvoy Street and George Street, a large number of trees are removed to make way for proposed building mass. Some of the existing trees in this location could be beneficial to buffer noise and pollution from McEvoy Street
3. Due to the perimeter apartment model, a number of large established trees are proposed to be removed on the North East portion of the site as well as along John Street. One of the key items to address from the Department is mitigating urban heat island effect, tree canopy is a key contributor in reducing impact.
4. On the west end of Wellington Street, potential for additional tree retention to provide better interface with existing terrace houses.
5. Courtyards within the perimeter block model provides opportunity for future tree planting - review building height to ensure adequate solar access to courtyards.
6. Ensure sufficient depth for deep soil zone is allowed with basement design.

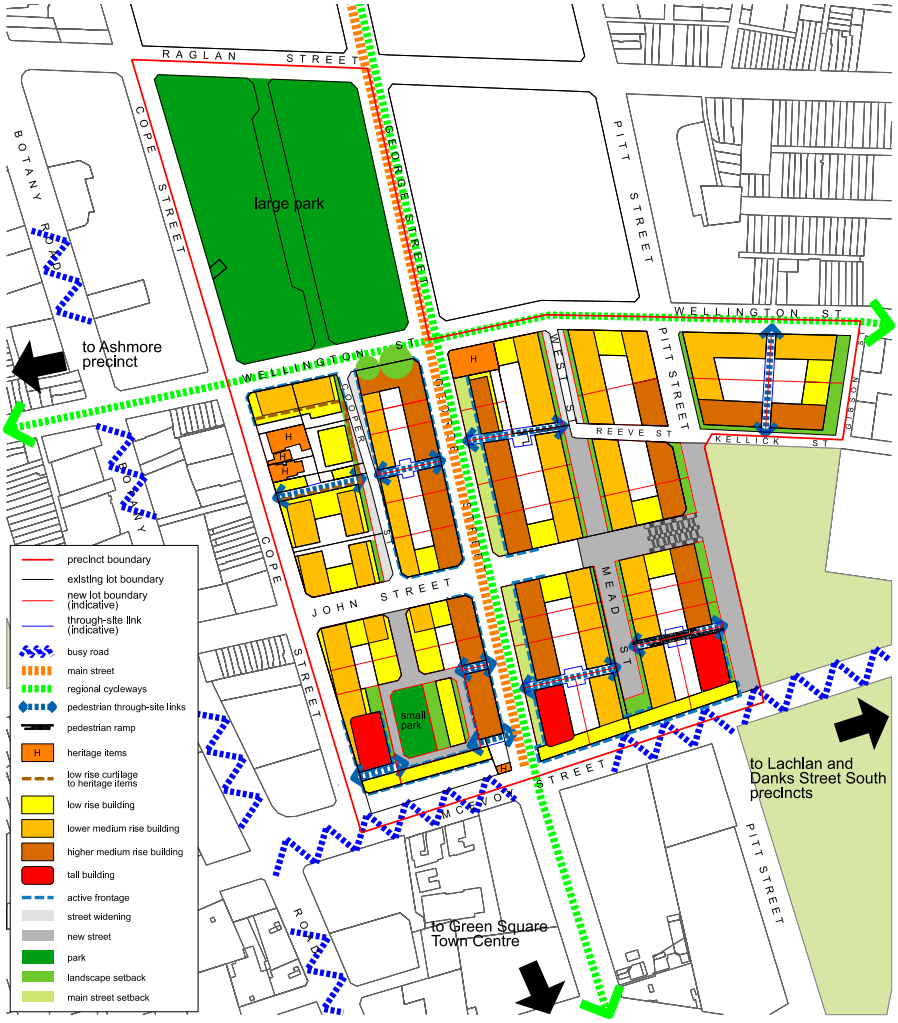
Source: Draft Waterloo Estate (South) Design Guide 2021

3.14 CONNECTIVITY & PERMEABILITY

The master plan follows existing urban and street grid with additional mid block connections to maximise permeability across the precinct.

Key Observations

1. The proposed street blocks knit Waterloo South into its urban context and replace former streets that existed prior to its creation as a public housing precinct.
2. No provision for pedestrian connection from Mead Street through to McEvoy Street.
3. No provision for pedestrian connection from small park through to McEvoy Street.
4. Vehicular connection blocked from George Street to McEvoy Street - CoS Planning Proposal notes that the blocked entry from McEvoy Street is to avoid 'rat runs' through precinct. Pedestrian and cycle permeability at this intersection is provided.
5. The location of mid block links provide additional permeability to long street blocks, and are appropriately located.
6. The character of the mid block connections requires careful design attention owing to the scale of adjacent buildings.
7. Mid block links need to be designed to accommodate CPTED principles



Source: Draft Waterloo Estate (South) Design Guide 2021

8. Connection of proposed south west small park to George Street and to Cope Street provides for public accessibility. Additional connections to Cope Street and McEvoy Street can be considered.

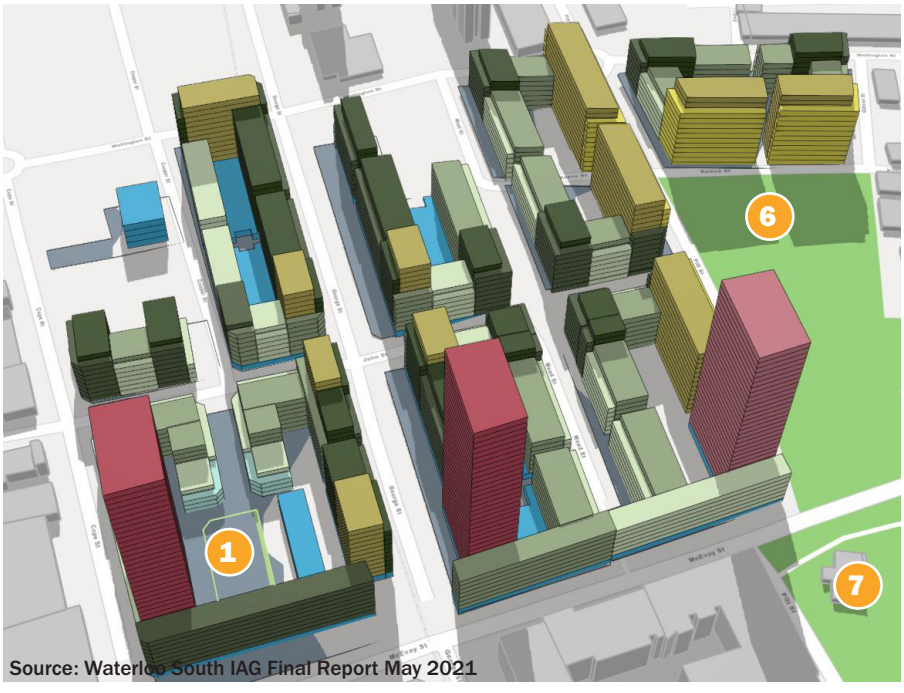
Source: Draft Waterloo Estate (South) Design Guide 2021

3.15 OPEN SPACES

Open spaces provide gathering places for visitors and residents. Quality of these spaces will have significant contribution to social and environmental sustainability.

Key Observations

1. Location of smaller park to the south west is very contained. Solar access to the park is potentially impacted by the surrounding building mass.
2. Internal court yard solar access potentially compromised by the mid/high density perimeter apartment model
3. High street wall along George Street limiting solar access at street level
4. 'Publicness' and width of mid block connections
5. Pitt Street / 'Waterloo Park' overshadowed - but it is heavily treed, so impact may be negligible.
6. Potential overshadowing impact to Waterloo Oval from tower mass
7. Overshadowing impact of towers to Waterloo Park
8. Stairs to the east of John Street - require more clarification on the character of this space - potential requirement on solar access. Potential to embed public use for activation.
9. George Street setback has a 50% deep soil provision - requires clarification.
10. The proposal seeks to maximise green roof and rooftop communal open space. This enables environmental and social sustainability. Review the configuration of green roof with height of building to enable flexibility.
11. Provision for PV on rooftop not defined



Source: Waterloo South IAG Final Report May 2021

Ground level planting/deep soil Source: Draft Waterloo Estate (South) Design Guide 2021

Rooftop communal open space and green roofs
Source: Draft Waterloo Estate (South) Design Guide 2021

3.16 APARTMENT AMENITY

Climate responsive design provides good amenity for the future residents of Waterloo through careful consideration of solar access, view, privacy, ventilation, acoustic and thermal comfort.

Key Observations

1. Floorplate width allows good natural cross ventilation.
2. Orientation of building mass presents challenge for solar compliance on the west facade living/private open space. The current street grid orientation is slightly off north to allow sun into living/private open space at 1pm mid winter to achieve a minimum of 2 hour solar access between 9:00am and 3:00pm.
3. Building separation and height presents potential challenge for solar access to contained courtyards and buildings with lower height.
4. Potential inadequate building separation within the blocks to the west of Pitt Street where buildings are between 9 -13 storeys. A minimum of 24m is required
5. Potential inadequate building separation within the blocks to the west of George Street where buildings are between 8 -11 storeys. A minimum of 18m is required
6. Building massing along McEvoy Street is very narrow, may result in bedrooms to be located on the McEvoy Street frontage which is noisy and polluted. Building mass does not provide enough depth to achieve good apartment amenity.

Table 1 Minimum building separation increases proportionally to the building height

Building height	Separation distance
9 storeys and above	12-24m
Up to 8 storeys	9-18m
Up to 4 storeys	6-12m

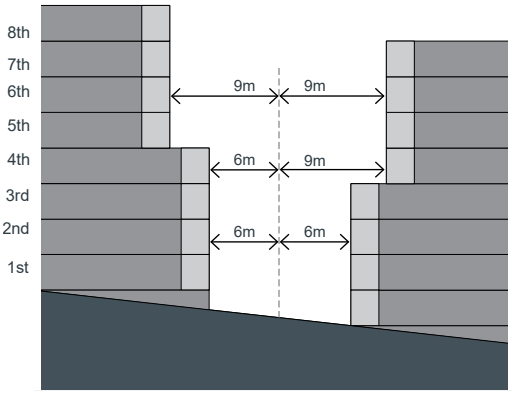
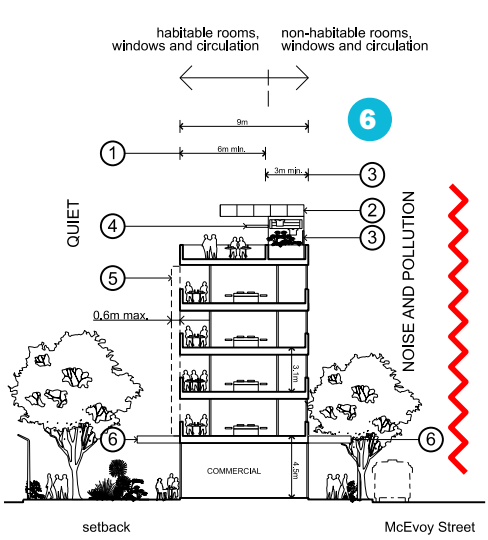


Figure 3F.4 Within the same site, minimum separation should be shared equitably between buildings. On sloping sites, appropriate separation distances ensure visual privacy for apartments on different levels

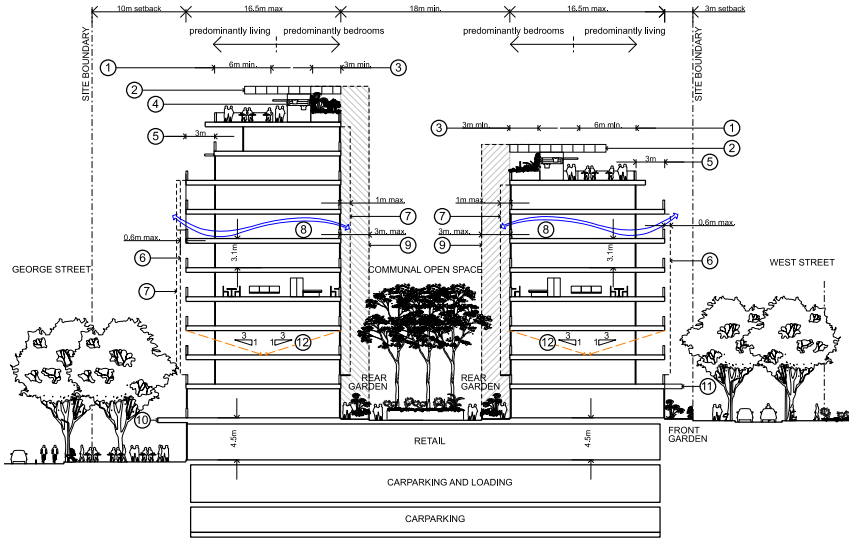
Minimum building separation requirement

Source: Apartment Design Guide

Source: Draft Waterloo Estate (South) Design Guide 2021



McEvoy Street building section



George and West Street building section

Source: Draft Waterloo Estate (South) Design Guide 2021

3.17 CPTED PRINCIPLES

Building height and separation may create uninviting mid block links posing safety concerns for users.

Key Observations

1. The connectivity and permeability proposed within the precinct provides multiple access and exit points to streets and public open spaces to encourage activity, enabling a greater level of security.
2. Narrowness and publicness of mid block links. Due to the relative narrowness of these mid block links, the elevation facing the links will have limited visual connection to provide passive surveillance after hours (having regard to ADG separation requirements).
3. Notches within the mid block links provide potential opportunities for hidden spaces with limited sight line from the main streets. Potential safety concerns after hours. Careful design and activation of the mid block links is therefore critical.
4. Height of building adjacent to mid block link may create an unfriendly environment - windy and overshadowed. May deter people from using the links hence reducing passive surveillance.
5. Access and security to courtyards that are open onto the streets - minimise opportunity for tailgating through design.
6. Potential viability of landscaping due to overshadowing of built form with impact to its attractiveness to future residents.

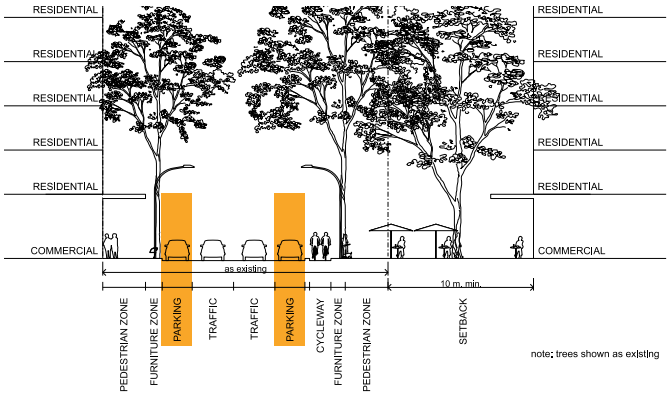
Source: Draft Waterloo Estate (South) Design Guide 2021

3.18 CAR PARKING

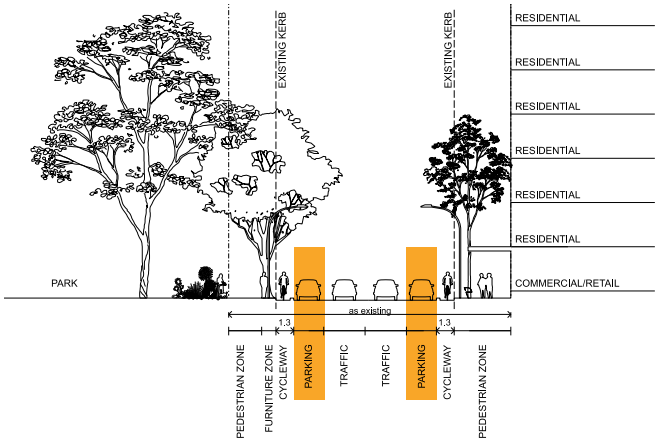
The precinct is located in close proximity of the future Waterloo Metro station, providing great transport access for the future users. Parking provision should be kept at a minimum to prioritise pedestrians and cyclists.

Key Observations

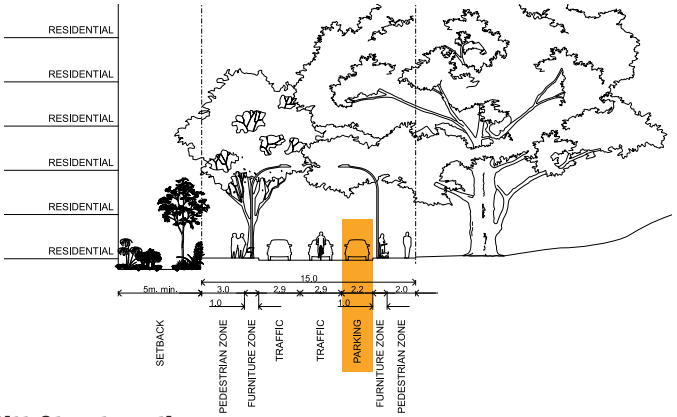
1. No proposed parking entry on George Street to maximise activation and safety.
2. Review efficiency of basement parking planning to allow for deep soil zone in courtyard.
3. Consolidated car park may impact staging and future strata definition
4. On street parking along George Street, Wellington Street, PItt Street, Cooper Street, West Street and Mead Street.



George Street section



Wellington Street section



Pitt Street section

Source: Draft Waterloo Estate (South) Design Guide 2021

Source: Draft Waterloo Estate (South) Design Guide 2021

3.19 SUMMARY OF OBSERVATIONS

1. The planning proposal is seeking to negotiate the significant challenge of meeting both a high requirement for yields (thereby allowing LAHC business case compliance) and achieving an amenable and comfortable neighbourhood.

2. The overarching urban design principles of the planning proposal, and its resultant urban arrangement, are sound.

3. Amenity, urban comfort and character should be the drivers for any changes to the proposed built form as a result of this urban design review.

4. Any redistribution of floor space resultant from this urban design review will need to promote:
   - → neighbourhood amenity, via tree canopy cover, retention of trees, wind impact amelioration and pedestrian permeability
   - → Apartment amenity, via access to sunlight, appropriate building separation and envelope flexibility for innovative design

Source: Draft Waterloo Estate (South) Design Guide 2021

TECHNICAL ANALYSIS OF THE PLANNING PROPOSAL

4.0 OVERVIEW

Technical analysis is undertaken on the Planning Proposal against the key items outlined in the Gateway Determination and Apartment Design Guide to ensure the key objectives are met.

4.1 Gateway Determination

Below are they key items in the Gateway Determination that require further assessment.

The items highlighted may have yield implications, and so the approach to any reduced yield on LAHC owned land has been to replace it in other areas of the precinct where amenity impacts are lessened.

- → Enable the orderly redevelopment of Waterloo Estate (South);
- → Study & confirm affordable housing % to ensure project feasibility
- → Heritage assessment - relationship between proposed building envelopes and adjacent heritage and conservation areas
- → Urban tree canopy - study additional opportunity for tree retention on site
- → Opportunities to mitigate urban heat island effect through design
- → Provide flexibility in the definition of height of building. Current HOB map prescribes a particular development concept to be carried out rather than providing flexibility to encourage innovation
- → Review bulk and scale of the buildings to achieve better place and urban design outcome.
- → Review B2 centre as proposed and its potential impact to the hierarchy of other centres
- → Review proposed FSR - suggest to increase base FSR to 2:1 with access to bonus FSR through competitive design process
- → Outline how the proposed/ recommended building envelopes address level change, particularly towards the north east.
- → Flood study
- → Detailed study on appropriate GBA:GFA:NSA efficiency for feasibility calculation

In addition to the Gateway Determination key items, the technical analysis also includes assessment of the Planning Proposal against Apartment Design Guide (ADG) on a number of items:

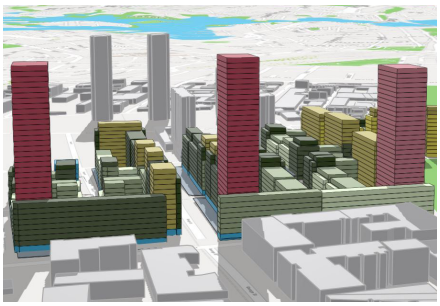
- → Building separation
- → Solar access to apartment
- → Solar access to public open space

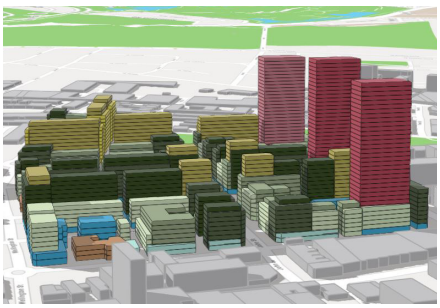
IAG Recommendations

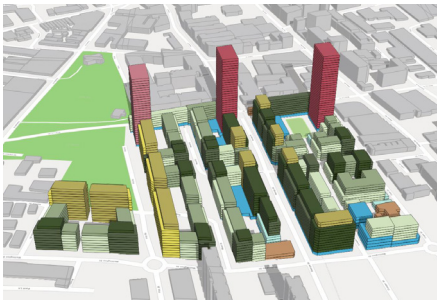
The IAG's review of the Planning Proposals for Waterloo South has resulted in two main conclusions. The first relates to the design inherent in the Council's Planning Proposal and the second relates to the provision of affordable housing in a financially feasible way.

→ With regard to the first, the IAG supports the urban typology of the Council Planning Proposal but has made some suggestions to redistribute street wall heights in order to improve the solar access to streets, courtyards and apartments.

→ With regard to affordable housing the IAG concludes that the provision of affordable housing on this site, in addition to 30% social housing is essential. This housing tenure is key to achieving a diverse community, to enabling transition through the housing continuum and to meeting the clear needs for affordable rental in this part of Sydney. A target of 10% is established, and the IAG has suggested an innovative method to achieve this in a financially feasible way.







Source: Waterloo South IAG Final Report 2021

4.1 OVERVIEW OF OPTIONS

An iterative options analysis was undertaken in order to test modifications to the planning proposal.

City of Sydney Planning Proposal - Option 01

Envelope represents the City of Sydney planning proposal.

Axonometric of Planning Proposal and surrounding built form

Urban Design Study - Option 02

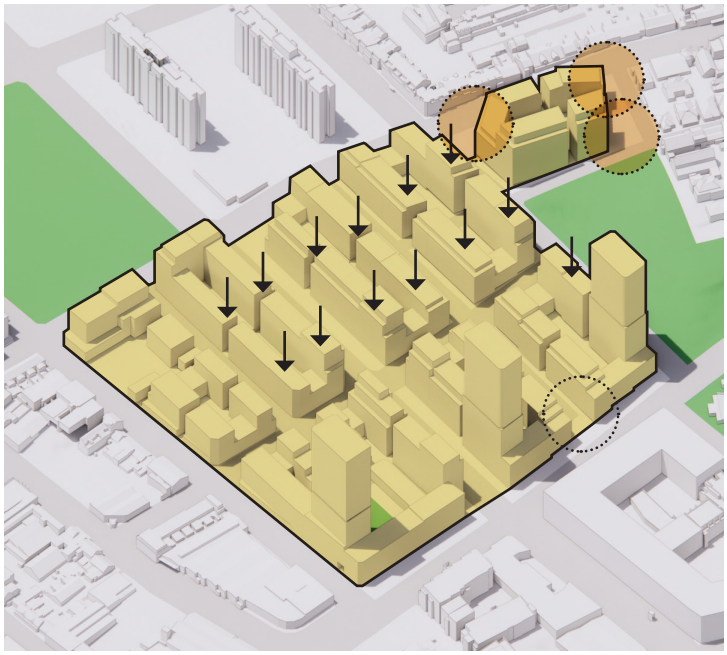
Heights of central perimeter buildings reduced to enhance solar access.

Enhanced tree retention.

Tower infill.

Defined street blocks to McEvoy and reduced building lengths.

Additional permeability from the small park to Cope Street and George Street.

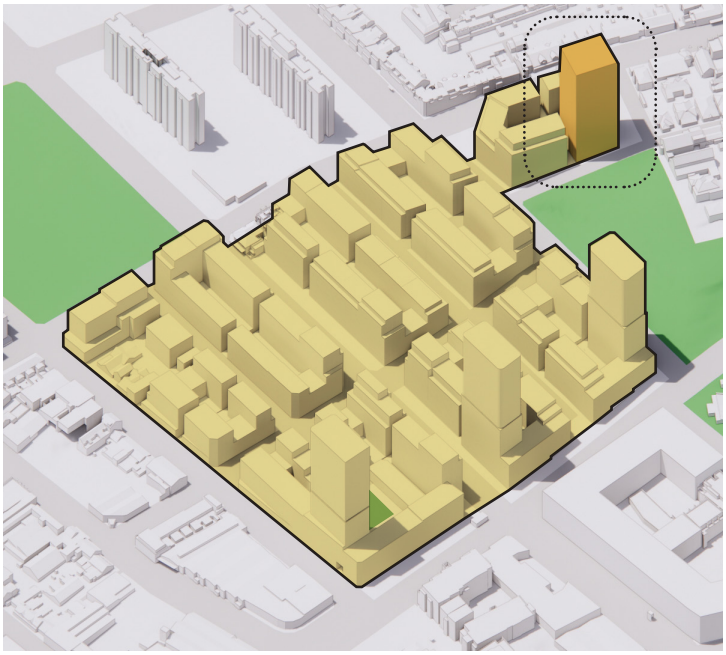


Axonometric of amended Planning Proposal Option 2 and surrounding built form

Urban Design Study - Option 03

Consistent with option 02 with additional south eastern tower to reduce floor space lost (equivalent to the floor space).

Tower at the relative floor height to the other towers.



Axonometric of amended Planning Proposal Option 3 and surrounding built form

Urban Design Study - The preferred direction

Perimeter blocks per City of Sydney heights, but with enhanced emphasis on street wall height variation.

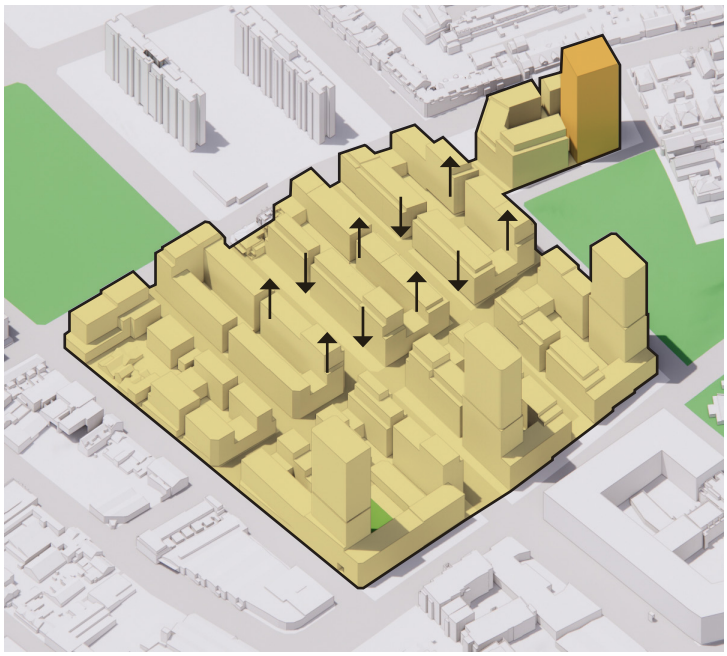
Additional tree retention to north western street block and McEvoy Street.

Tower infills to provide design flexibility.

Additional permeability for pedestrians and cyclists to McEvoy Street from Mead Street, and to the small park.

Additional tower at north eastern street block, up to the RL of the three McEvoy towers.

Envelope flexibility to promote differentiated heights.



Axonometric of amended Planning Proposal Option 4 and surrounding built form

4.2 AREA ASSUMPTION

The adjacent table illustrates the reviewed area schedule based on the revised the model (option 4).

Efficiencies

There has been considerable engagement with LAHC, the City of Sydney and DPIE with regard to building efficiencies. The efficiency assumptions are important as they influence the amount of floor space contained within the envelope, and the relative density of the project area.

In IAG report, the area efficiencies adopted for residential are as below:

GEA : GFA	85%
GFA : NSA	80%

The LAHC proposal has adopted the below area efficiency for residential:

GEA : GFA	75%
GFA : NSA	82.5% - 85%

The lower GFA:NSA assumption in the Planning Proposal considers a less efficient building typology compared to the LAHC proposal's tower typology.

Through design typology comparisons, and stakeholder inputs, the efficiencies have been refined for the purposes of this review. These efficiencies are broken down by building type, and reported in the table to the right.

Total floor space on LAHC owned land

Achieved (LAHC only)	GEA	GFA	NLA/NSA
Residential	328,205	246,154	205,084
Non - residential	23,452	18,762	16,885
	351,657	264,915	221,969

Applied efficiencies

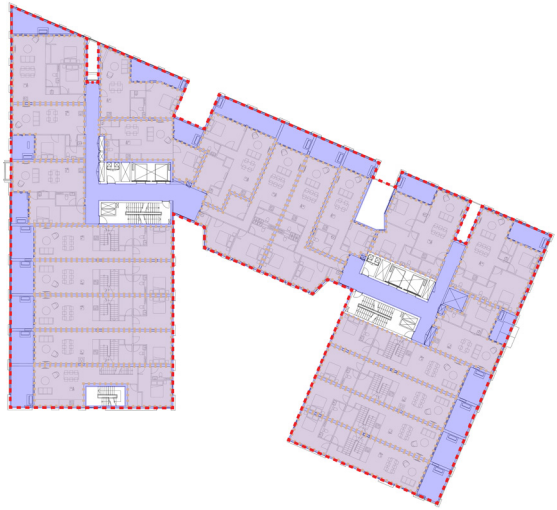
	Perimeter Block		Tower	
Residential	GFA : GEA	75.0%	GFA : GEA	75.0%
	NSA : GFA	82.5%	NSA : GFA	85.0%
Non-Resi	GFA : GEA	80.0%		
	NSA : GFA	90.0%		

A detailed yield schedule is provided in the report appendices.

Planning Proposal - potential FSR per development block

4.2 AREA ASSUMPTION

The following projects are provided as examples to benchmark the translation of GBA to GFA to NSA. The efficiency of buildings varies depending on height, extent of core and common facilities, general building quality, apartment mix and typology. The breadth of efficiency variation shown here demonstrates a need to be relatively conservative at the planning stage, where design has not been developed in detail.



Scale 1:1000 @A1

Telopea by Bates Smart

The area efficiencies adopted for residential are as below:

GBA/GFA	93%
GFA/NSA	87%

GBA:	2,345m²
GFA:	2,185m²
NSA:	1,901m²

GBA boundary
GFA boundary
NSA boundary

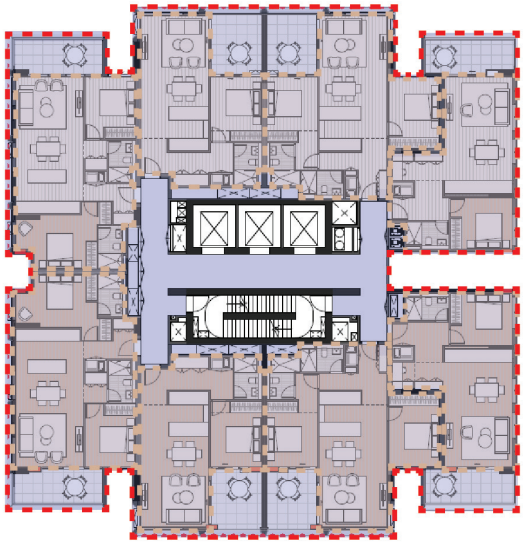
Waterloo by Hassell

The area efficiencies adopted for residential are as below:

GBA/GFA	71.2%
GFA/NSA	86.9%

Total apartments = 170 apts

3 Beds	10/4%
2 Bed	88/48%
2 Bed + Study	4/3%
1 Bed	68/45%



GBA boundary
GFA boundary
NSA boundary

GBA:	860m²
GFA:	613m²

Summer Hill by Hassell

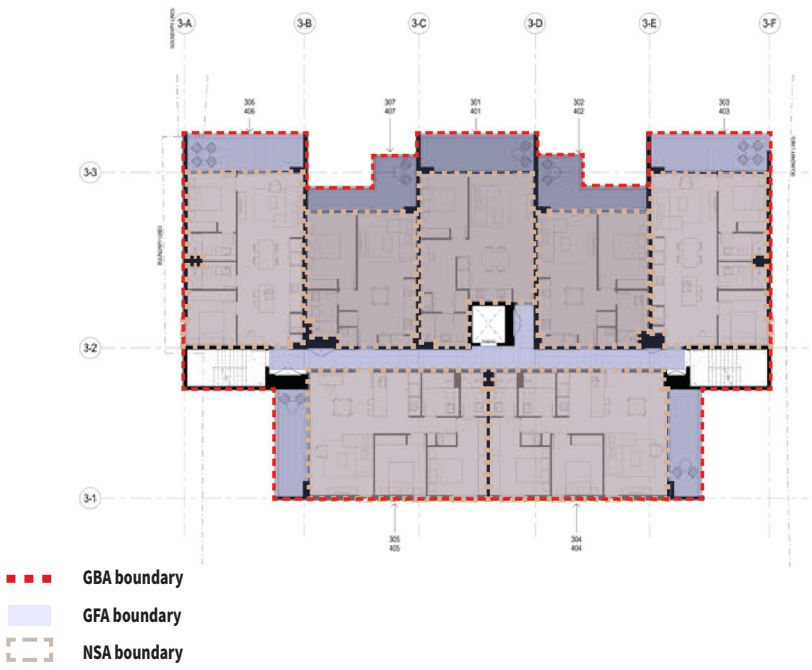
The area efficiencies adopted for residential are as below:

GBA/GFA	67%
GFA/NSA	80.4%

Total apartments = 375 apts

Townhouse,

4 Beds	10/3%
3 Beds	41/11%
2 Bed	260/69%
1 Bed/Studio	64/17%

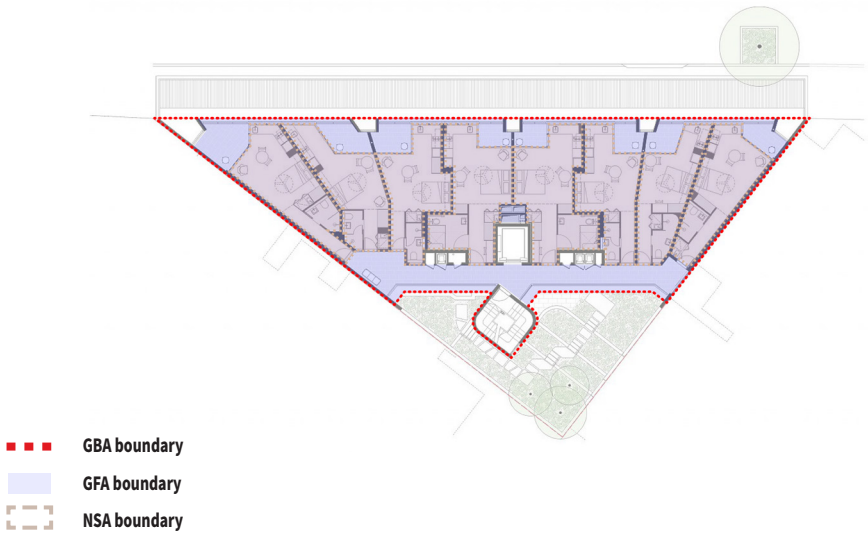


Dulwich Hill by Hill Thalis

The area efficiencies adopted for residential are as below:

GBA : GFA	90.7%
GFA : NSA	65.6%

GBA:	386.8m²
GFA:	351.2m²
NSA:	230.4m²

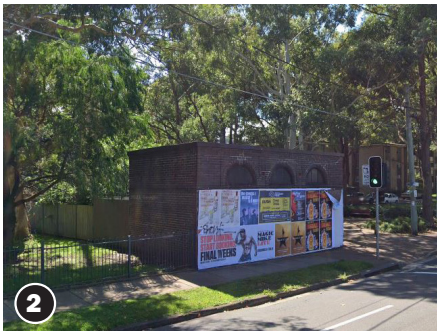


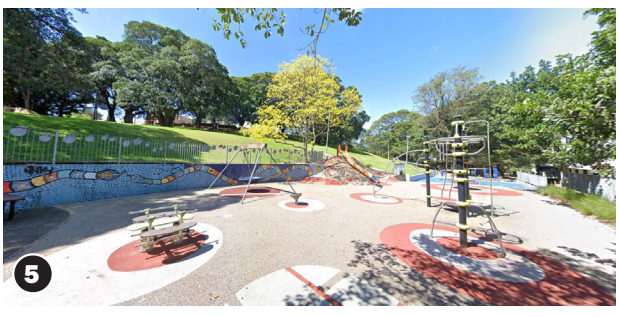
Scale 1:200 @A1

4.3 HERITAGE

The site interfaces with a number of heritage items and conservation zones. The proposed height and built form within the site should provide a considered contextual response at these junctions.

1. Duke of Wellington Hotel is a 2 storey building located on the corner of Wellington Street and George Street. The proposed building to the east is between 11 and 13 storeys.
2. The existing substation on McEvoy Street is a 1 storey building that sits adjacent to footpath.
3. The existing terraces here are surrounded by relatively low built forms transitioning to taller buildings
4. The heritage conservation zone along Wellington Street consists of 2 storey terraces. It interfaces with proposed buildings of 8 and 9 storey height.
5. Waterloo park interfaces with proposed buildings along Kellick and Pitt Street. The proposed buildings are between 11 and 27 storeys.

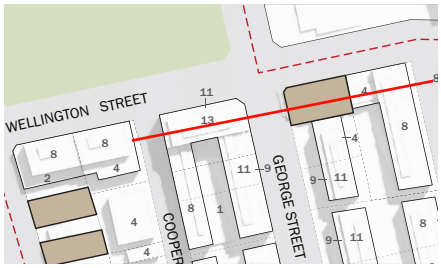




1. Duke of Wellington Hotel
2. Terraces on Cope Street
3. Substation
4. Heritage Conservation Zone along Wellington Street
5. Waterloo Park

Sydney LEP 2012 Heritage Map

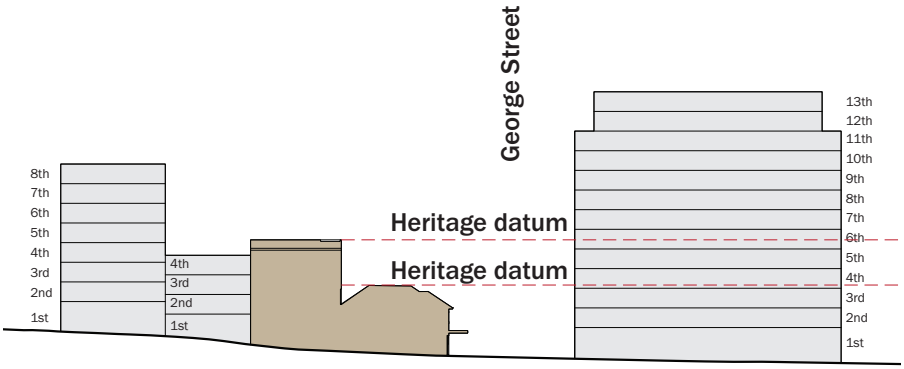
4.3 HERITAGE



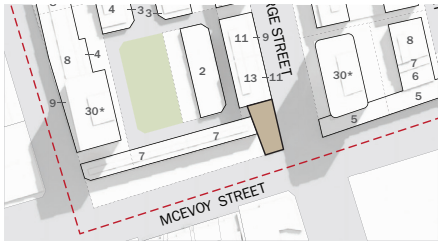
1. Duke of Wellington Hotel

The proposed built form west of George Street is between 11 and 13 storeys, a dramatic transition from the 2 storey heritage building.

To include the provision of requiring the future development adjacent the Duke of Wellington Hotel to address the height change and respond to the datums of the heritage building in built form or architectural articulation.

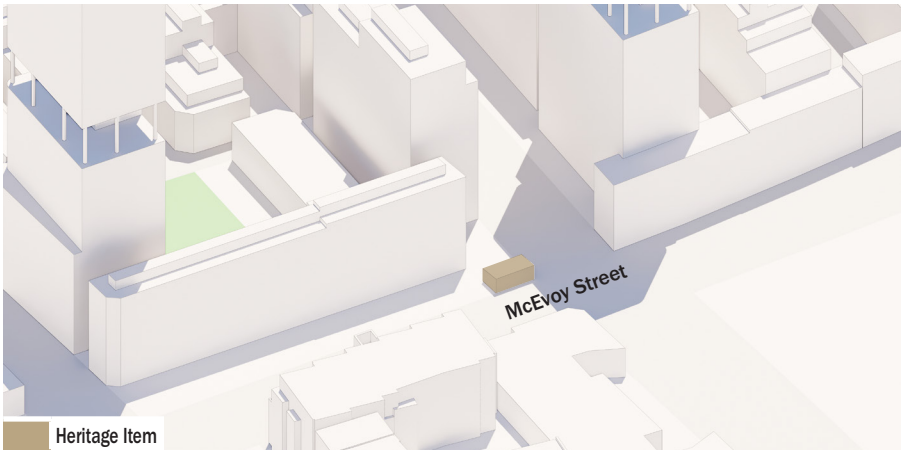


Proposed east west section through Duke of Wellington Hotel

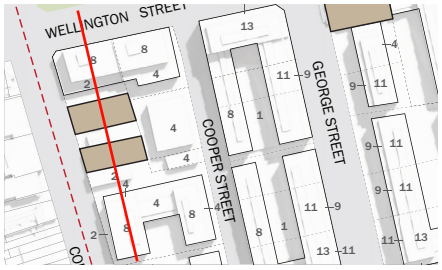


2. Substation

The existing substation on the corner of McEvoy Street and George Street will contribute to the character of the site. The public domain, foot path and built form surrounding it should be sympathetic to the existing heritage building.



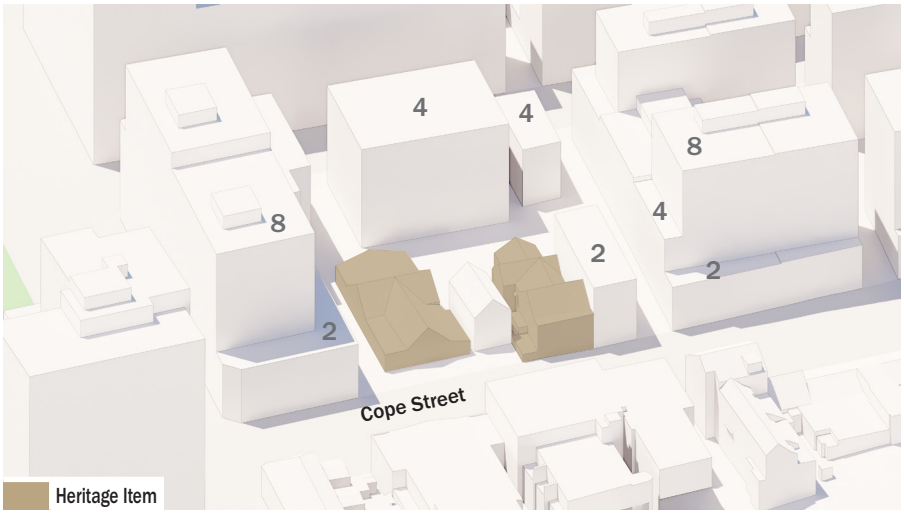
Axo of existing substation along McEvoy Street and surrounding proposed built form & urban condition



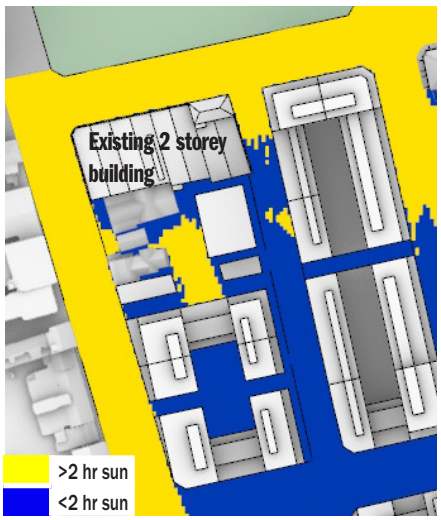
2. Heritage Terraces (Cope Street)

The proposal built form around the heritage terraces on the northern end of Cope Street are of small scale. Sets an appropriate height and transition to the taller buildings further away.

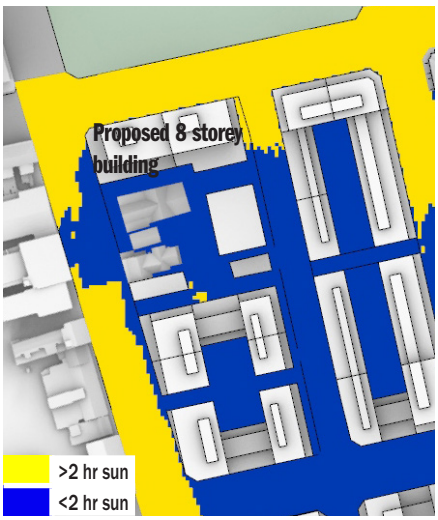
The proposed height to the north of the heritage items will create additional overshadowing between 9:00am and 3:00pm mid winter, resulting in the POS and potentially living room to receive less than 2 hour direct solar between 9:00am and 3:00pm mid winter.



Axo of heritage terraces along Cope Street and surrounding proposed built form

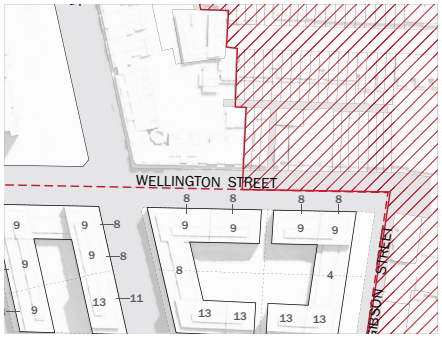


Existing condition



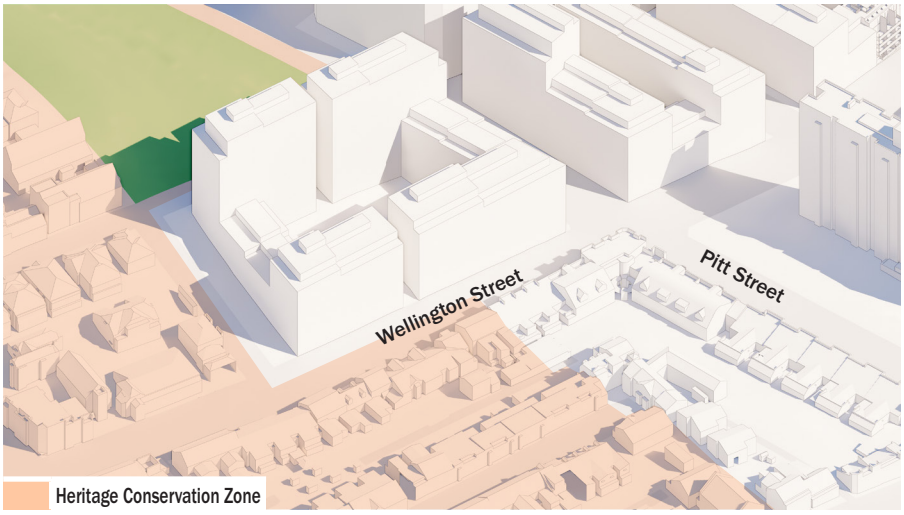
Planning Proposal condition

4.3 HERITAGE

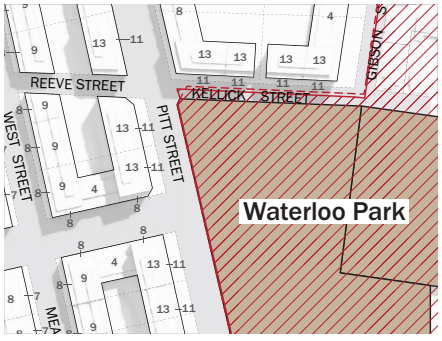


4. Heritage Conservation Zone

Transition and relationship to the heritage conservation zones should be carefully considered through the design of the building massing, bulk and scale. This is to be addressed in design guidelines.



Axo of heritage conservation zone along Wellington Street and surrounding proposed built form



5. Waterloo Park

The built form around Waterloo Park should be designed to ensure adequate sun access to the park in mid winter, as well as to adjacent residential properties. Additional tree retention within this north western street block would further improve the development interface to the small scale residential houses.

Axo of Waterloo Park and surrounding proposed built form

Source: Google maps Existing built form and surrounding context - View towards Gibson Street

Source: Google maps Existing built form and surrounding context - View towards Wellington Street

4.4 TREE CANOPY

Gateway Determination requested further assessment of the proposed tree retention and identify additional across the precinct, which will help with reducing heat island effect and retain character of the site.

A number of additional areas of existing trees have been identified for potential retention in additional to the Planning Proposal:

- → To the southern edge of the project area along McEvoy Street
- → North eastern street block along Wellington Street, Gibson Street and Kellick Street.

Aerial view of existing site

Planning Proposal - tree retention

4.4 TREE CANOPY

The existing trees along McEvoy Street, showing a cluster providing canopy over the pedestrian footpath.

Retention of these trees could assist with noise amelioration to adjacent residential buildings.

Trees at the corner of Wellington and Pitt Street. These large, mature trees add significantly to the neighbourhoods existing character and should be retained.

Trees at the corner of Wellington and Gibson Streets. These large, mature trees add significantly to the neighbourhoods existing character and should be retained. Their retention will help improve the interface between the tall residential development of the planning proposal and the existing single storey residential terraces opposite.

The image below shows the impact of existing large trees at the corner of Gibson and Kellick Streets. These trees should be retained for interface, character and canopy benefits.

4.4 TREE CANOPY

McEvoy Street East Block

No setback requirement to the east block of McEvoy Street compared to the west. McEvoy Street is a busy street with high traffic and pollution. A large amount of trees are proposed to be removed with the built form from Planning Proposal. It is recommended to retain additional trees along McEvoy Street to provide better pedestrian as well as building amenity. Utilising existing trees as buffer between the street and the future apartments.

By setting back the east block along McEvoy Street, it allows additional trees to be retained. 2 high value trees will need to be removed so on balance, 5 moderate value trees and 2 high value trees will be retained through this recommended change in massing.

By allowing connection from Mead Street to McEvoy Street, an additional 2 high value trees can be retained. The connection can be non vehicular to provide pedestrian and cycle access only.

Opportunity along McEvoy Street for further tree retention

Recommended built form and additional tree retention along McEvoy Street east block

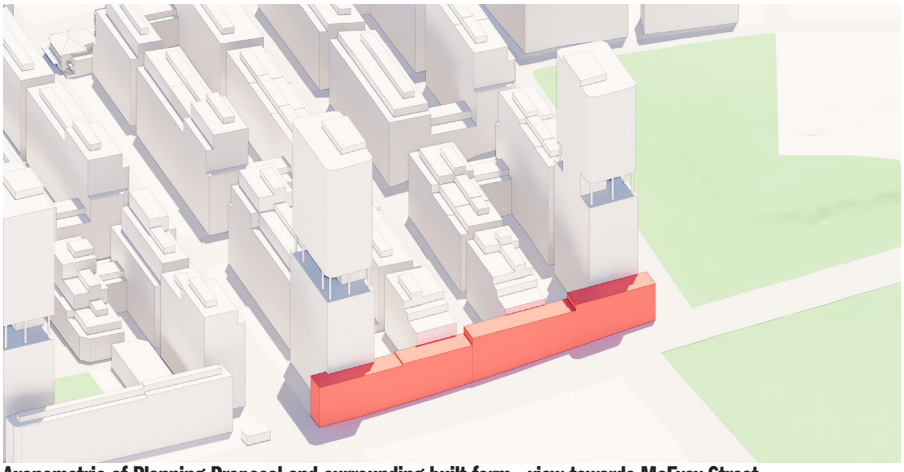
Recommended built form and additional tree retention along McEvoy Street east block providing access from Mead Street to McEvoy Street

- High value tree (Retained)
- Moderate value tree (Retained)
- High value tree (Removed)
- Moderate value tree (Removed)
- High value tree (Recom. to be Retained)
- High value tree (Recom. to be Removed)
- Moderate value tree (Recom. to be Retained)

Area Loss

GEA	GFA*	NSA
- 6,240m²	- 4,524m²	- 3,620m²

The lower levels highlighted in the adjacent diagram is recommended to be removed to allow additional tree retention as well as greater setback to McEvoy Street.

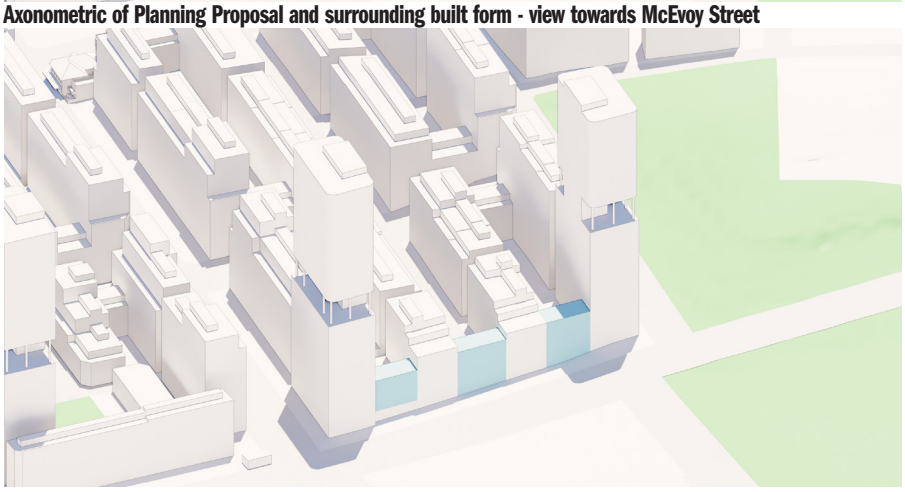


Axonometric of Planning Proposal and surrounding built form - view towards McEvoy Street

Option 1 Area Gain

GEA	GFA*	NSA
2,318m²	1,680m²	1,345m²

The gaps of the buildings are filled in with additional mass to create the perimeter block as well as blocking off Mead Street for vehicular access.



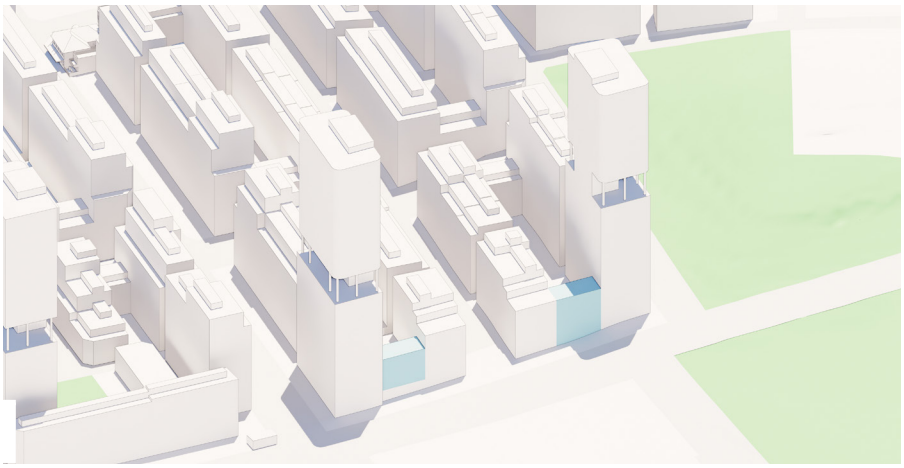
Axonometric of amended Planning Proposal and surrounding built form - view towards McEvoy Street

Option 2 Area Gain

GEA	GFA*	NSA
1,413m²	1,025m²	820m²

The gaps of the buildings are filled in with additional mass to create the perimeter block while allowing non vehicular access from Mead Street and McEvoy Street.

* GFA is based on the assumption of 72.5% of GEA



Axonometric of amended Planning Proposal and surrounding built form - view towards McEvoy Street

Built form lost due to additional tree retention

Built form gain replacing portion of area lost

4.4 TREE CANOPY

North East Block (Wellington St East)

The north-eastern street block contains a number of large and high value or moderate value trees.

These trees add significantly to the existing character and amenity of Waterloo.

By reorientating the courtyard arrangement of the buildings, significant trees at the intersection of Wellington and Pitt, Wellington and Gibson and Kellick and Gibson can be retained.

As these trees are located at the corners of buildings, they can also assist in mitigating wind downdraught.

Opportunity along McEvoy Street for further tree retention

Recommended built form and additional tree retention along McEvoy Street east block

- High value tree (Retained)
- Moderate value tree (Retained)
- High value tree (Removed)
- Moderate value tree (Removed)
- High value tree (Recom. to be Retained)
- High value tree (Recom. to be Removed)
- Moderate value tree (Recom. to be Retained)
- Retention to be investigated as part of design excellence

The diagram to the right shows the City of Sydney planning proposal. It contains a range of heights from four to 13 storeys.

The recommended amended building envelope shows greater setbacks for tree retention, as well as the addition of a tower for redistributed floor space (to account for improved solar access generally). The matter of floor space redistribution is discussed later in this report.

Planning Proposal Block 7A+7B

GEA	GFA*	NSA
35,052m²	25,413m²	20,330m²

Axonometric of Planning Proposal and surrounding built form - view towards Wellington Street

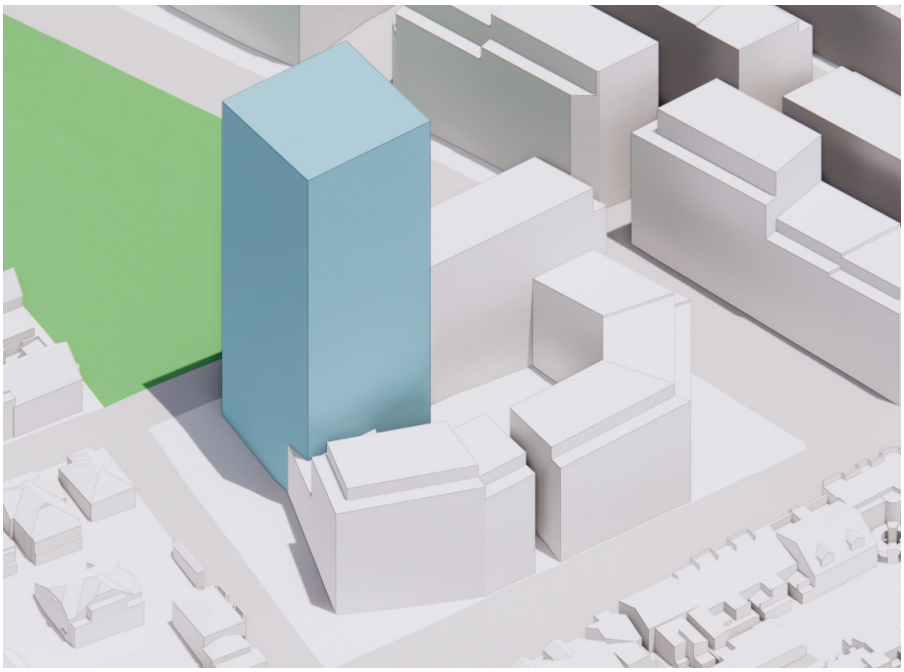
Amended Block 7A+7B

GEA	GFA*	NSA
42,914m²	31,113m²	24,890m²

Area Gain

GEA	GFA*	NSA
7,862m²	5,700m²	4,560m²

* GFA is based on the assumption of 72.5% of GEA



Axonometric of amended Planning Proposal built form - view towards Wellington Street

4.4 TREE CANOPY

Tree Retention Summary

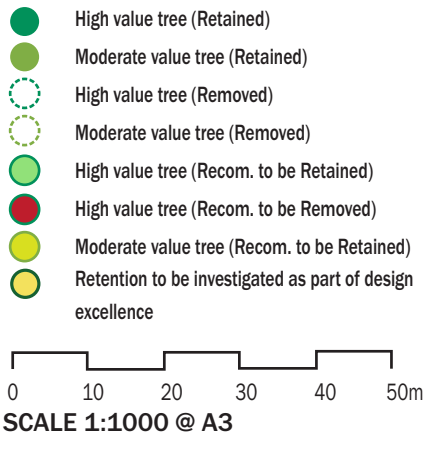
→ McEvoy East block to have further set back to allow additional tree retention along McEvoy Street. Allow additional permeability from Mead Street to McEvoy Street. Some of the area lost by allowing further setback is recovered through the reconfiguration of the preferred massing option.

→ North East block along Wellington Street to be reconfigured for additional tree retention, resulting in the below area difference:

Area difference

	GEA	GFA	NSA
McEvoy East Block	-4,827m²	-3,499m²	-2,800m²
North East Block	+7,862m²	+5,700m²	+4,560m²
Total	+3,035m²	+2,201m²	+1,760m²

A total of 3,035m2 of building envelope area is gained through the process of additional tree retention to ensure the key trees identified by the arborist are protected.



Amended Planning Proposal Building - Tree Retention

4.5 BUILDING SEPARATION

Adequate building separation is important to provide good privacy between habitable spaces as well as allowing sunlight into the apartments and open spaces between buildings.

The adjacent diagram extracted from ADG illustrates the minimum requirement for building separation.

The diagram on the following page highlights the blocks identified in the Planning Proposal that require further review to ensure building separation meets the minimum requirement of ADG to ensure privacy and other apartment amenities are met.

Table 1 Minimum building separation increases proportionally to the building height

Building height	Separation distance
9 storeys and above	12-24m
Up to 8 storeys	9-18m
Up to 4 storeys	6-12m

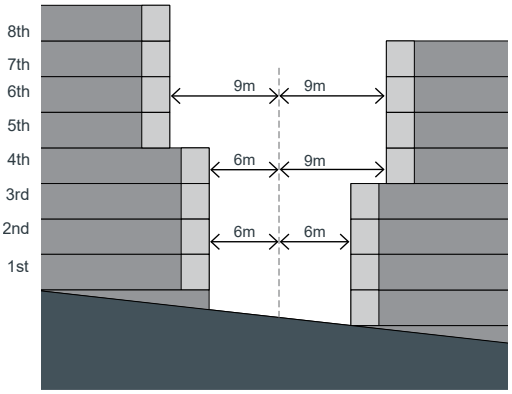


Figure 3F.4 Within the same site, minimum separation should be shared equitably between buildings. On sloping sites, appropriate separation distances ensure visual privacy for apartments on different levels

Objective 3F-1

Adequate building separation distances are shared equitably between neighbouring sites, to achieve reasonable levels of external and internal visual privacy

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:

Building height	Habitable rooms and balconies	Non-habitable rooms
up to 12m (4 storeys)	6m	3m
up to 25m (5-8 storeys)	9m	4.5m
over 25m (9+ storeys)	12m	6m

Minimum building separation requirement

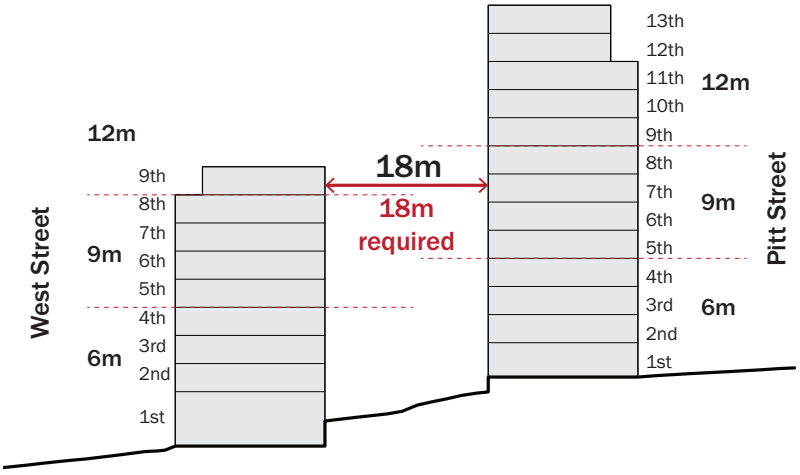
Source: Apartment Design Guide

Planning Proposal Building Height in Storeys and Building Separation

4.5 BUILDING SEPARATION

West Street - East Block

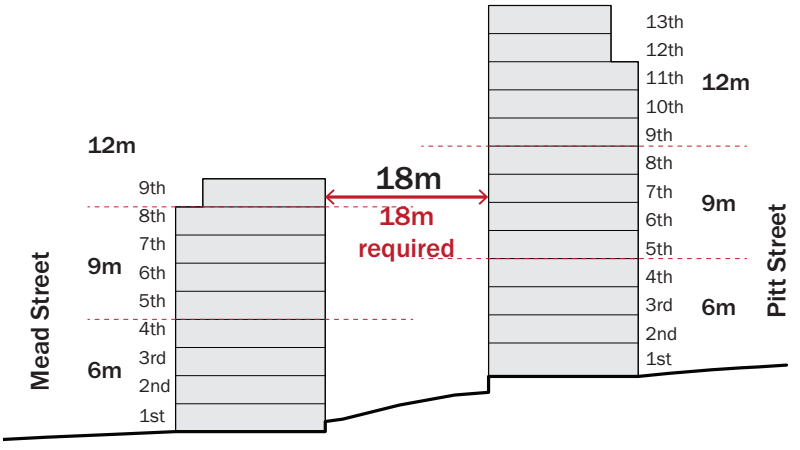
Sufficient building separation of 18m is provided. The existing topography slops down from Pitt Street to West Street allowing taller built form to be achieved with 18m building separation.



Proposed section through West Street east block

Mead Street - East Block

Sufficient building separation of 18m is provided. The existing topography slops down from Pitt Street to Mead Street allowing taller built form to be achieved with 18m building separation.

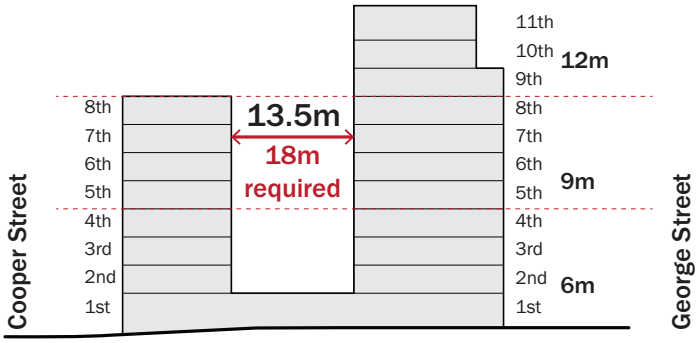


Proposed section through Mead Street east block

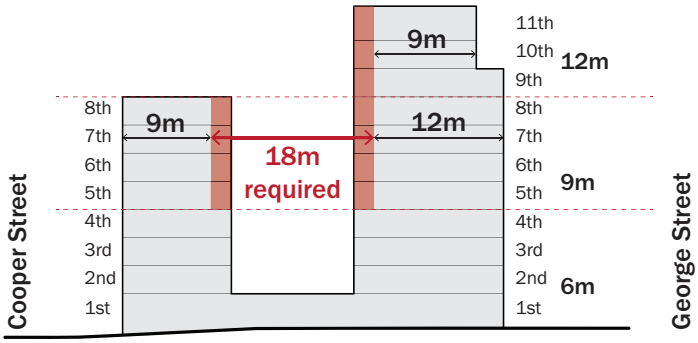
George Street - West Block

Based on a straight forward compliance check, Insufficient building separation of 13.5m is provided. According to ADG, a minimum of 18m separation is required between storey 5 and storey 8, 24m from level 9.

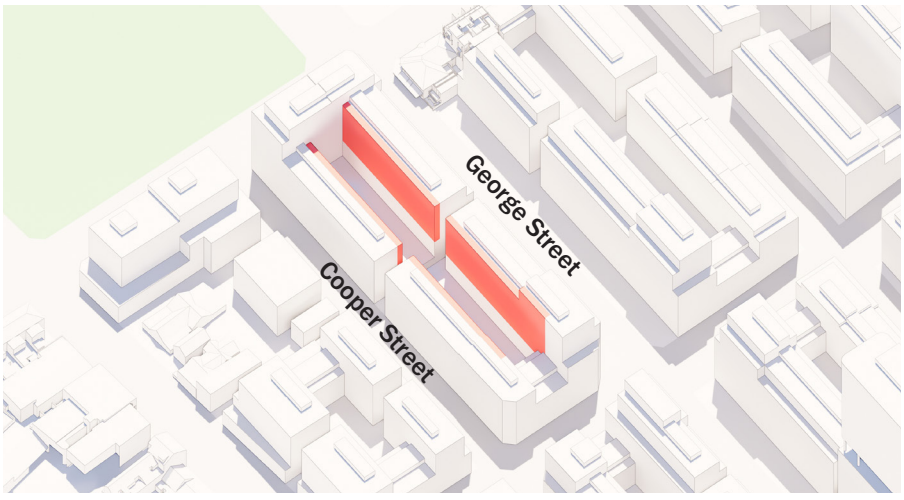
For the built form to comply with ADG requirements on building separation, it will require specific apartment design outcomes relating to layout and window placement.



Proposed section through George Street west block



Proposed section through George Street west block with ADG compliant building separation



Built form lost due to building separation requirement

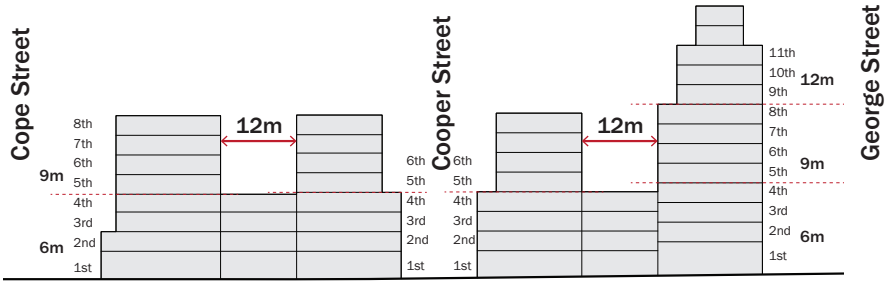
4.5 BUILDING SEPARATION

Cooper Street - South Block

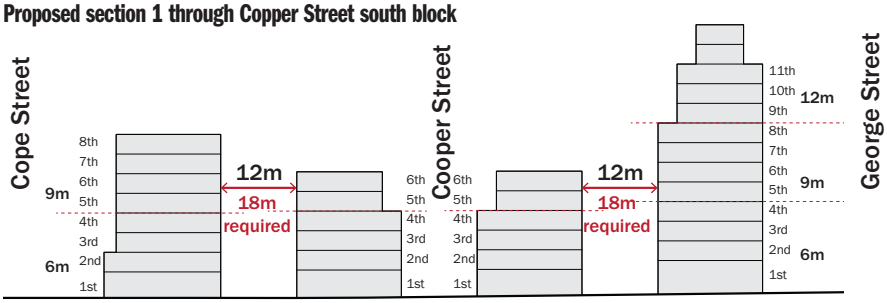
Cooper Street has been realigned in the Planning Proposal to create more consistent street blocks. George Street has been widened as it is proposed as the main commercial/ retail street within the precinct. The location and alignment of these two streets resulted in the maximum block width.

Insufficient building separation of 12m is provided. According to ADG, a minimum of 18m separation is required between storey 5 and storey 8, 24m from level 9.

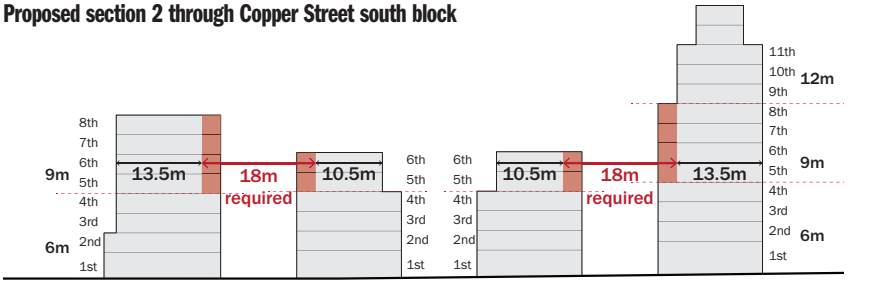
For the built form to comply with ADG requirements within the envelope, design attention to apartment arrangement and window placement is required. The recommended approach is to provide for compliance at a detailed design stage.



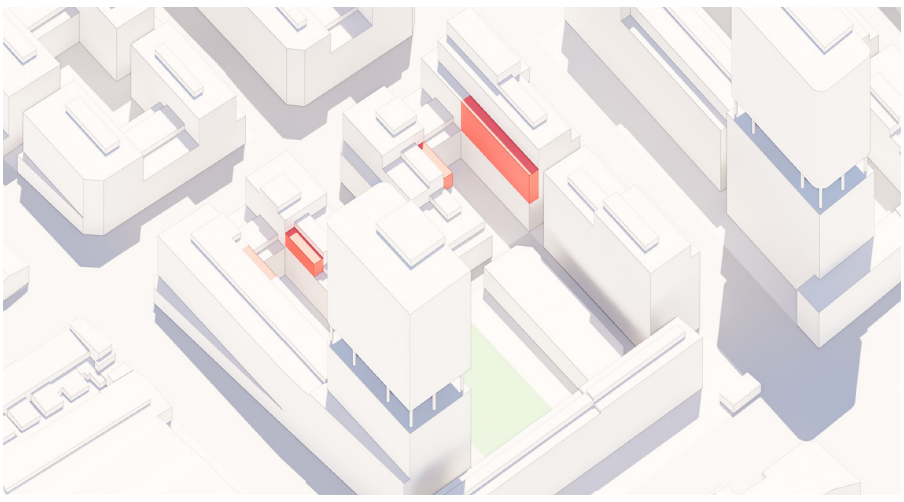
Proposed section 1 through Copper Street south block



Proposed section 2 through Copper Street south block



Proposed section 2 through Copper Street south block with ADG compliant building separation



Built form lost due to building separation requirement

Building Separation Summary

→ West Street and Mead Street west block building massing comply with the minimum building separation due to the slopped site condition.

→ George Street west block and Cooper Street south block will require specific apartment design outcomes to comply with the minimum requirement. As a result, the envelope has not been altered from the City of Sydney proposal.

4.6 SOLAR ACCESS

Streets and Open Spaces

Solar analysis based on ADG requirement, measuring between 9:00am and 3:00pm mid winter capturing the effective direct solar access.

Winter Solstice

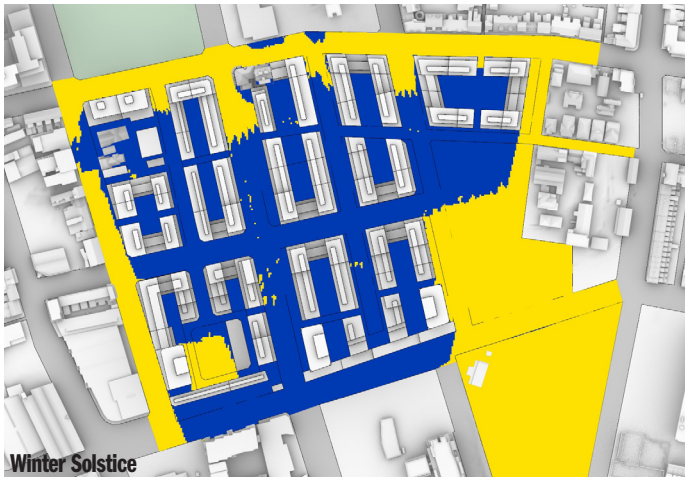
1. All shared courtyard spaces within the perimeter building blocks do not receive a minimum of 2 hour solar access between 9am-3pm mid winter
2. The majority of George Street, Mead Street, West Street, John Street and Cooper Street have minimal access to sunlight between 9am-3pm mid winter.
3. The south west park has good solar access mid winter.

Summer Solstice

4. Streets and mid block links have a minimum of 2 hours solar access.
5. A number of courtyards have less than 2 hour solar access while the others have partial access to a minimum of 2 hours sunlight.

Equinox

6. George Street has good access to sunlight
7. Majority of courtyards are overshadowed by the perimeter building blocks. The courtyard on the north east of the site and to the north east of George Street has some access to sunlight.



Solar analysis measuring between 9:00am and 5:00pm mid winter.

Winter Solstice

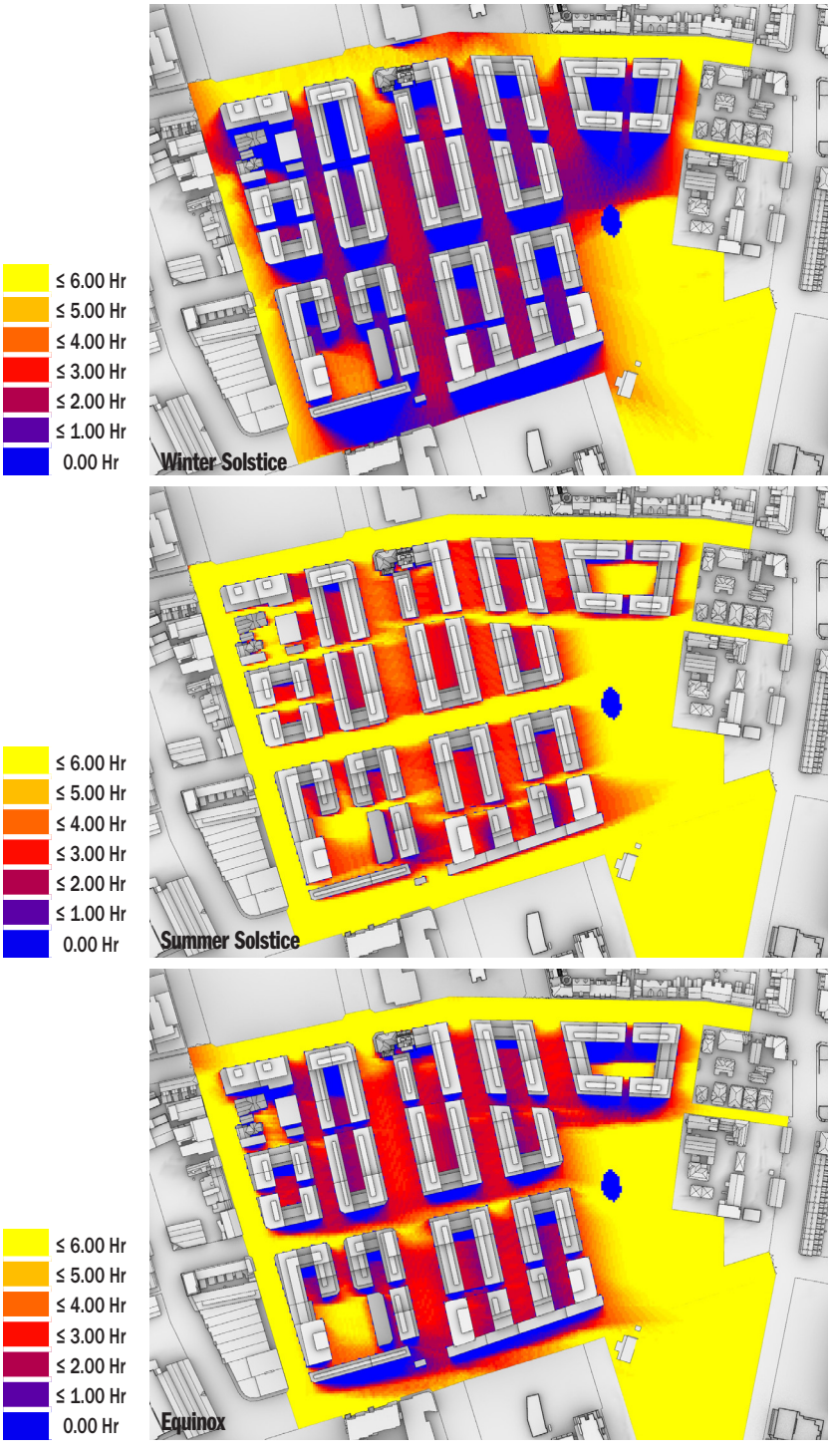
1. Majority of the courtyard spaces with in the perimeter building blocks do not receive more than 2 hours of solar access within the extended analysis hours of 9:00am and 5:00pm mid winter
2. There is a high degree of courtyard areas with no access to sunlight.
3. North south streets receives 2-3 hours of solar between 9am and 5pm mid winter.

Summer Solstice

4. Good level of solar access to courtyards and streets during summer.
5. East west streets receives more than 6 hours of direct solar during summer. Shading strategy should be considered.

Equinox

6. Majority of the courtyards receive between 2-3 hours of solar between 9am and 5pm in Spring and Autumn
7. The north south streets receives between 3-4 hours of solar between 9am and 5pm in Spring and Autumn



4.6 SOLAR ACCESS

Communal Open Space

Solar access is key to the usability, safety and environmental comfort of communal open space. While the Planning Proposal has nominated the rooftop communal open space as the principal usable part of the open space. It is imperative for the courtyard communal open space to gain adequate solar access to ensure it's usability.

The proposed built form of the Planning Proposal overshadows the internal courtyard where all courtyards receives less than 2 hour solar access between 9:00am and 3:00pm mid winter. This will result in cold and dark public spaces with limited sunlight to encourage plant growth.

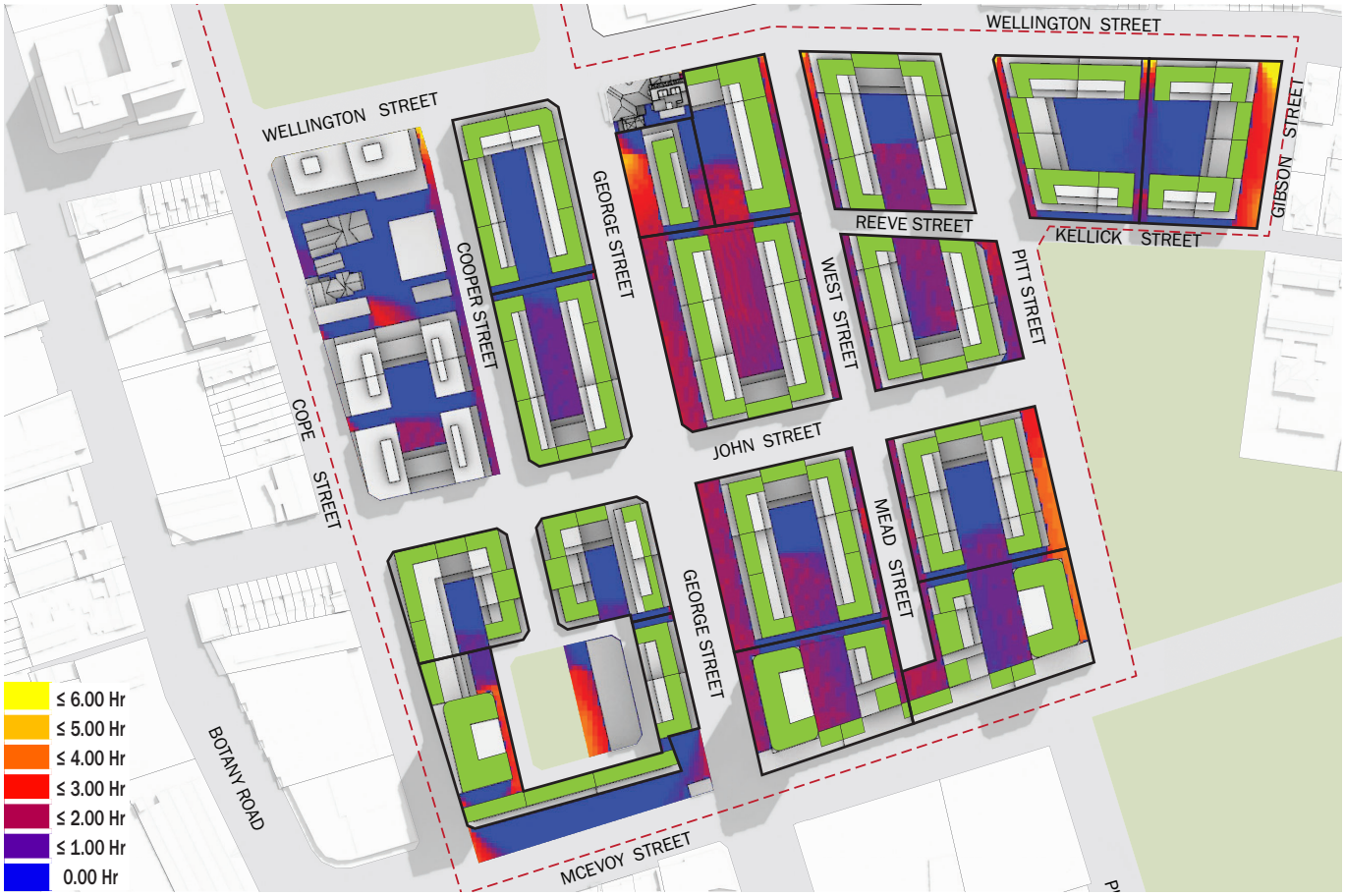
Objective 3D-1
An adequate area of communal open space is provided to enhance residential amenity and to provide opportunities for landscaping
Design criteria
1. Communal open space has a minimum area equal to 25% of the site (see figure 3D.3)
2. Developments achieve a minimum of 50% direct sunlight 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)

Objective 3D-2
Communal open space is designed to allow for a range of activities, respond to site conditions and be attractive and inviting
Design guidance
The location of facilities responds to microclimate and site conditions with access to sun in winter, shade in summer and shelter from strong winds and down drafts

Objective 3D-4
Public open space, where provided, is responsive to the existing pattern and uses of the neighbourhood
Design guidance
The public open space should be well connected with public streets along at least one edge
The public open space should be connected with nearby parks and other landscape elements
Public open space should be linked through view lines, pedestrian desire paths, termination points and the wider street grid
Solar access should be provided year round along with protection from strong winds
Opportunities for a range of recreational activities should be provided for people of all ages

Minimum building separation requirement

Source: Apartment Design Guide



Planning Proposal solar access to development block open spaces between 9am and 5pm mid winter

Planning Proposal solar access to development block open spaces between 9am and 3pm mid winter

4.6 SOLAR ACCESS

Communal Open Space - Deep Soil Zone

In accordance with ADG, deep soil zones should provide areas that allow for and support healthy plant and tree growth, in particular the growth of larger trees to improve amenity and local microclimate

– Majority of deep soil zones proposed within the development have limited access to sunlight which will impact tree and planting growth.

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

Design criteria

1. Deep soil zones are to meet the following minimum requirements:

Site area	Minimum dimensions	Deep soil zone (% of site area)
less than 650m^2	-	7%
650m^2 - 1,500m^2	3m	
greater than 1,500m^2	6m	
greater than 1,500m^2 with significant existing tree cover	6m	

Design guidance

On some sites it may be possible to provide larger deep soil zones, depending on the site area and context:

- 10% of the site as deep soil on sites with an area of 650m^2 - 1,500m^2
- 15% of the site as deep soil on sites greater than 1,500m^2

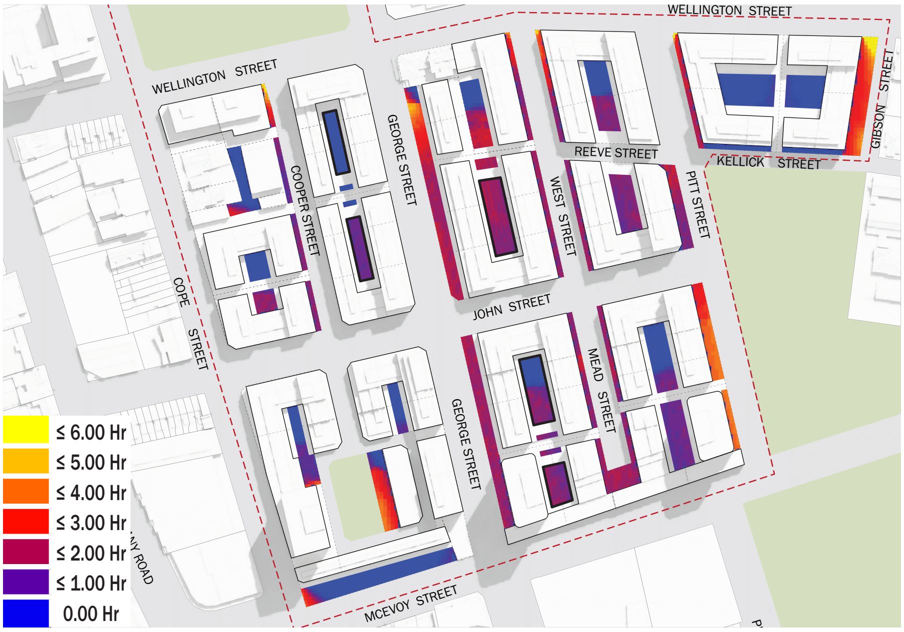
Deep soil zones should be located to retain existing significant trees and to allow for the development of healthy root systems, providing anchorage and stability for mature trees. Design solutions may include:

- basement and sub basement car park design that is consolidated beneath building footprints
- use of increased front and side setbacks
- adequate clearance around trees to ensure long term health
- co-location with other deep soil areas on adjacent sites to create larger contiguous areas of deep soil

Solar analysis to deep soil zones and planting areas measuring between 9:00am and 5:00pm.

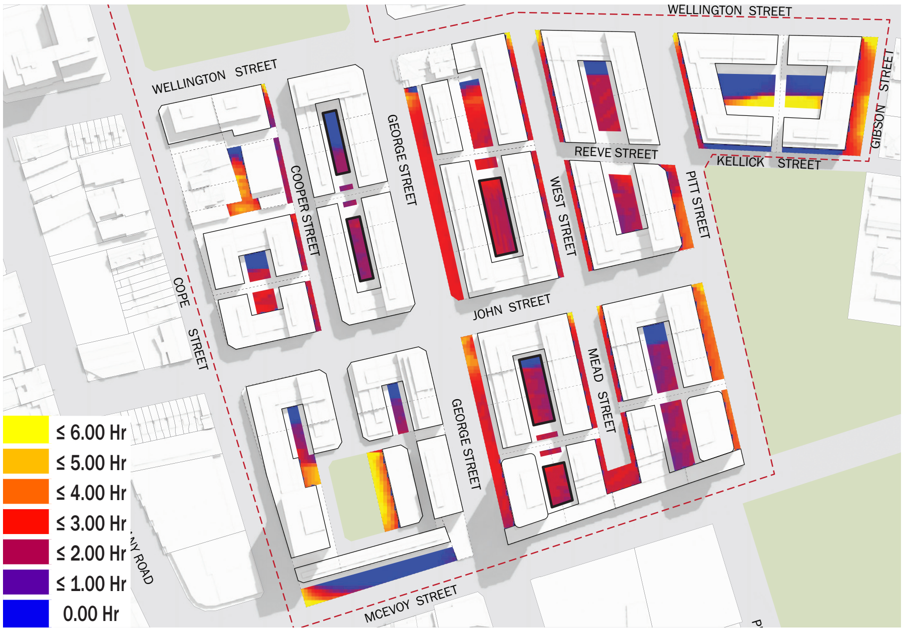
Winter Solstice

1. All shared courtyard spaces with deep soil zones within the perimeter building blocks receives less than 2 hour solar access, some less than 1 hour.
2. The majority of George Street, Mead Street, West Street and Cooper Street have minimal access to sunlight
3. Pitt Street north and Kellick Street also have minimal access to sunlight.



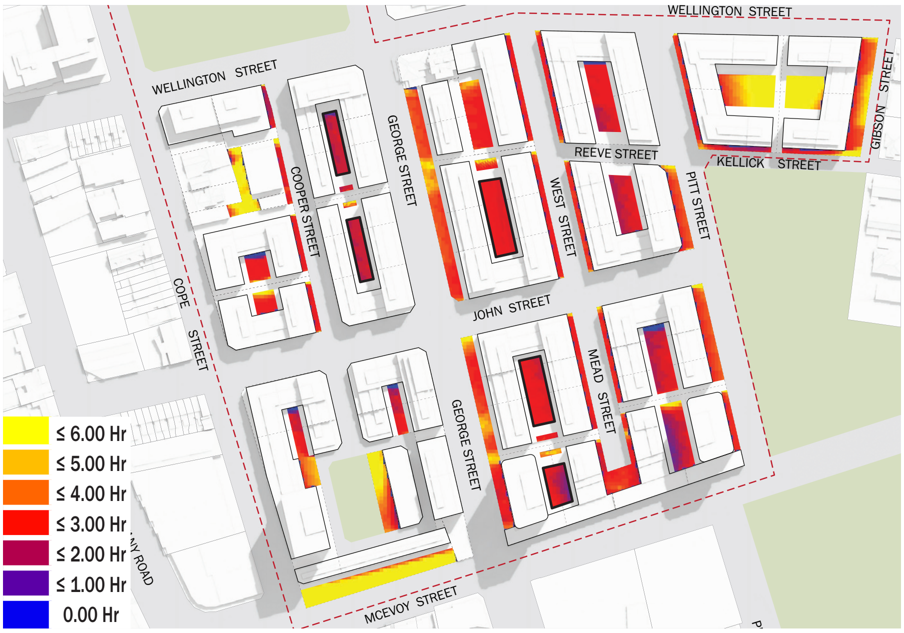
Equinox

1. Majority of deep soil zone within the courtyards have less than 2 hours of sunlight access.
2. The majority of Cooper Street, Mead and West Street have less than 2 hour access to sunlight.



Summer Solstice

1. The highlighted courtyards have less than 2 hours of sunlight access



4.6 SOLAR ACCESS

Apartment Amenity

Access to direct sunlight from the living space and private open space of apartments is one of the key aspect of providing good resident amenity.

Without undertaking a detailed apartment planning exercise, the built form needs to be designed and planned to maximise solar access to the living room and private open space in accordance to ADG.

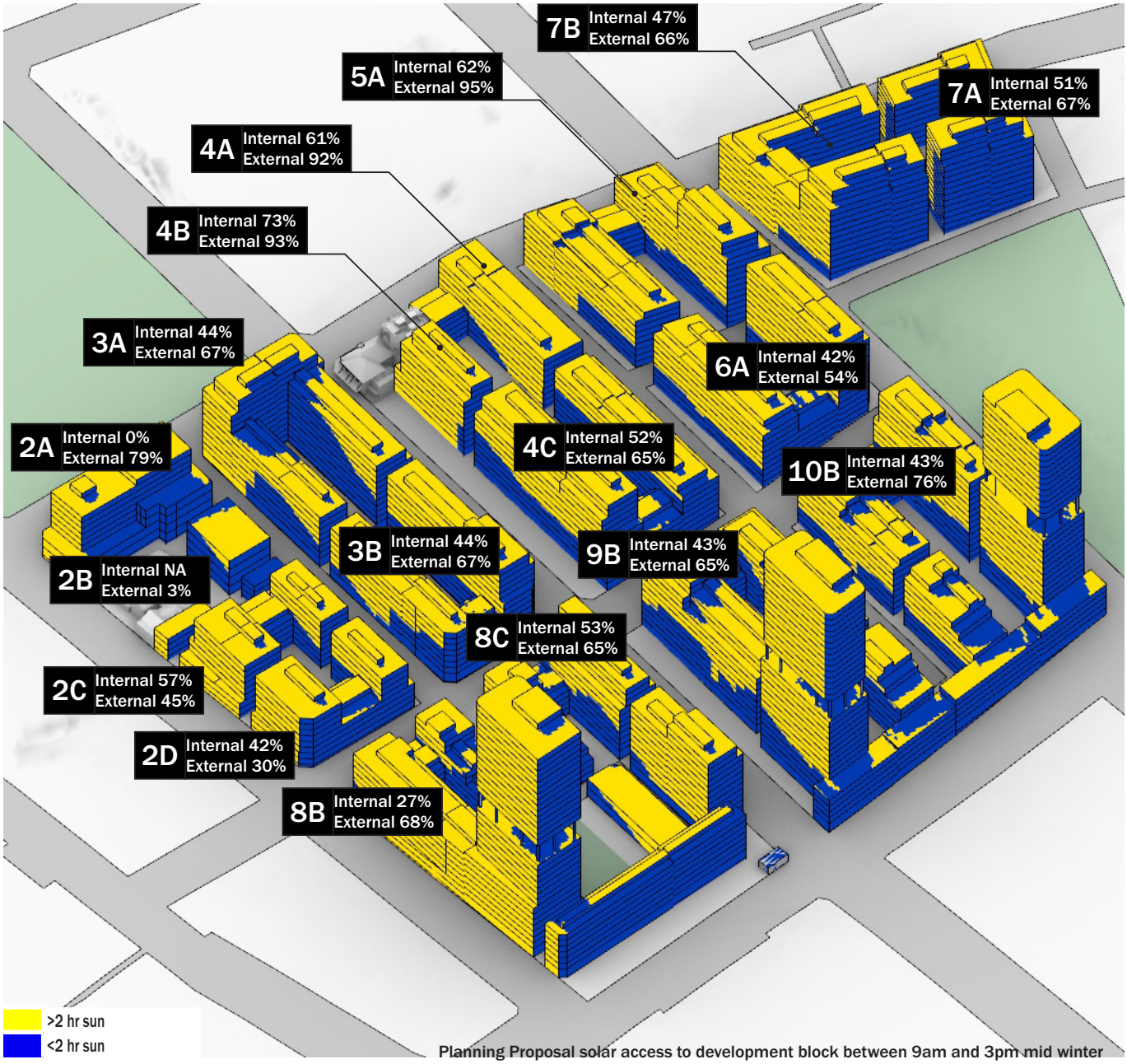
The diagrams on the adjacent page illustrates the facade or elevation that can receive a minimum of 2 hours direct solar between 9:00am and 3:00pm mid winter. To maximise solar access to the living room and private open space of apartments, the future designs need to maximise the number of living rooms and private open space on these facade or elevation.

Objective 4A-1
To optimise the number of apartments receiving sunlight to habitable rooms, primary windows and private open space
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 9 am and 3 pm at mid winter in the Sydney Metropolitan Area and in the Newcastle and Wollongong local government areas
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
3. A maximum of 15% of apartments in a building receive no direct sunlight between 9 am and 3 pm at mid winter
Design guidance
The design maximises north aspect and the number of single aspect south facing apartments is minimised
Single aspect, single storey apartments should have a northerly or easterly aspect
Living areas are best located to the north and service areas to the south and west of apartments
To optimise the direct sunlight to habitable rooms and balconies a number of the following design features are used: • dual aspect apartments • shallow apartment layouts • two storey and mezzanine level apartments • bay windows
To maximise the benefit to residents of direct sunlight within living rooms and private open spaces, a minimum of 1m^2 of direct sunlight, measured at 1m above floor level, is achieved for at least 15 minutes

The diagram below illustrates the percentage of solar access to the internal and external perimeter of the facade on the Planning Proposal.

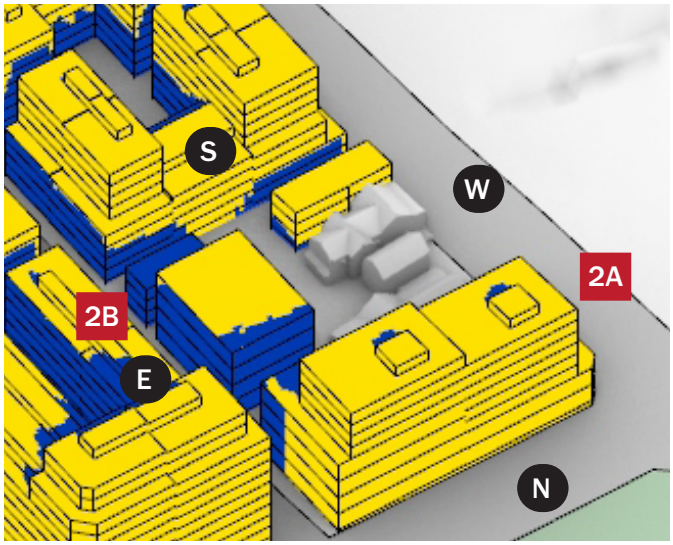
Planning Proposal

- Due to the height of the buildings proposed, the facade of the buildings are self shaded and overshadowed by adjacent buildings.
- The blocks in the centre of the precinct are the most impacted.
- The external percentage demonstrates in particular the east and west facades where the living rooms and POS will likely be located and the likelihood of compliance.



Planning Proposal solar access to development block between 9am and 3pm mid winter

Diagrams below illustrates the potential solar compliance of each building block.



Block 2A

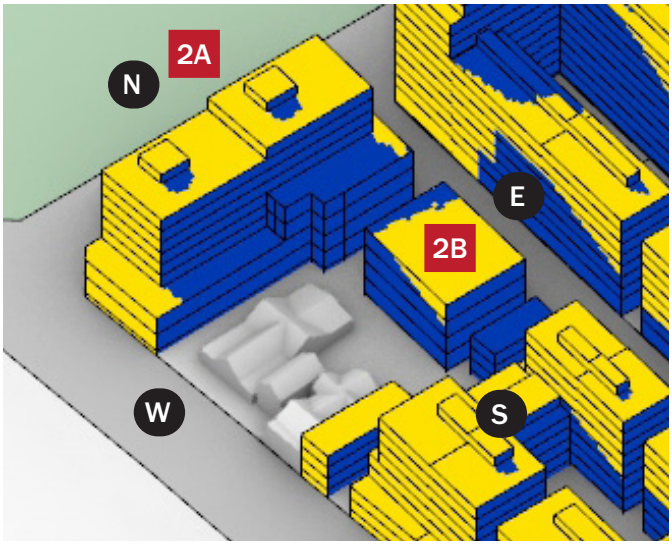
Internal - 0%

External - 79%

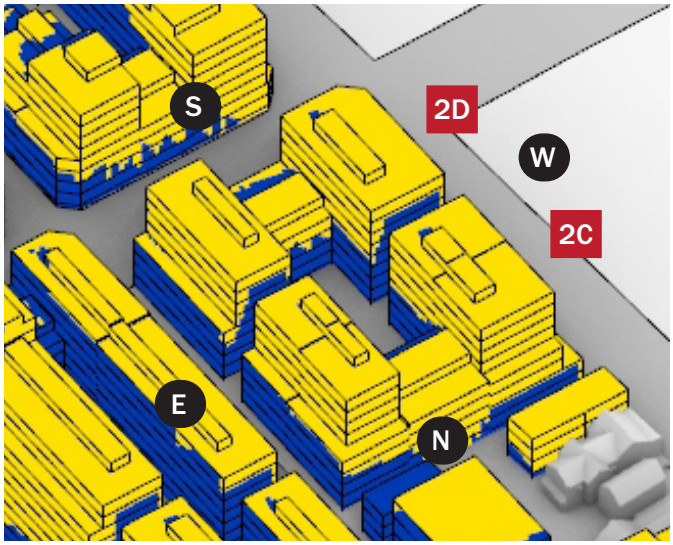
Block 2B

Internal - 0%

External - 3%



Block 2A is north facing, ideal for solar compliance. However, it overshadows block 2B resulting in a non compliant block.



Block 2C

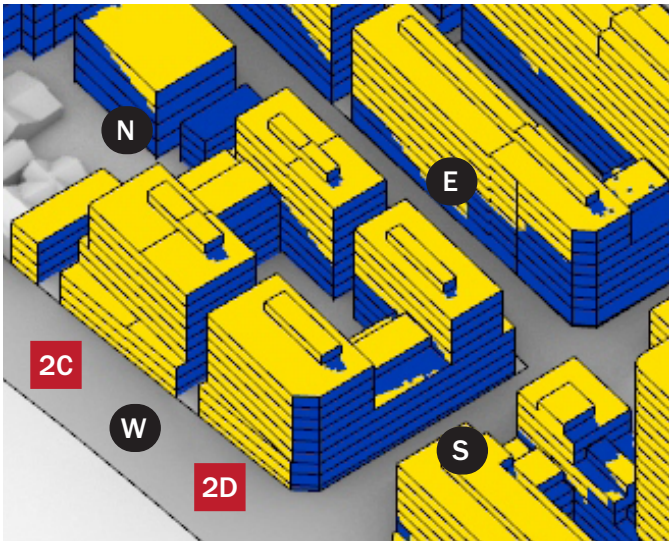
Internal - 57%

External - 45%

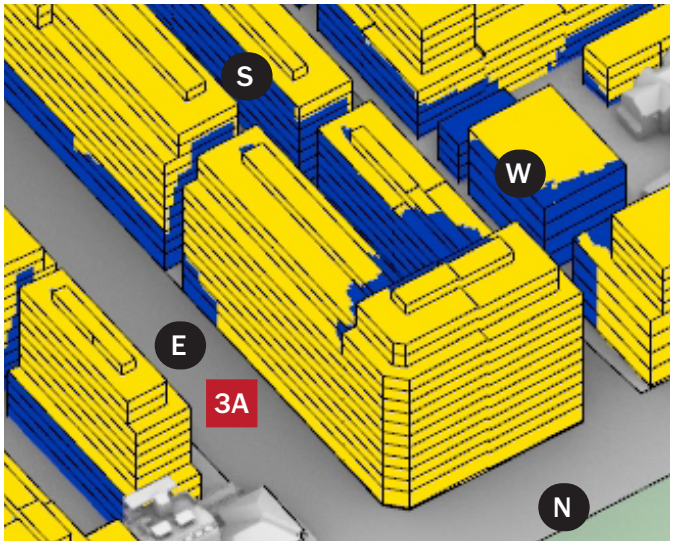
Block 2D

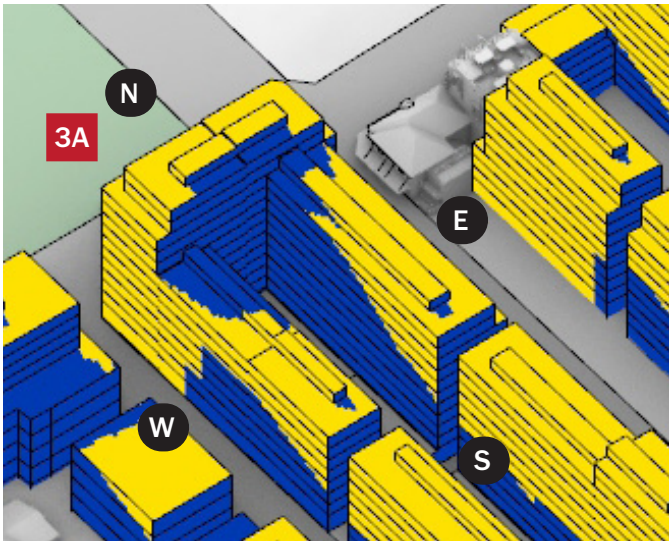
Internal - 42%

External - 30%



Lower levels of Block 2D are overshadowed, considering the height and scale of this block, ADG solar access will be hard to achieve.



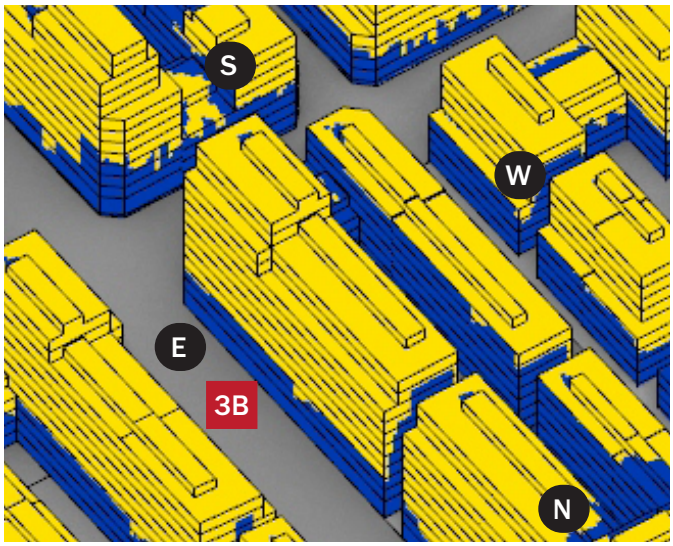


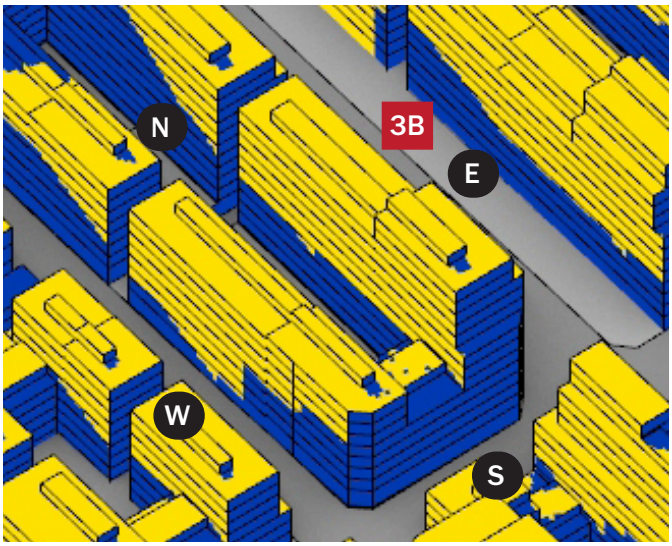
Block 3A

Internal - 4%

External - 87%

Block 3A along Wellington Street have good solar access on the north and east elevation. The internal elevations are heavily overshadowed. While the solar access of the interior facade and courtyard is not ideal, block 3A should be able to planned to achieve ADG solar compliance.





Block 3B

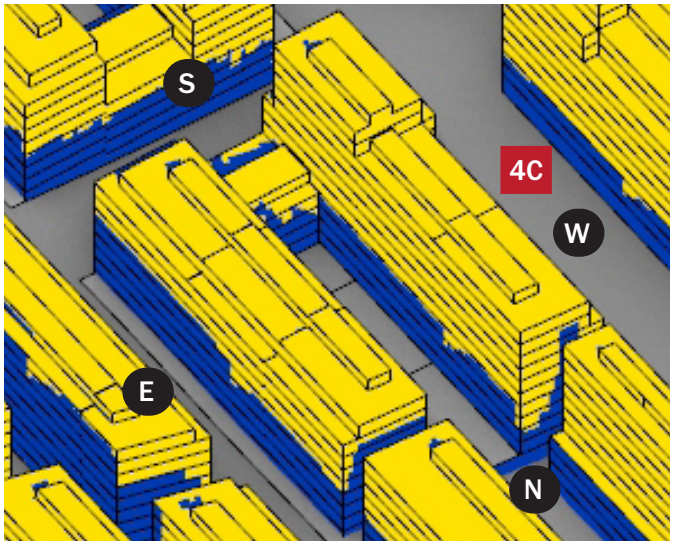
Internal - 44%

External - 67%

The lower levels of this building are overshadowed by adjacent buildings while the internal elevations are self shaded.

It could be challenging for this block to achieve ADG solar compliance.

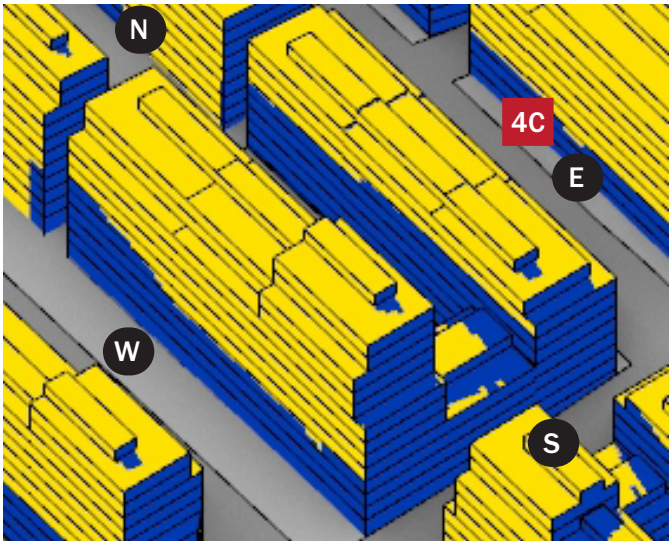
Diagrams below illustrates the potential solar compliance of each building block.



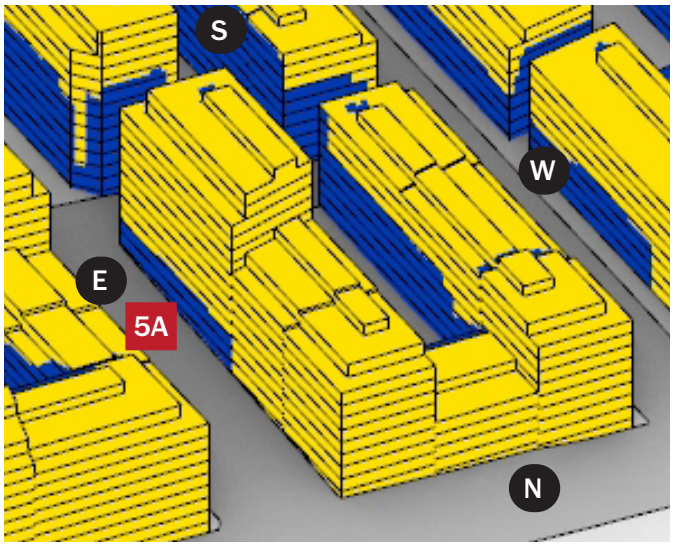
Block 4C

Internal - 52%

External - 65%



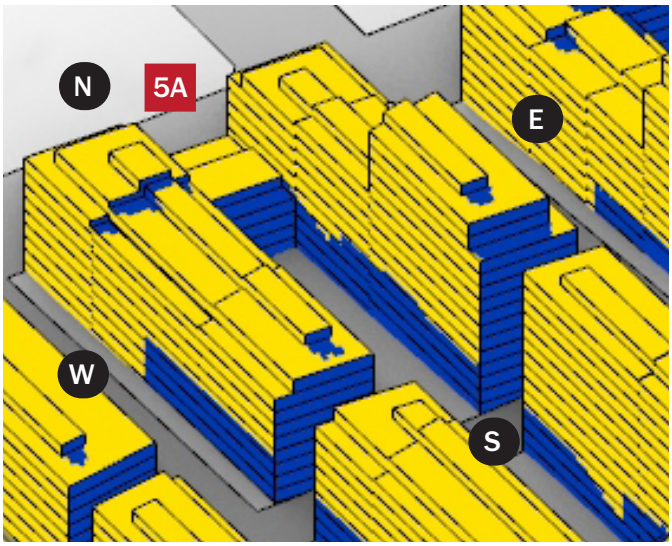
The lower 3 to 4 levels are either self shaded or overshadowed by other building. It will be a challenge for this block to achieve ADG solar compliance



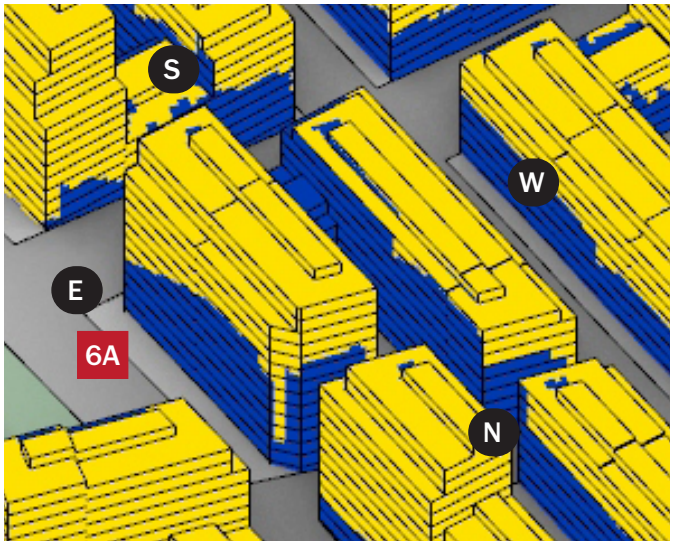
Block 5A

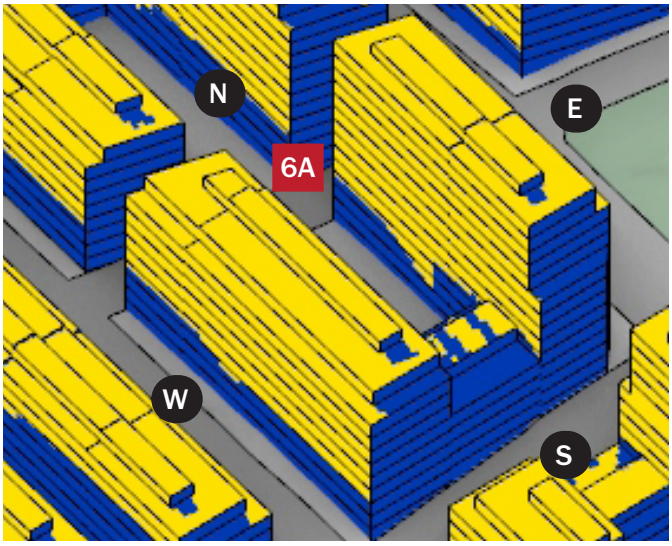
Internal - 62%

External - 95%



While parts of the internal elevations are overshadowed, considered apartment planning could allow this block to achieve solar compliance.



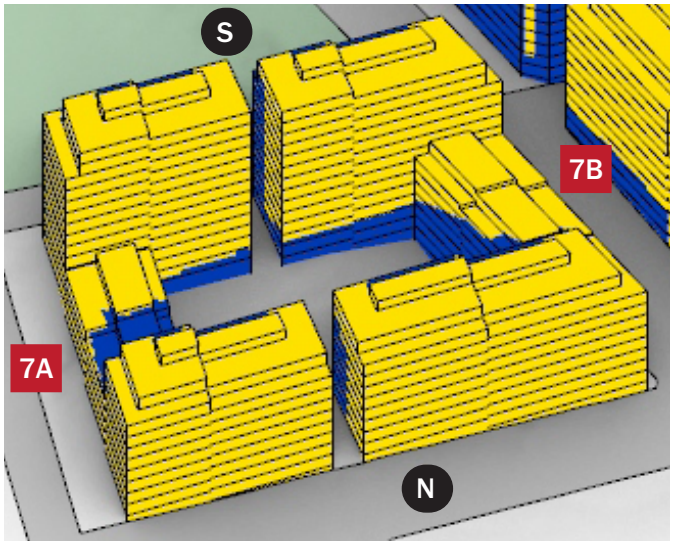


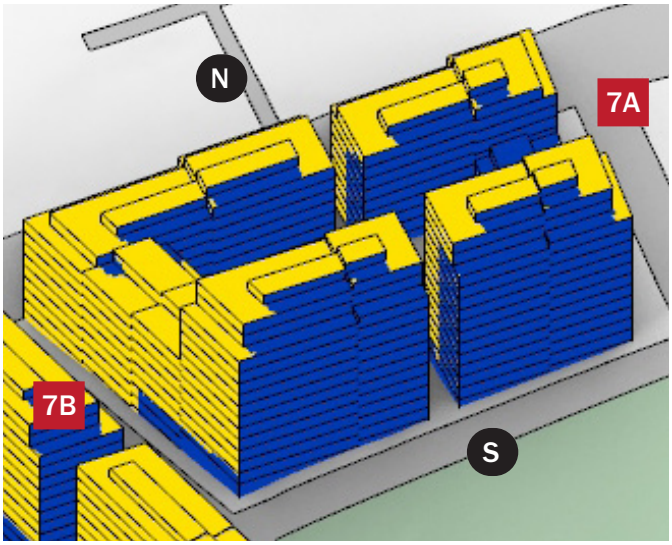
Block 6A

Internal - 42%

External - 54%

The east elevations of this block are most shaded while the west elevation are shaded on the lower 2-3 residential levels. Potential challenge for this block to achieve ADG solar compliance.





Block 7A

Internal - 51

External - 67%

Block 7B

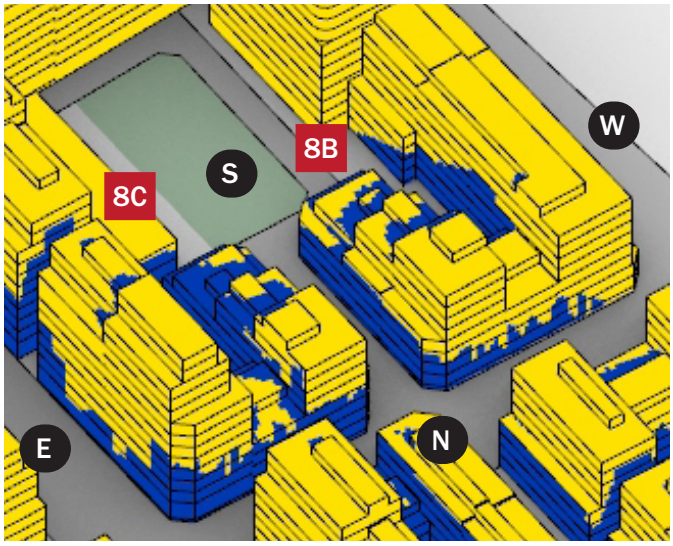
Internal - 47%

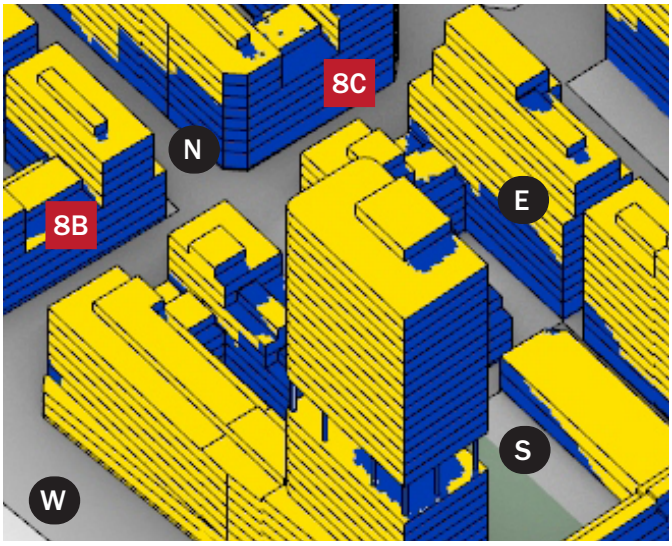
External - 66%

The larger frontages of this block are north facing, ideal for solar compliance.

The southern elevation of this block faces Waterloo Park. However, it will create non-compliance if living room and POS are located on this elevation.

Diagrams below illustrates the potential solar compliance of each building block.





Block 8B

Internal - 27%

External - 68%

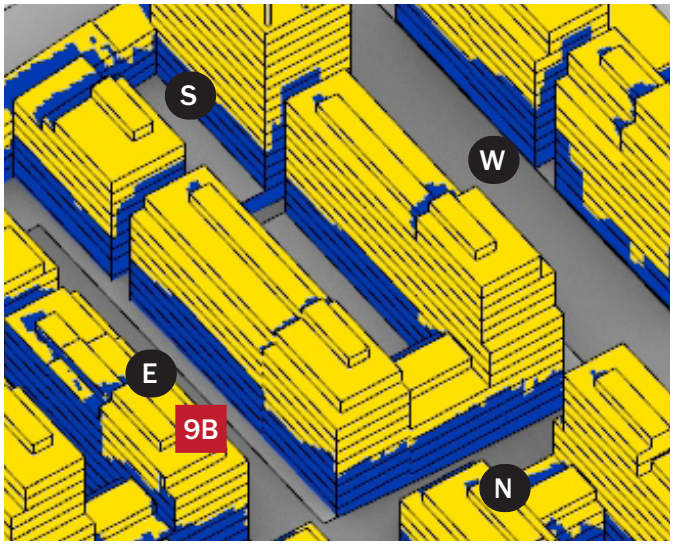
Block 8C

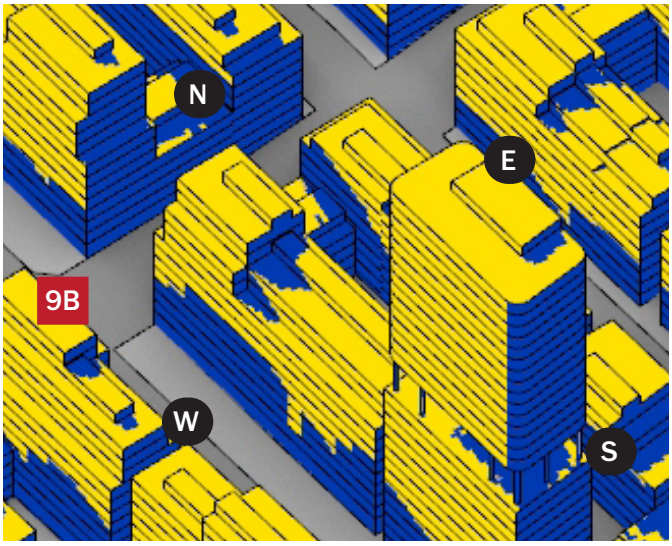
Internal - 53%

External - 65%

Lower levels of Block 8C are overshadowed while the building that's stepping down towards the south is mostly overshadowed. Creating challenge for this block to comply with ADG solar access requirement.

The smaller building within Block 8B stepping down towards south is mostly overshadowed while the internal elevation of the western portion of the block is self shaded, presenting potential challenge for ADG solar compliance.



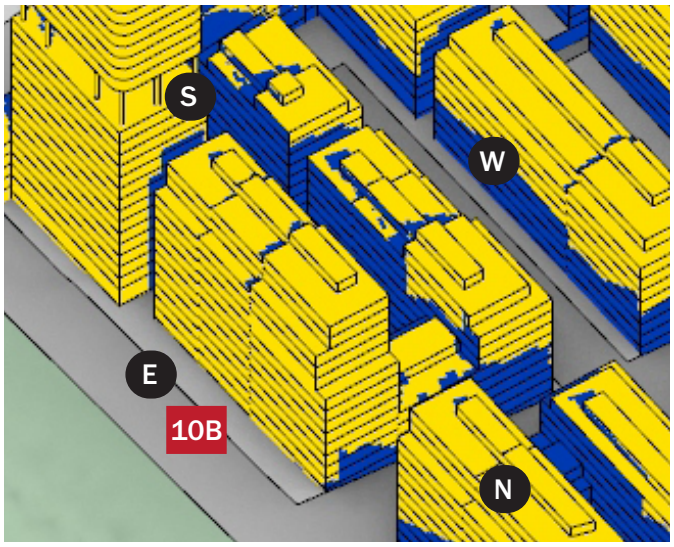


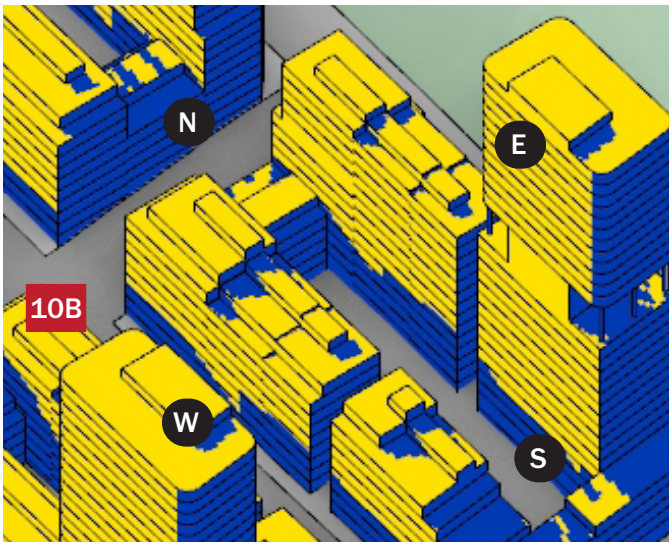
Block 9B

Internal - 43%

External - 65%

The lower levels of this block is either self shaded or overshadowed by adjacent block, creating potential challenge for this block to achieve ADG solar compliance.





Block 10B

Internal - 43%

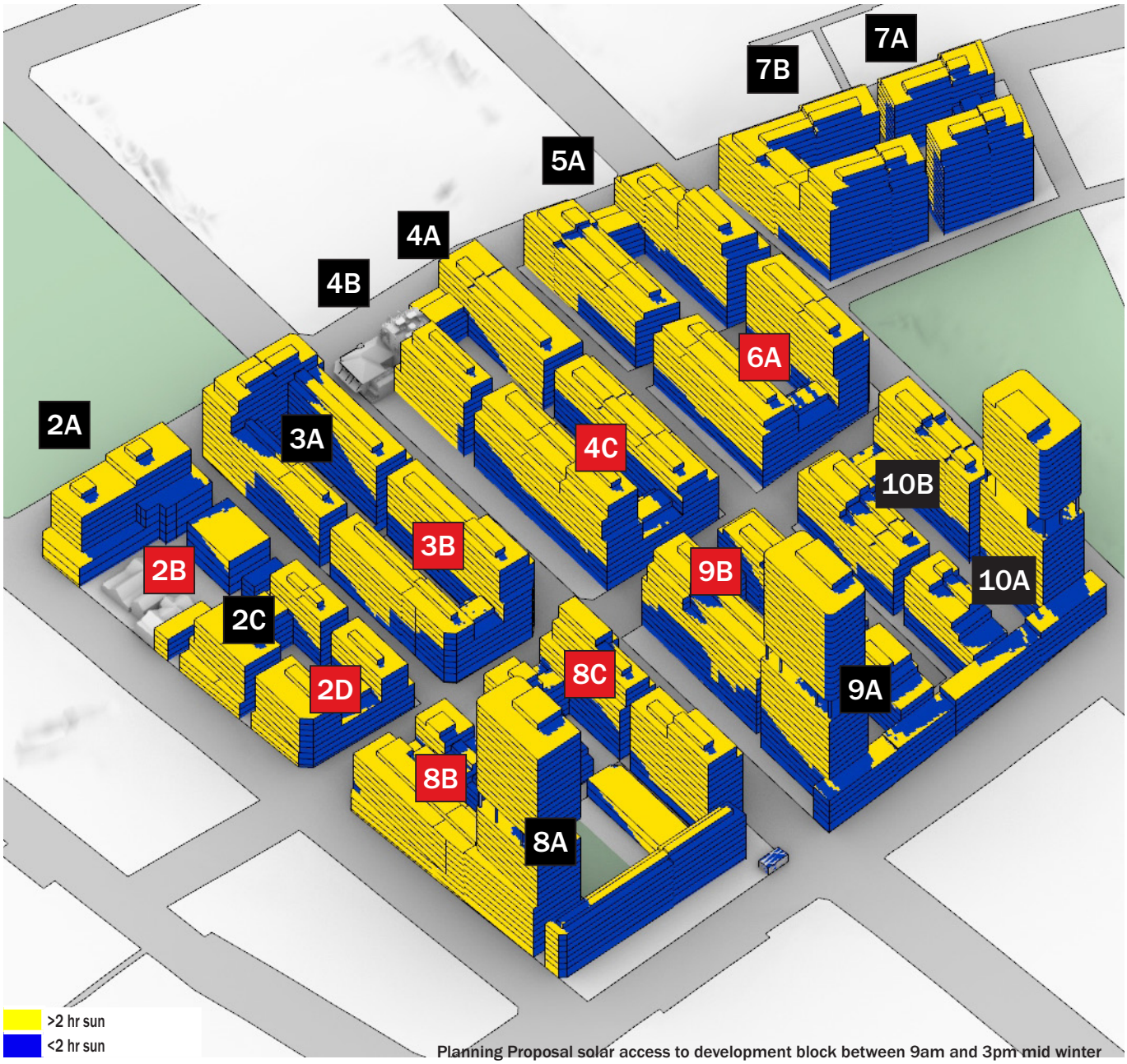
External - 79%

Good solar access to the external east elevation while the internal east elevation of the smaller building is overshadowed.

4.6 SOLAR ACCESS

Planning Proposal (Option 01)

Diagram below illustrates the percentage of solar access to the internal and external perimeter of the facade.



Planning Proposal solar access to development block between 9am and 3pm mid winter

4.6 SOLAR ACCESS

Amended Option 02

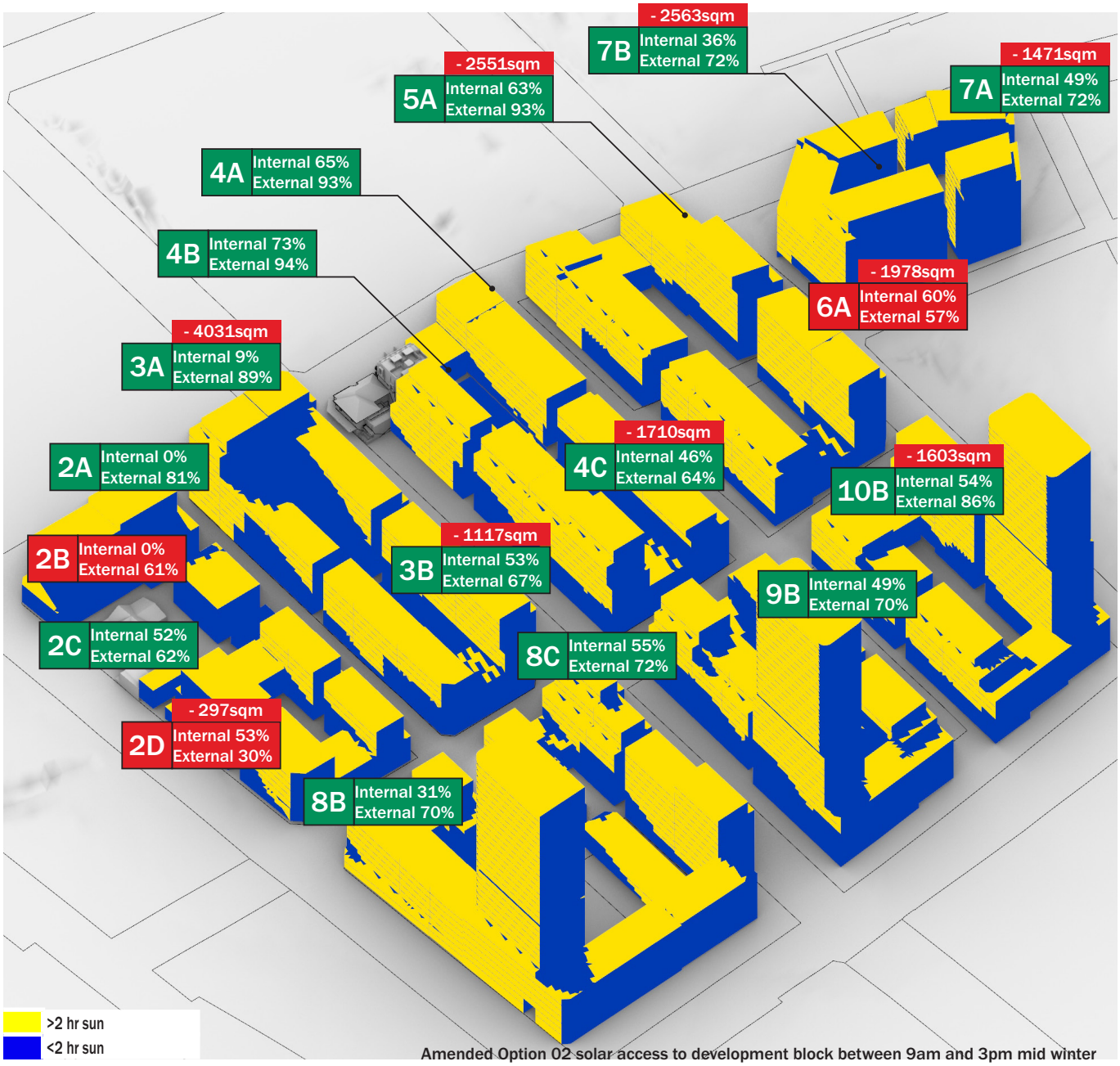
Diagram below shows the potential improvements to solar amenity by reducing building mass.

Total area removed:

GEA = - 17,321m^2

GFA* = - 12,557m^2

* GFA is based on the assumption of 72.5% of GEA



Amended Option 02 solar access to development block between 9am and 3pm mid winter

4.6 SOLAR ACCESS

Amended Option 03

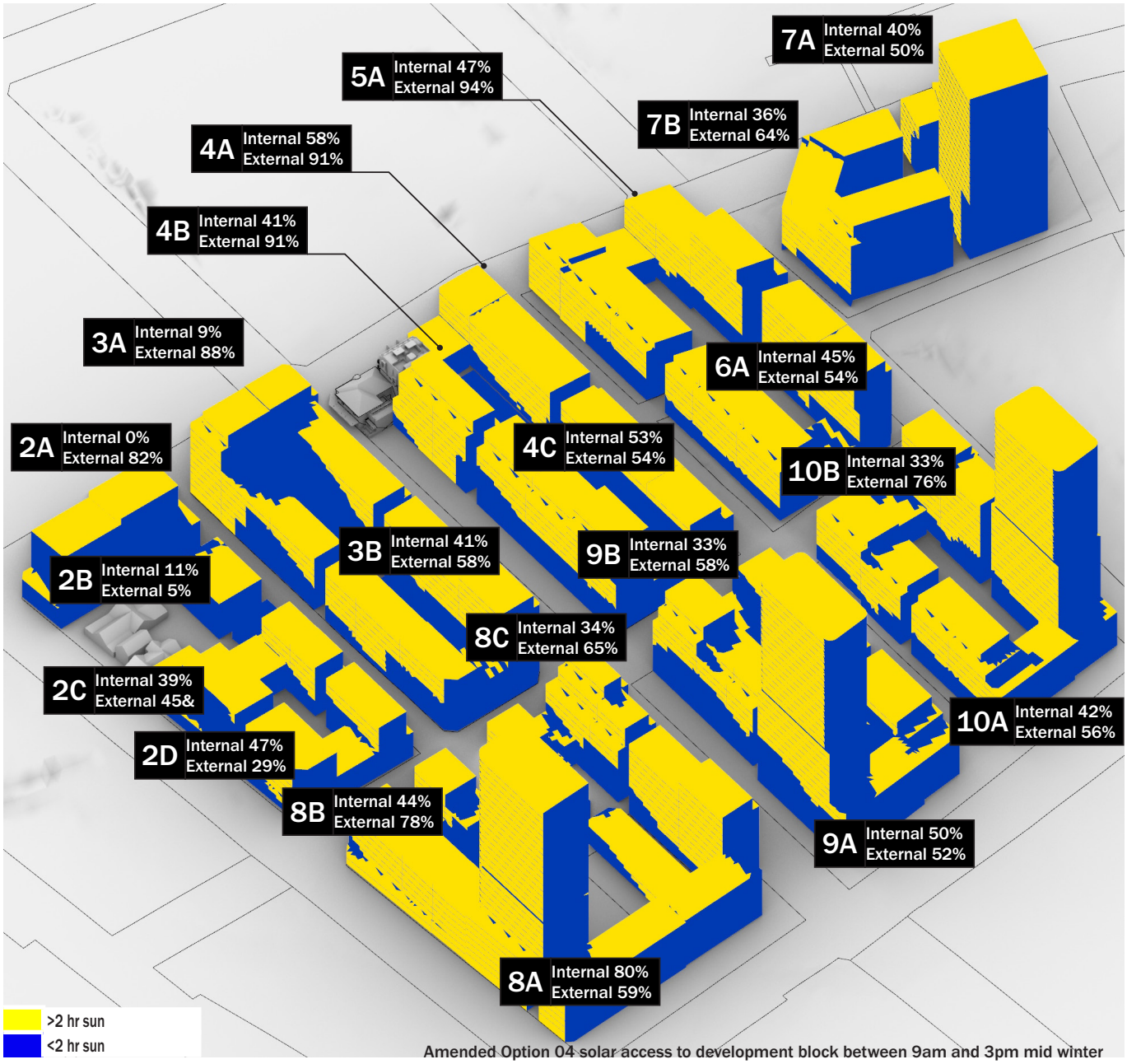
Diagram below illustrates the percentage of solar access to the internal and external perimeter of the facade.

Amended Option 03 solar access to development block between 9am and 3pm mid winter

4.6 SOLAR ACCESS

Amended Option - Preferred direction

Diagram below illustrates the percentage of solar access to the internal and external perimeter of the facades.



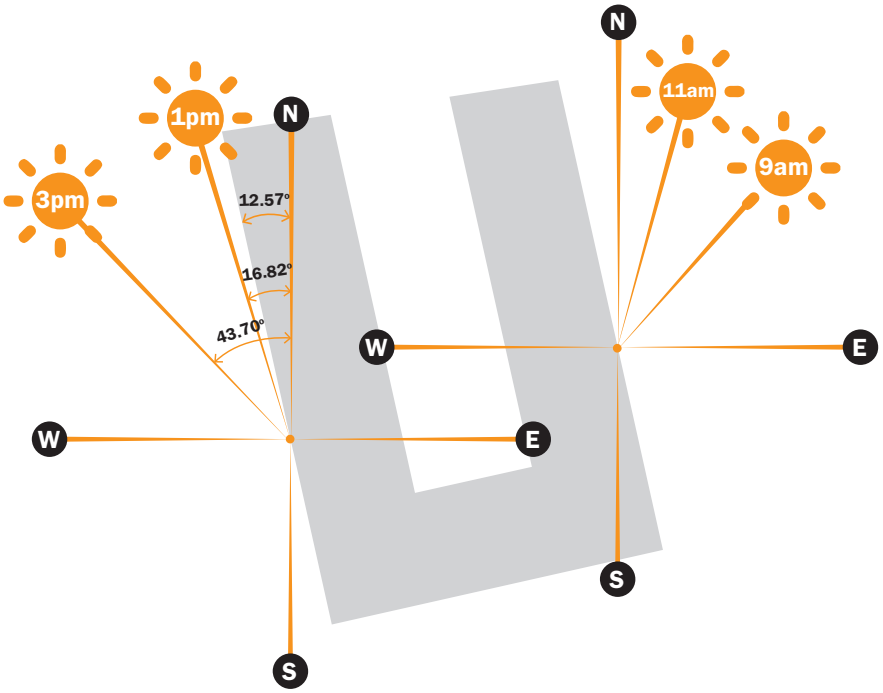
Amended Option 04 solar access to development block between 9am and 3pm mid winter

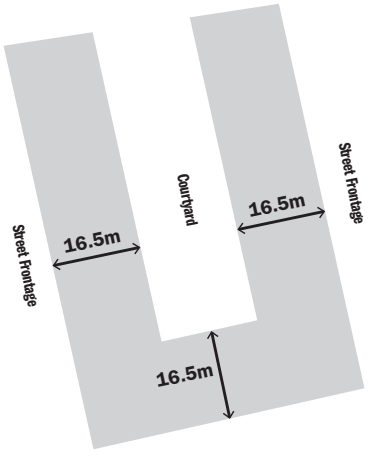
4.6 SOLAR ACCESS

The proposed building orientation allows the west elevation to have access to direct sunlight from 1:00pm mid winter.

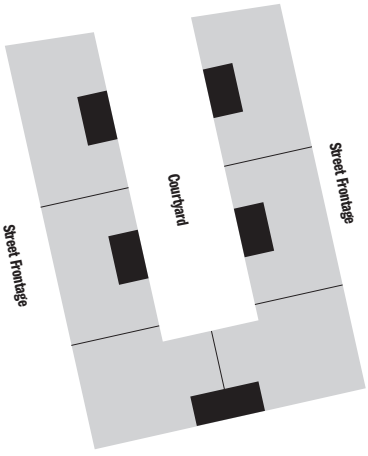
Building Orientation

- West elevation of the proposed building envelope is 12.57 degrees off the north point. It allows the west elevation to have sun assess at 1:00pm mid winter to ensure the elevation achieves a minimum of 2 hours solar access between 9:00am and 3:00pm mid winter.
- East elevation achieves good access to direct solar between 9am and 11am mid winter.
- Proposed building width allows single loaded corridors with dual and single aspect apartments around multiple cores

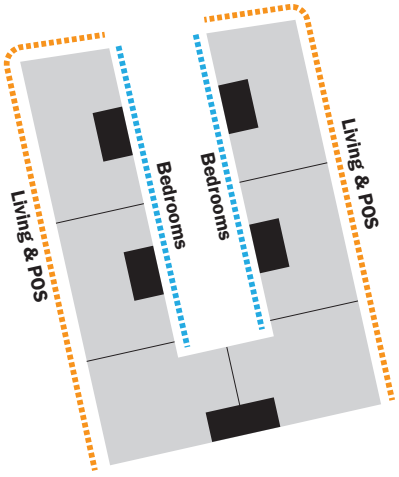




Envelope Width



Potential Core Location



Planning

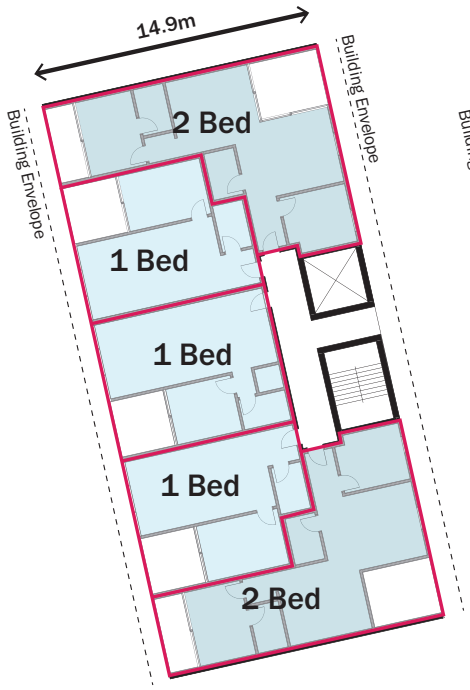
Due to the width of the building envelope, it allows a single loaded corridor configuration.

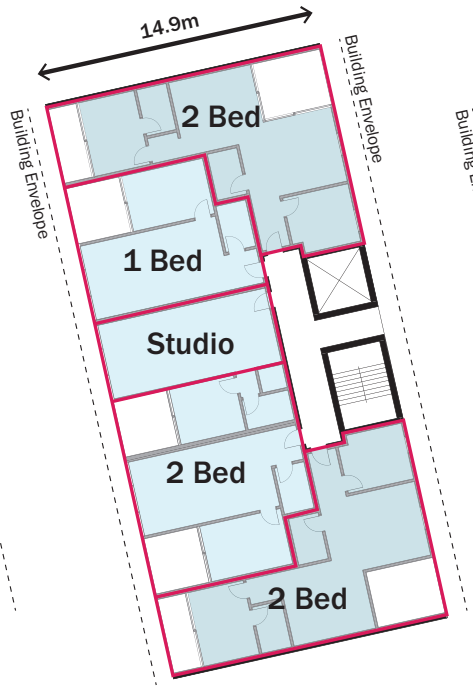
Apartment Planning

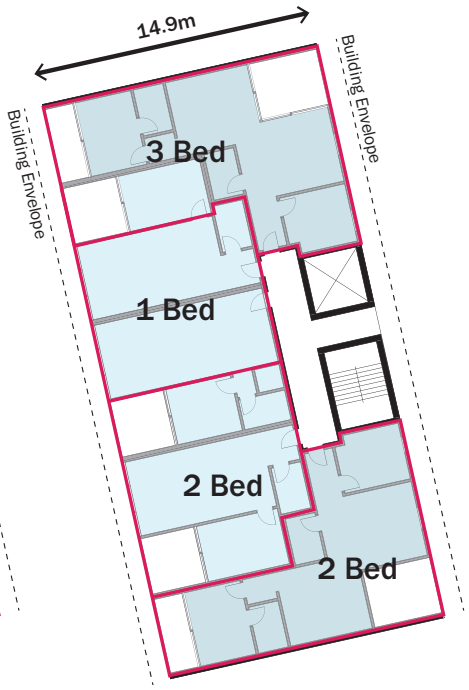
– Diagrams below show indicatively the potentially apartment planning options for 5 apartments per core and 6 apartments per core. To service more apartments, the core and corridor will become more inefficient.

5 apartments per core

– 2 dual aspect apartments with east facing living and POS for solar compliance
– 3 single aspect west facing apartments
– Configuration and planning of apartment can be adapted to suit unit mix requirements







Configuration 1

→ 5 apartments
→ 5/5 apartments achieves solar compliance

Configuration 2

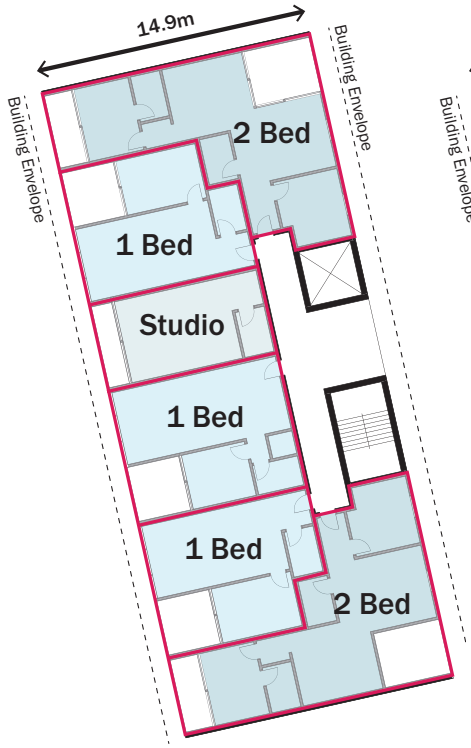
→ 5 apartments
→ 4/5 apartments achieves solar compliance

Configuration 3

→ 4 apartments
→ 4/4 apartments achieves solar compliance

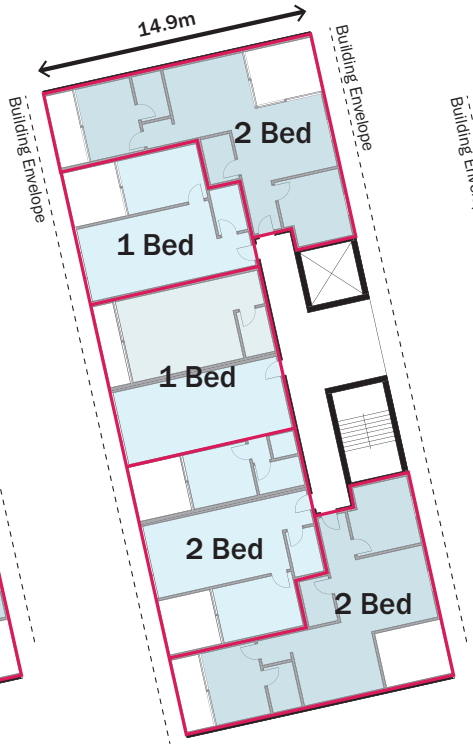
6 apartments per core

- 2 dual aspect apartments with east facing living and POS for solar compliance
- 4 single aspect west facing apartments
- Configuration and planning of apartment can be adapted to suit unit mix requirements



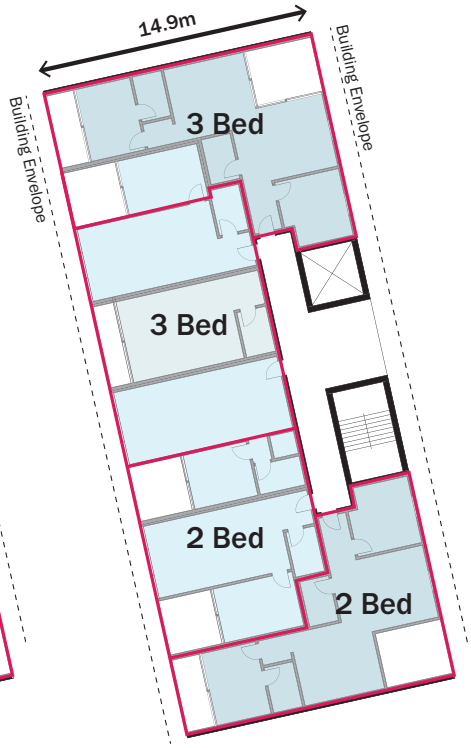
Configuration 1

→ 6 apartments
→ 5/6 apartments achieves solar compliance



Configuration 2

→ 5 apartments
→ 5/5 apartments achieves solar compliance



Configuration 3

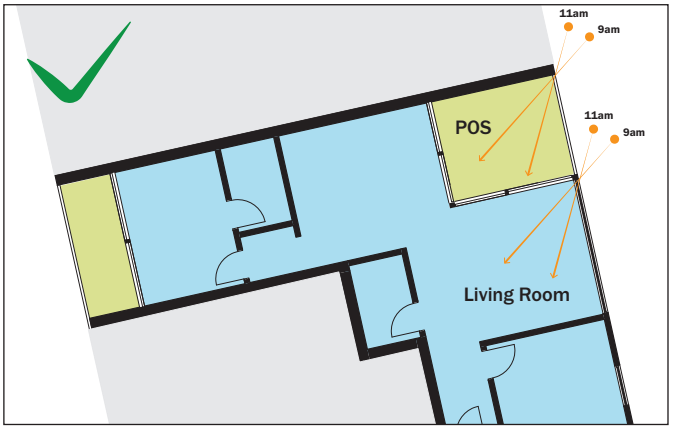
→ 4 apartments
→ 4/4 apartments achieves solar compliance

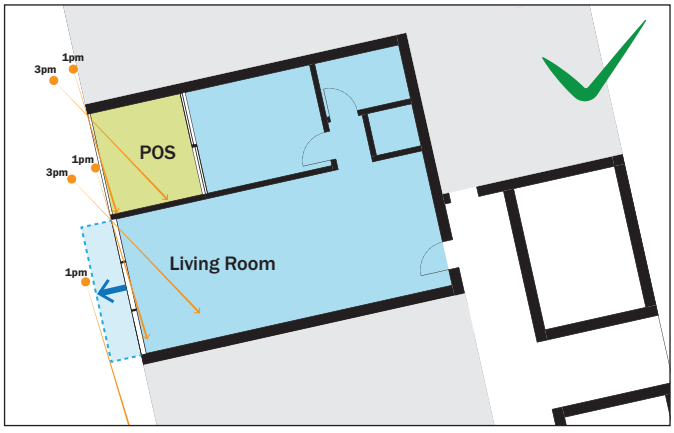
Living room and POS facing west requires consideration in planing configuration to ensure solar compliance.

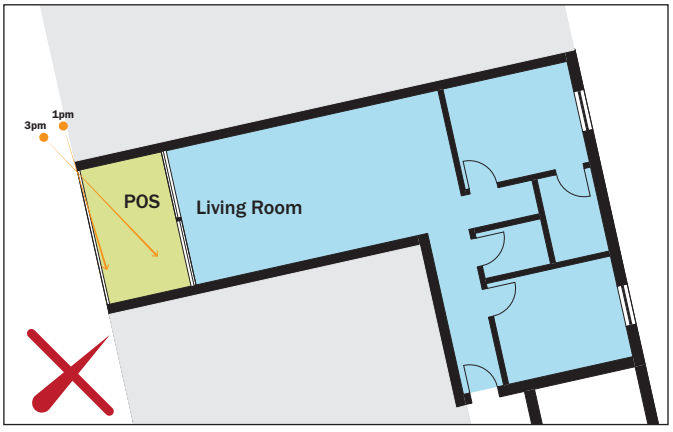
Building Orientation

- West elevation of the proposed building envelope is 12.57 degrees off the north point. It allows the west elevation to have sun assess at 1:00pm mid winter to ensure the elevation achieves a minimum of 2 hours solar access between 9:00am and 3:00pm mid winter.
- East elevation achieves good access to direct solar between 9am and 11am mid winter.
- Proposed building width allows single loaded corridors with dual and single aspect apartments around multiple cores

Solar Access to Apartments







01 - Single Aspect

- Living room located adjacent to POS on the facade
- Both living room and POS start to receive direct sunlight at 1:00pm mid winter. However, the area of sunlight received within living room and POS at this time is less than 1sqm.
- Potential design opportunity to push out living or POS to maximise solar access at 1:00pm mid winter. However, this will create overshadowing to the adjacent living room or POS.

02 - Dual Aspect

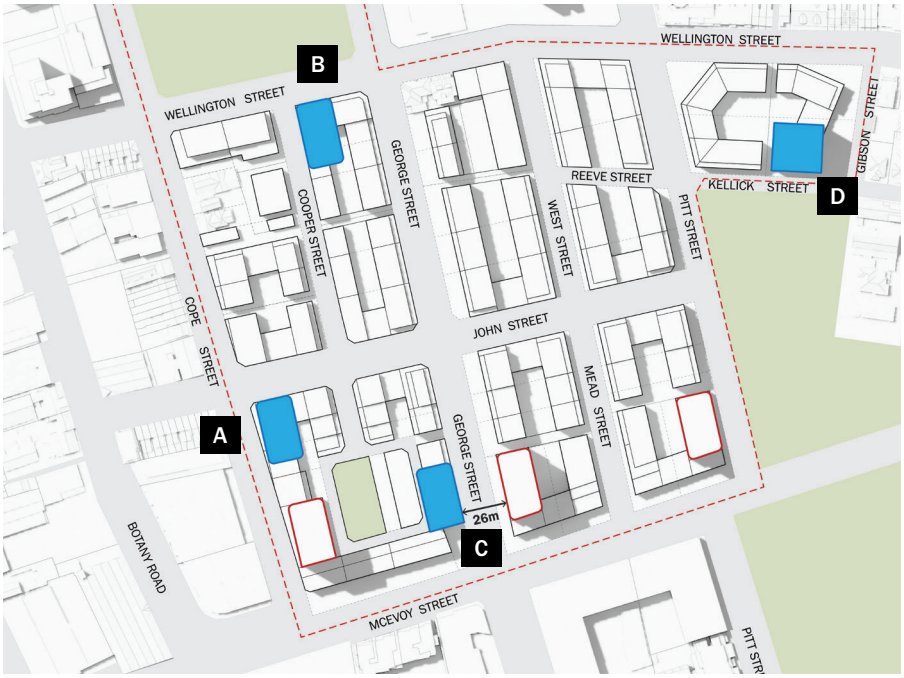
- If living room and POS are located on the western facade, Living room located behind POS
- Due to the orientation of the building/envelope, the living room does not achieve ADG solar access requirement, resulting in a non compliant apartment.

4.7 POTENTIAL TOWER LOCATIONS

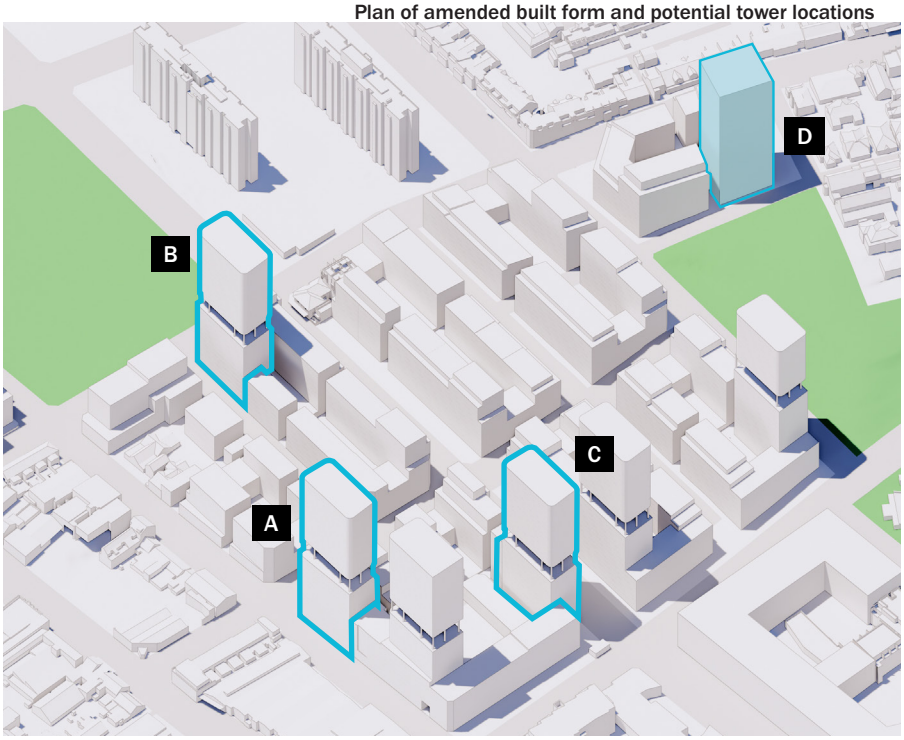
In order to recover the area lost to provide better solar access to apartments, an additional tower is considered in a number of locations.

Potential tower locations considers the below:

- Overshadowing to public open spaces and apartments, both existing and proposed.
- View amenity
- Existing topography
- Urban context
- Tower clustering



Plan of amended built form and potential tower locations



Axonometric of amended built form and potential tower locations

Potential to utilise proposed breaks in the tower to offset area lost through amenity uplift.

The Planning Proposal has proposed breaks in the tower form for wind mitigation to provide pedestrian comfort on ground level.

Many other options can be considered to reduce the effect of wind down draft caused by the tower form without having a prescribed outcome.

The below area can be gained from infilling the breaks in the tower form:

<u>Tower 8A:</u>

3 Storeys x 733sqm

Total GEA = 2,199sqm

<u>Tower 9A:</u>

3 Storeys x 732.5sqm

Total GEA = 2,197sqm

<u>Tower 10A:</u>

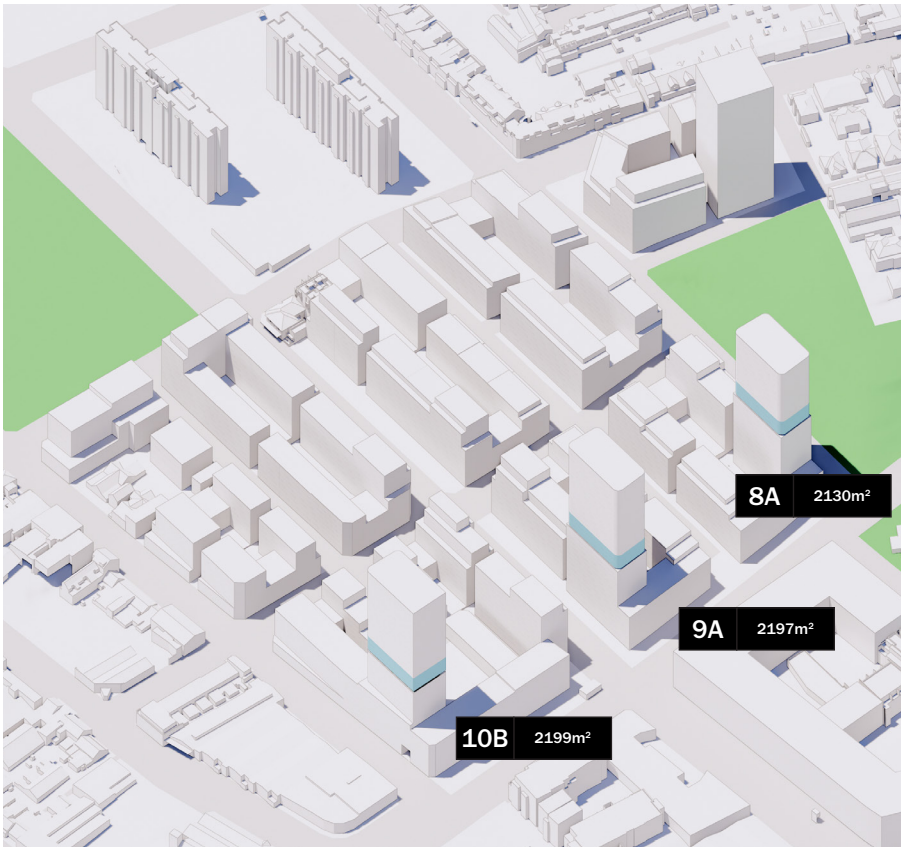
3 Storeys x 710sqm

Total GEA = 2,130sqm

Total GEA = 6,529sqm

Total GFA* = 4,733sqm

* GFA is based on the assumption of 72.5% of GEA



Axonometric of amended built form and surrounding context

4.7 POTENTIAL TOWER LOCATIONS

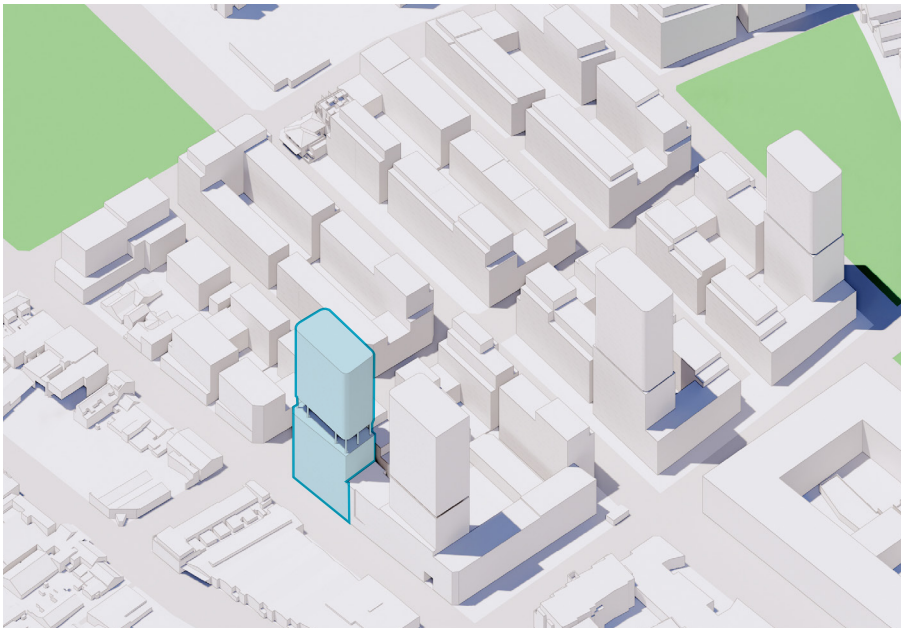
Tower location A

Pro:

- Located near the proposed tower cluster
- Good solar amenity

Con:

- Potential overshadowing to developments to the south.
- Building separation
- Overshadow to the south west pocket park



Axonometric of amended built form and potential tower location A

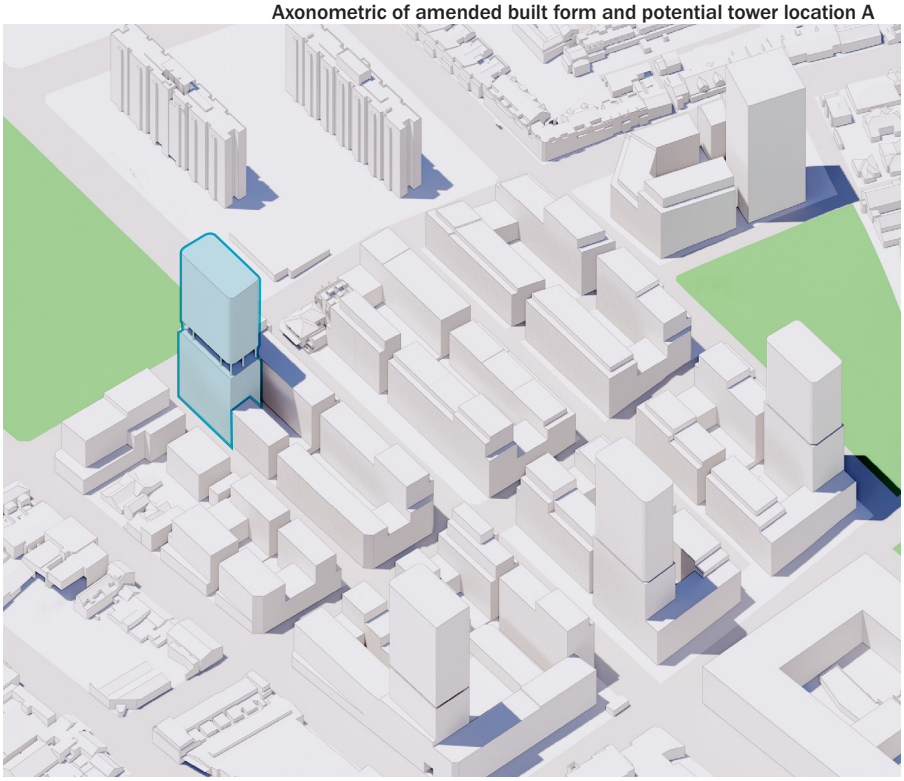
Tower location B

Pro:

- Located adjacent to park, maximise access to view and solar amenity
- Located in close proximity to WMQ development tower cluster
- Narrow block which requires redistribution of massing and area to achieve compliance.

Con:

- Wider tower requires specific design attention at the lower levels where the perimeter block meets the tower
- Potential overshadowing to developments to the south.



Axonometric of amended built form and potential tower location B

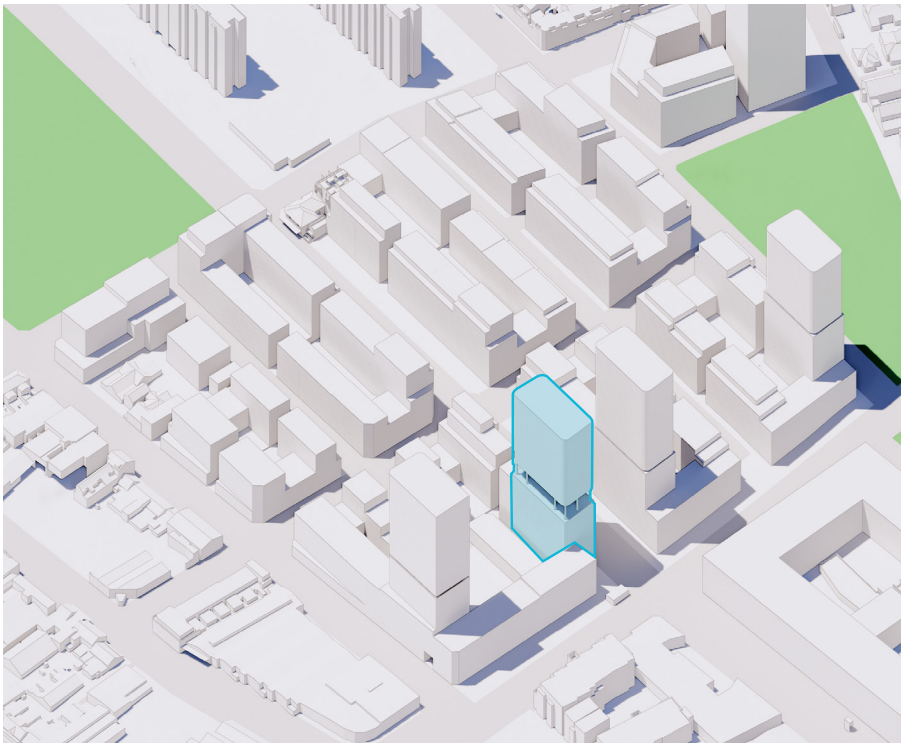
Tower location C

Pro:

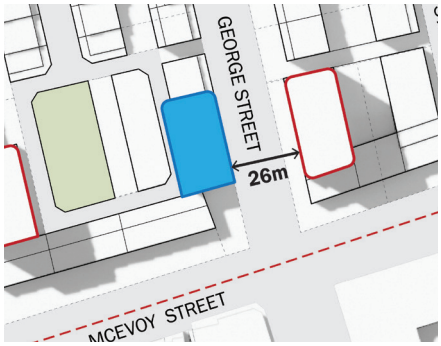
- Aligned to the existing master plan of tower location - adjacent to McEvoy Street
- Good access to solar
- Adequate building separation
- Less overshadowing impact to the proposed precinct and public open spaces

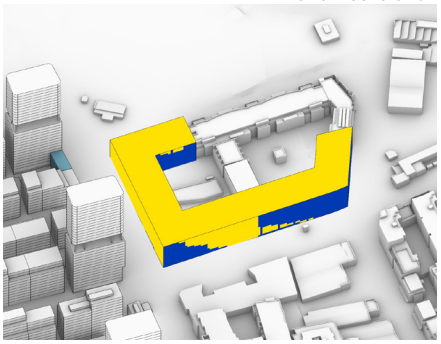
Con:

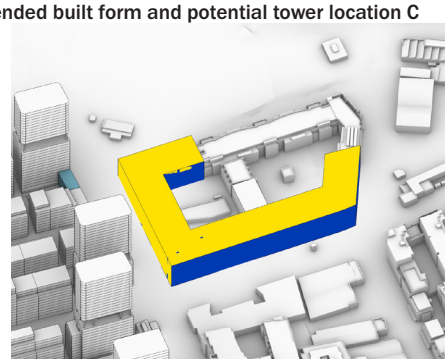
- Overshadow impact to the south side of McEvoy Street
- Dominant line of towers, bulk of towers not distributed across site.



Axonometric of amended built form and potential tower location C







Building Separation

- The proposed tower location C has adequate building separation to the tower to the east at 26m.

Overshadowing to existing residential development

- While the proposed tower location C optimises amenity for the future Waterloo Estate south precinct, it does have overt overshadowing impact to the residential development to the south of McEvoy Street.

4.7 POTENTIAL TOWER LOCATIONS

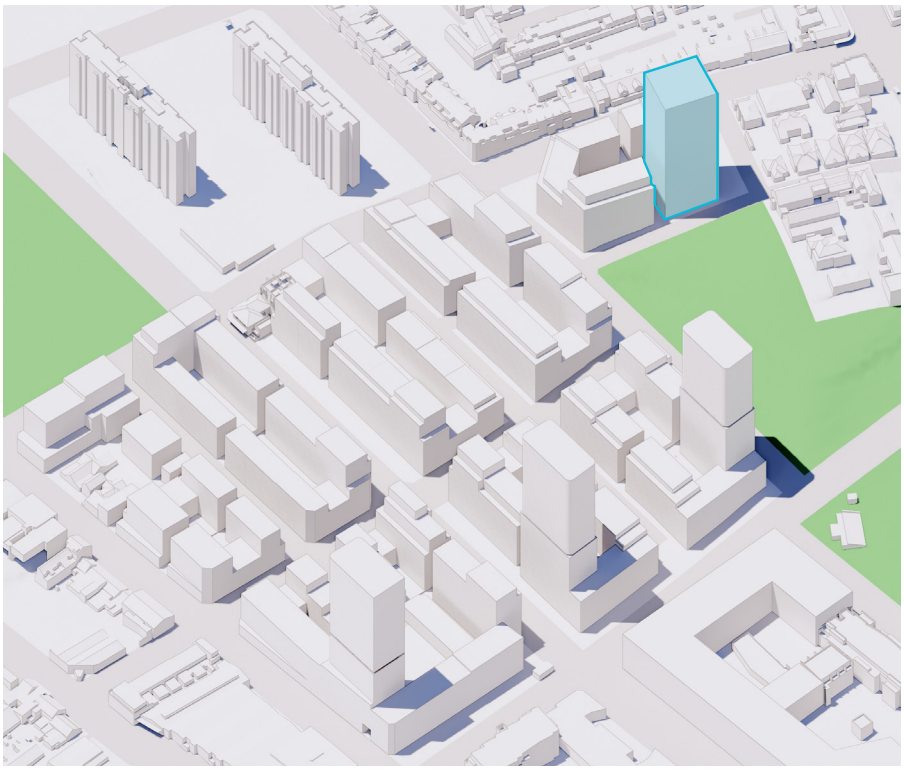
Tower location D (Preferred)

Pro:

- Located near the proposed tower cluster
- Good solar amenity

Con:

- Potential overshadowing to developments to the south.
- Building separation
- Overshadow to the south west pocket park



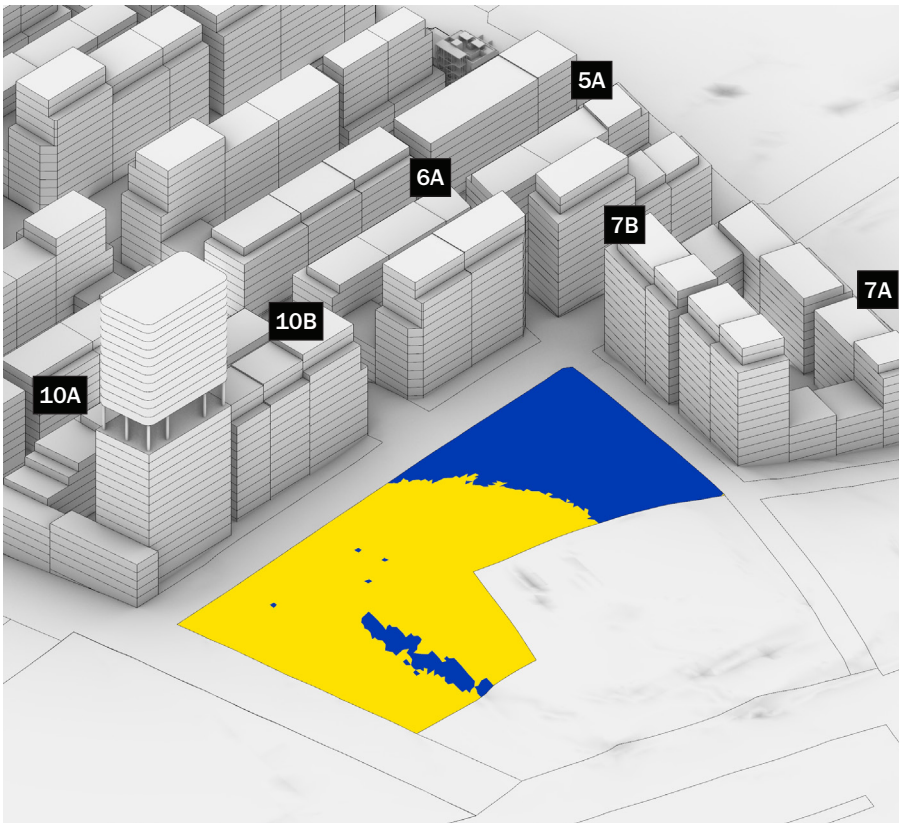
Axonometric of amended built form and potential tower location D

Solar impact of additional tower to Waterloo Park

The City of Sydney planning proposal has been tested to consider an overshadowing baseline to Waterloo Park.

The drawing to the right shows the planning proposal as having:

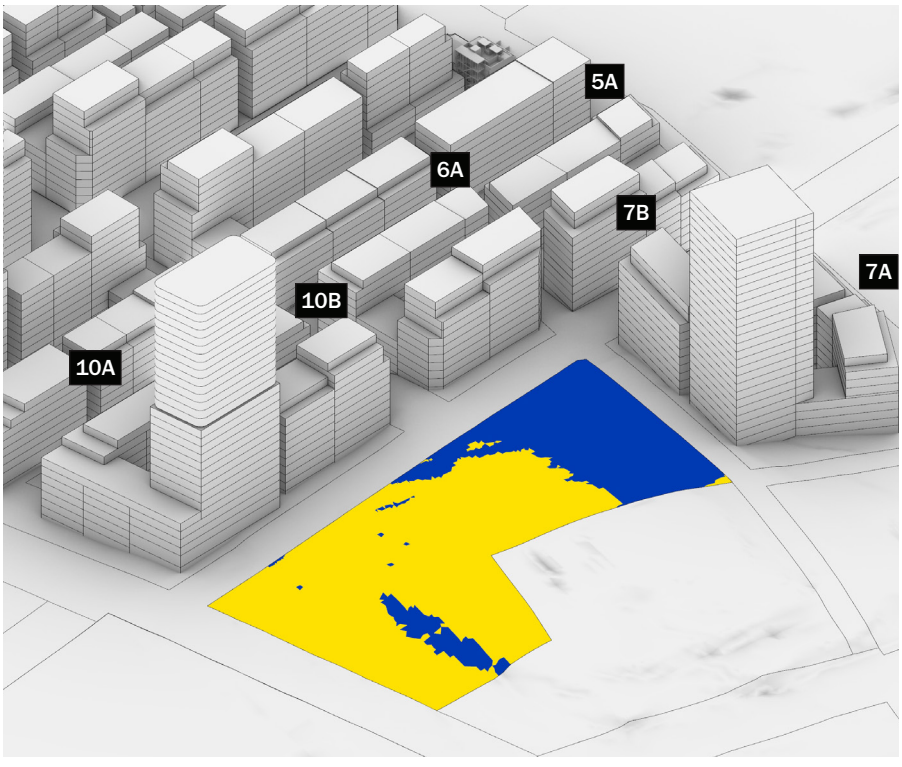
- In Shadow = 38% / 4836 sqm
- In Sun = 62% / 7812 sqm
- (A minimum of 4 hours+ of 50% of solar access required in winter)



Solar access to Waterloo Park with surrounding built form

The amended building envelope has a marginally improved outcome:

- In Shadow = 37% / 4685 sqm
- In Sun = 63% / 7963 sqm
- (A minimum of 4 hours+ of 50% of solar access required in winter)



Solar access to Waterloo Park with surrounding built form

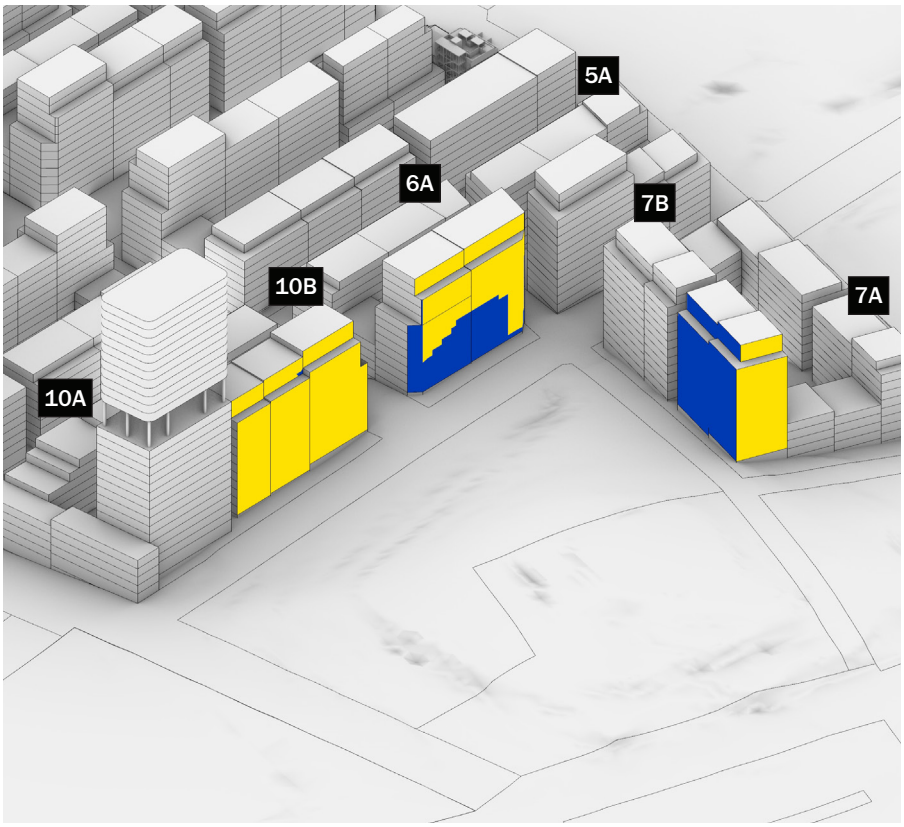
Solar impact of additional tower to adjacent buildings

The City of Sydney planning proposal has been tested to consider an overshadowing baseline to adjacent development.

The drawing to the right shows the planning proposal impact to the street facades of future residential development:

- **Block 6A:**
  - In Shadow = 36% / 735 sqm
  - In Sun = 64% / 1290 sqm
  - (A minimum of 2 hours+ of 50% of solar access required in winter)

- **Block 10B:**
  - In Shadow = 0.5% / 10 sqm
  - In Sun = 99.5% / 2158 sqm
  - (A minimum of 2 hours+ of 50% of solar access required in winter)

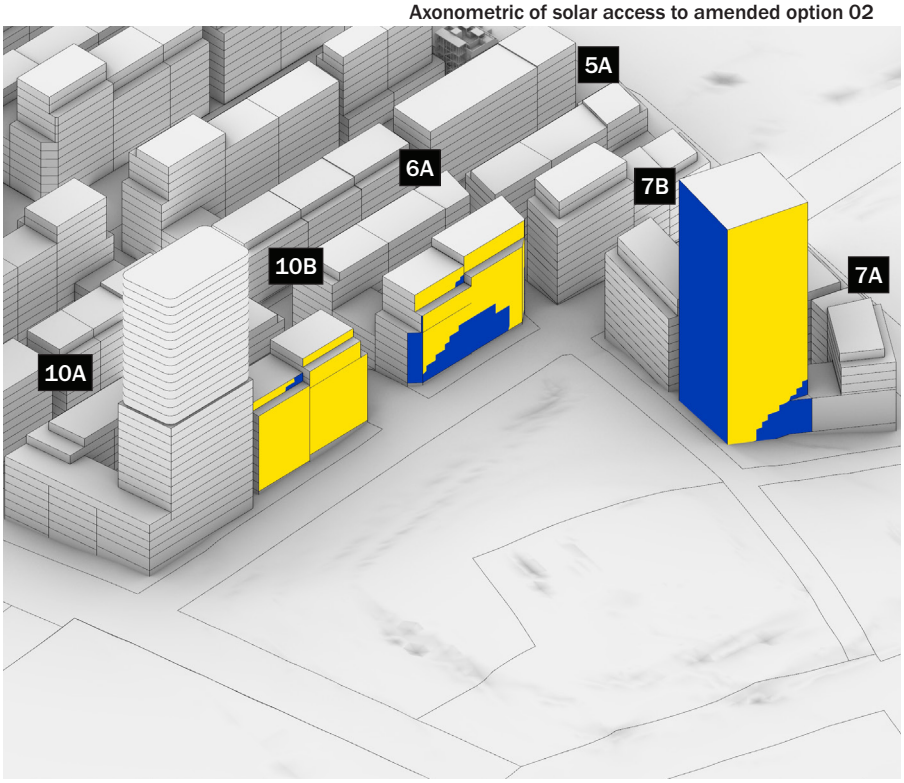


Axonometric of solar access to amended option 02

The amended building envelope has an improved outcome:

- **Block 6A:**
  - In Shadow = 31% / 508 sqm
  - In Sun = 69% / 1130 sqm
  - (A minimum of 2 hours+ of 50% of solar access required in winter)

- **Block 10B:**
  - In Shadow = 2% / 26 sqm
  - In Sun = 98% / 1444 sqm
  - (A minimum of 2 hours+ of 50% of solar access required in winter)

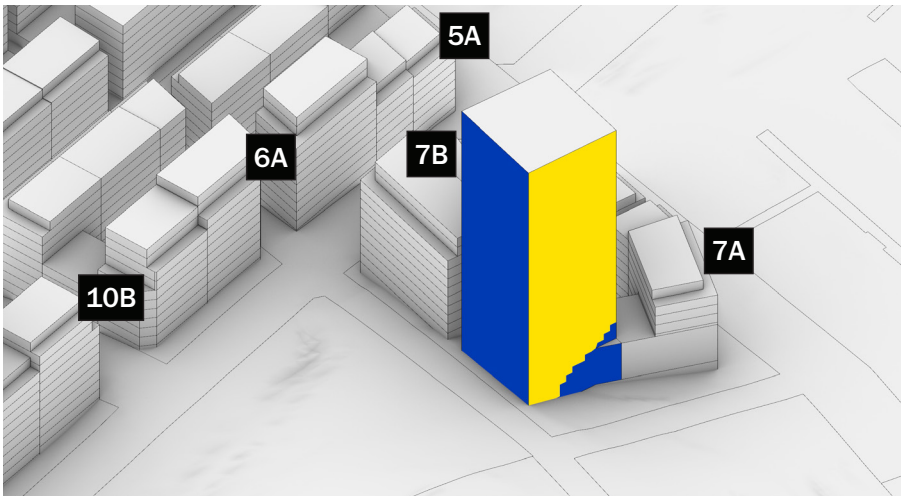


Axonometric of solar access to amended option 02

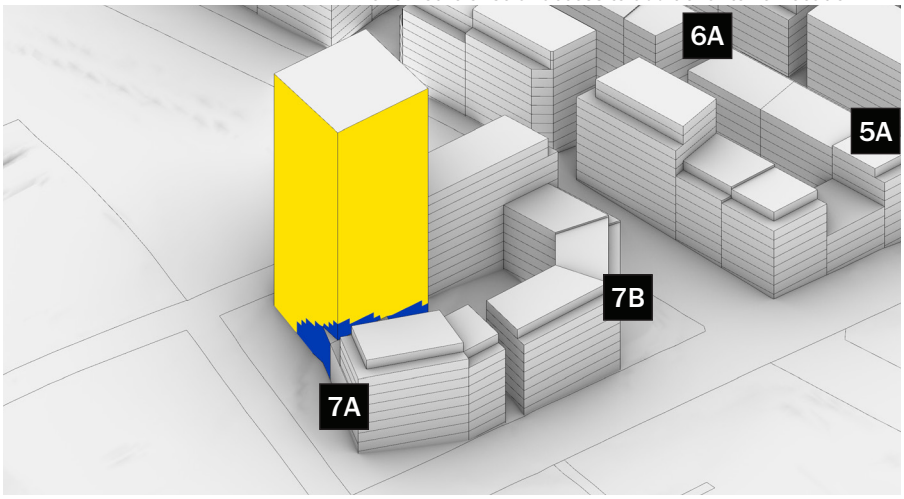
Additional tower - solar access compliance

The proposed additional tower has been located and arranged in order to conform to ADG solar access requirements:

- **East Facade**
  - In Shadow = 30% / 3758 sqm
  - In Sun = 70% / 8890 sqm
  - (A minimum of 2 hours+ of 50% of solar access required in winter)



Axonometric of solar access to additional tower location D



Axonometric of solar access to additional tower location D

4.8 GIBSON STREET SECTION

Street Cross Section - Gibson Street

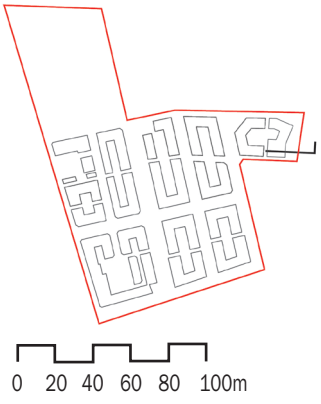
The section and street view showing tower interface to existing residential context.

Whilst a tower in this location provides a significantly different condition to the opposite residential terrace buildings, it needs to be considered in the context of:

- The planning proposal shows a 13 storey building at this location
- Retention of the existing trees will mean a greater setback to Kellick and Gibson Streets
- The adjacent residential terraces have their primary orientation away from the tower, to the north and south
- Design excellence will be a required process to consider impacts such as wind and ground interface conditions.

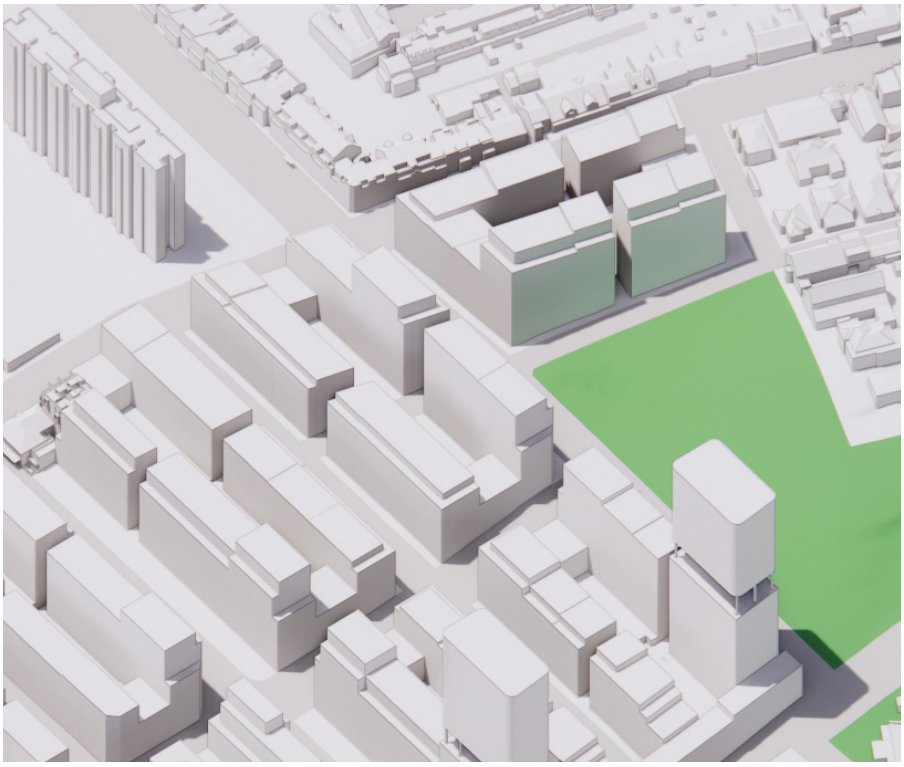
Source: Google Maps - View of Gibson Street

Section of Amended Planning Proposal built form and surrounding context



SCALE 1:500 @ A3

The planning proposal 13 storey interface to Waterloo Park and adjacent residential terrace houses.



The addition of a tower at this location of 27 storeys (inclusive of plant) has been considered in the context of:

- Additional set backs

- Tree retention

- Design excellence

4.9 THROUGH SITE LINKS

Improved access to the small park

A number of through site links were identified in the City of Sydney planning proposal, providing pedestrian connectivity generally in an east west orientation to improve permeability and diminish the impact of the long street blocks.

The IAG report identified a need for improved permeability to the small park, particularly from Cope Street. This has been reflected in the envelope massing, and will also provide for separation between buildings to reduce their overall length.

The additional through site links are shown on the plan overleaf.


STREET
GEORGE STREET
PITT STREET
WELLINGTON STREET
WELLINGTON STREET
COOPER STREET
GEORGE STREET
REEVE STREET
WEST STREET
PITT STREET
GIBSON STREET
KELLICK STREET
COPE STREET
JOHN STREET
MEAD STREET
GEORGE STREET
Additional through site link
BOTANY ROAD
MCEVOY STREET
PITT STREET

RECOMMENDATIONS

5.0 RECOMMENDATIONS

Envelope flexibility

Envelope flexibility will provide for design innovation and potential for the development industry to respond to market demands moving forward.

It will also allow the design excellence process to explore innovative approaches to identified design matters associated to solar access, wind, tree retention and noise impacts.

In that regard, a more generalised height of building map is proposed. This sets the height of perimeter buildings to the maximum level prescribed in the design guidelines, with specific objectives around solar access and amenity to also be maintained.

The envelope is shaped to enable retention of trees, the provision of through site links and to allow design solutions to wind impacts.

Tower envelopes are set at an area 25% greater than the expected FSR outcome. This will provide for flexibility in design in association with a diminished bulk.

A	3m	T3	28m
E	6m	U1	30m
J	9m	U2	33m
M	12m	V	35m
N	13m	W1	40m
O	15m	W2	42m
P	18m	X1	45m
Q	20m	X2	47m
R	22m		>100m 126.4 RL
S2	24m		Maximum Building Height - m (RL)
T2	27m		

Notes on the HOB plan identify that:

- the height controls are maximums
- due regard needs to be given to the massing envelope contained in the DCP, and
- Any building will need to be designed to ensure compliance with solar access controls.

Heights of buildings

This height of building map will be contained in the design guidelines associated to Waterloo South. It provides additional detail with regard to setbacks and stepped building heights, consistent with the City of Sydney Planning Proposal.

The main point of difference relates to:

- A requirement within the design guidelines for variation in building heights so that a consistent street wall is avoided;
- Additional design guideline content to explicitly require a stepped interface to heritage buildings or conservation zones;
- Attention to solar access requirements so that ADG compliance and urban amenity can be achieved;
- A focus on design excellence, such that redistributed floor space from the City of Sydney planning proposal envelope can be contained within the tower at the north eastern street block.

A	3m	T3	28m
E	6m	U1	30m
J	9m	U2	33m
M	12m	V	35m
N	13m	W1	40m
O	15m	W2	42m
P	18m	X1	45m
Q	20m	X2	47m
R	22m		>100m 126.4 RL
S2	24m		Maximum Building Height - m (RL)
T2	27m		

Floor space ratios

A clearer approach to floor space ratios is recommended for Waterloo South. In particular:

- Floor space ratios apply to the resultant developable land.
- There is no need to harvest or re-apportion floor space from open space areas and streets.
- Design excellence bonuses may be granted for floor space only, up to 10% across the LAHC owned sites.
- A design bonus does not apply to the community facility site (shown as 8C on the FSR map). Here, the full mapped FSR applies.

The floor space ratios range from 0.95 at the community site adjacent to the small open space, up to 7.45, where a tower is located.

Design excellence

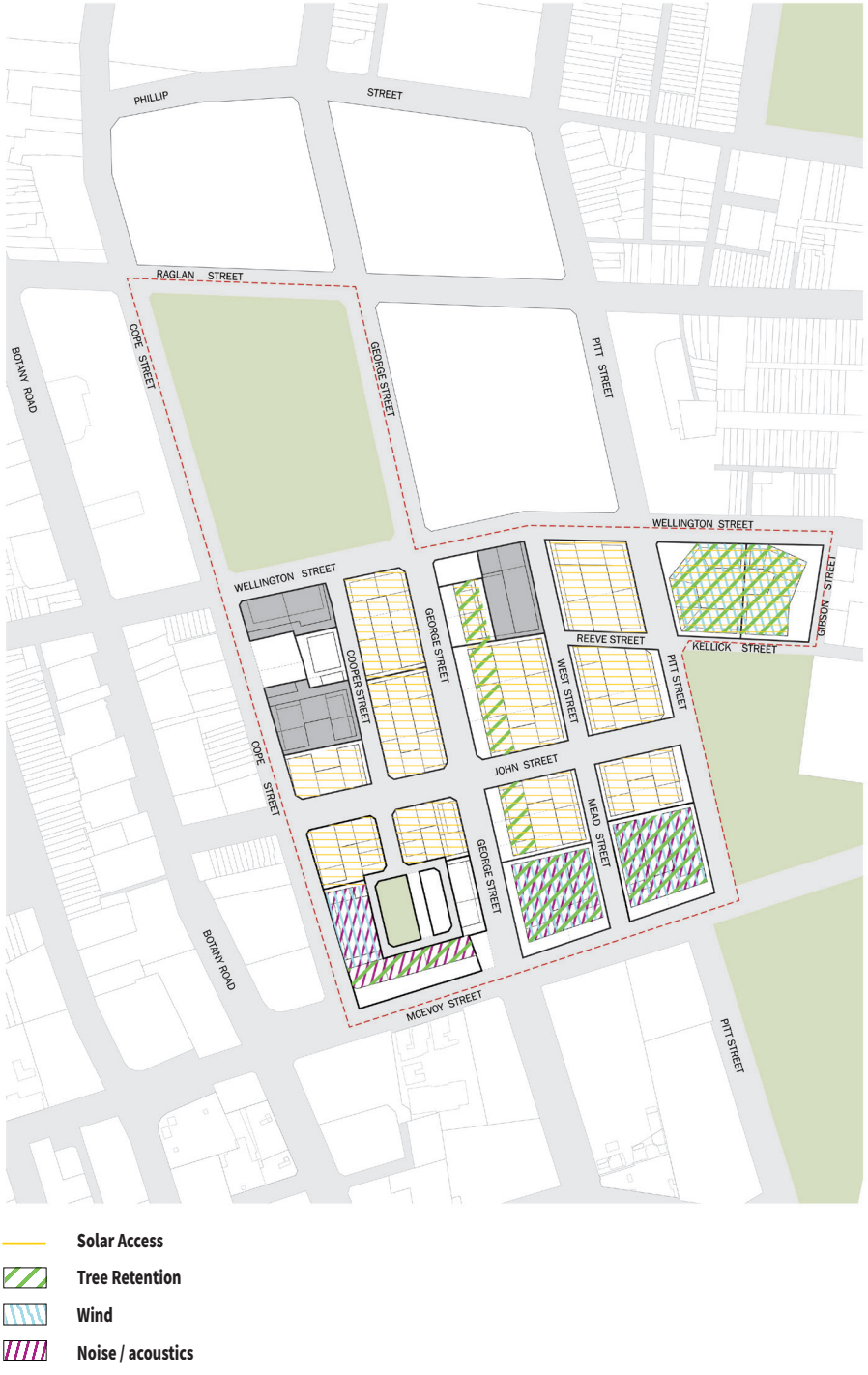
Owing to the complexity of development across Waterloo South, the resultant density, and need to carefully consider design impacts on tree retention, solar access, wind impacts and noise intrusion to apartments, a comprehensive design approach is considered appropriate. This is consistent with the City of Sydney's intended approach, but simplifies the method to a clear 10% bonus.

A design excellence map has been prepared in support of this process. Through design competition, a 10% bonus may be applied to LAHC owned sites, notwithstanding building typology.

Specific sites have been identified for particular matters over and above general design quality, including responses to:

- Solar access
- Tree retention
- Wind
- Acoustics.

Design excellence for towers will encourage a design that takes into account their prominence on the surrounding locality. and interface to lower scale buildings and conservation areas. Towers will be generally contained to 75% of the nominated envelope.



Heights and courtyards

The IAG report proposes alternative building heights to the City of Sydney proposal, in order to improve solar access to the streets and street facades of buildings.

In doing so, north facing building edges are generally increased to 7 storeys (from the City's 4 storeys), in order to balance GFA outcomes.

Response:

- The technical analysis shows that the central courtyards are significantly overshadowed during parts of the year.
- Owing to the building typology, it is difficult to achieve good solar access into the courtyards.
- For this reason, the principal open space is designated at building rooftops.
- Notwithstanding, increasing the north building faces from 4 to 7 storeys would further diminish solar access to the courtyards.
- Accessibility to courtyards is much greater than to building rooftops.
- It is recommended the north building faces remain at 4 storeys (as indicated in the revised envelope).

Tree retention

The design guidelines associated with the Planning Proposal require a minimum of 50% of high value trees and a minimum of 50% of moderate value trees are to be retained.

Additional trees are to be retained where possible.

Response:

- Through built form massing investigations, consultation with DPIE's appointed arborist, as well as considerations of amenity and character, additional areas of tree retention are recommended:
- At the north eastern street block where there are substantial existing trees - each at the corners of Pitt and Kellick, Pitt and Wellington and Wellington and West Streets.
- Along McEvoy Street between Pitt and George Streets, continuing the built form and landscape interface within the Planning Proposal between Cope and George Streets.
- Tree retention in these areas will help offset the proposed tower heights and assist in wind amelioration.

- High value tree (Retained)
- Moderate value tree (Retained)
- High value tree (Removed)
- Moderate value tree (Removed)
- High value tree (Recom. to be Retained)
- High value tree (Recom. to be Removed)
- Moderate value tree (Recom. to be Retained)
- Retention to be investigated as part of design excellence

Permeability and noise impacts from McEvoy Street

The City of Sydney proposal identifies a very long street wall between George and Pitt Streets, including extending the building face across Mead Street.

The key reason for this design solution is to mitigate noise from the busy traffic conditions on McEvoy Street.

A small portal 3 metres wide and one storey high is identified in the design guidelines to provide pedestrian connectivity.

It is noted that George Street opens onto McEvoy Street and that residential dwellings are intended at upper levels.

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Response:

- The intent by the City of Sydney for acoustic comfort within dwellings is worthy.
- However, an improved street block definition, consistent pattern of development and enhanced legibility is considered to be an appropriate trade off.
- In order to provide acoustic comfort within dwellings, the design guidelines contain provisions requiring appropriate design treatment.
- Design excellence provisions will apply to development along McEvoy Street to ensure acoustic comfort is considered.

Wind amelioration

Tall buildings may produce wind environments at ground level in public space, parks and streets that are not comfortable and may not be safe for people.

The City of Sydney proposal identifies the following measures to ameliorate wind impacts:

setting back the towers above lower scale buildings from the south by a minimum of nine metres;

rounding the corners of the towers;

continuous awnings to retail frontages and building entries on all sides of the towers that adjoin public space, streets and walkways; and

open floors between half and two thirds the tower height for at least the equivalent of three floors high.

Response:

- Through engagement with the City of Sydney, it became clear that the proposed open floors are one measure that may be considered to provide wind impact amelioration, and are not intended to be mandatory. On this basis, and because such a measure is very specific to a design, rather than an envelope control, it is recommended that requiring a building break in the tower is not reflected in the envelope.
- The principle of ensuring a comfortable ground plane should be the guiding mechanism within planning controls, and proponents can consider specific design solutions.

Wind impact at north east block

The City of Sydney proposal identifies a 13 storey building cluster at the north east street block. The IAG alternative also shows a maximum 13 storey height at this location.

Locating a tower at the corner of Kellick and Gibson Street, and lowering heights generally throughout the remainder of the precinct generally to balance floor space can improve solar access and amenity, both to internal apartment spaces, as well as to the existing Waterloo Park.

Response:

- Any wind impacts of a tower at this location will be offset by the retention of large trees at the street intersections - Kellick and Gibson; Gibson and Wellington; Wellington and Pitt.
- Additionally, wind impacts can be further addressed through building design, as recommended in the City of Sydney Planning Proposal, and through the design excellence process.

Interface to heritage items

The planning proposal contains or interfaces with a number of heritage items and conservation areas:

- Electricity substation no. 174 at the corner of George and McEvoy Streets
- Duke of Wellington Hotel (corner George and Wellington Streets)
- Former Waterloo pre-school on Cabe Street
- 229 - 231 Cope Street terrace houses
- Waterloo heritage conservation area - retains highly intact groups of terrace house development c.1880s

The planning proposal retains the heritage status of these items and areas.

The planning proposal accommodates the specific heritage items within the area by having a lower form (generally two storey) interface to them.

Response:

- The technical analysis shows that the interface of contemporary dense / bulky form adjacent to heritage items can be dealt with through the envelope and design guideline elements.
- It is recommended that the design guidelines reference the heritage items and require appropriate design attention to facade and roof heights, parapet datums.

Recommended massing

The recommended envelope massing is a cumulative impact of the urban design study and associated recommendations.

Flexibility for future design innovations , certainty of development outcomes and a focus on urban amenity have been the driving factors.

The areas identified in red in the drawing to the right are those factors that have undergone change as compared to the City of Sydney proposal. Perimeter buildings need to have regard to height for solar accessibility especially in these highlighted areas, and improved permeability is recommended to McEvoy Street.

The blue highlighted areas are additional to the City of Sydney envelope. This provides flexibility in design outcome, and provides a balancing of floor space.

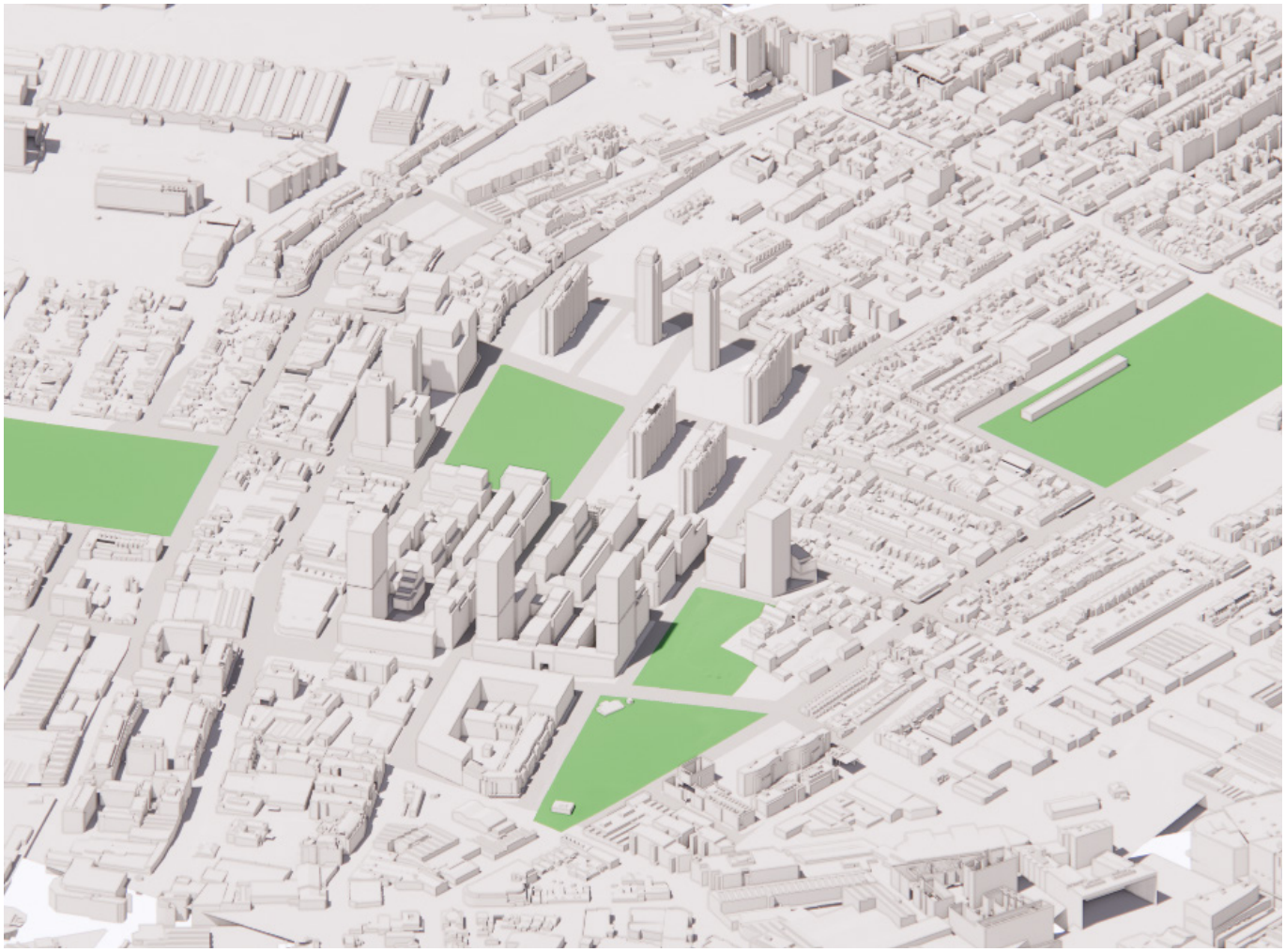
Axonometric of amended envelope showing areas requiring design attention.

Modifications to the City of Sydney proposal

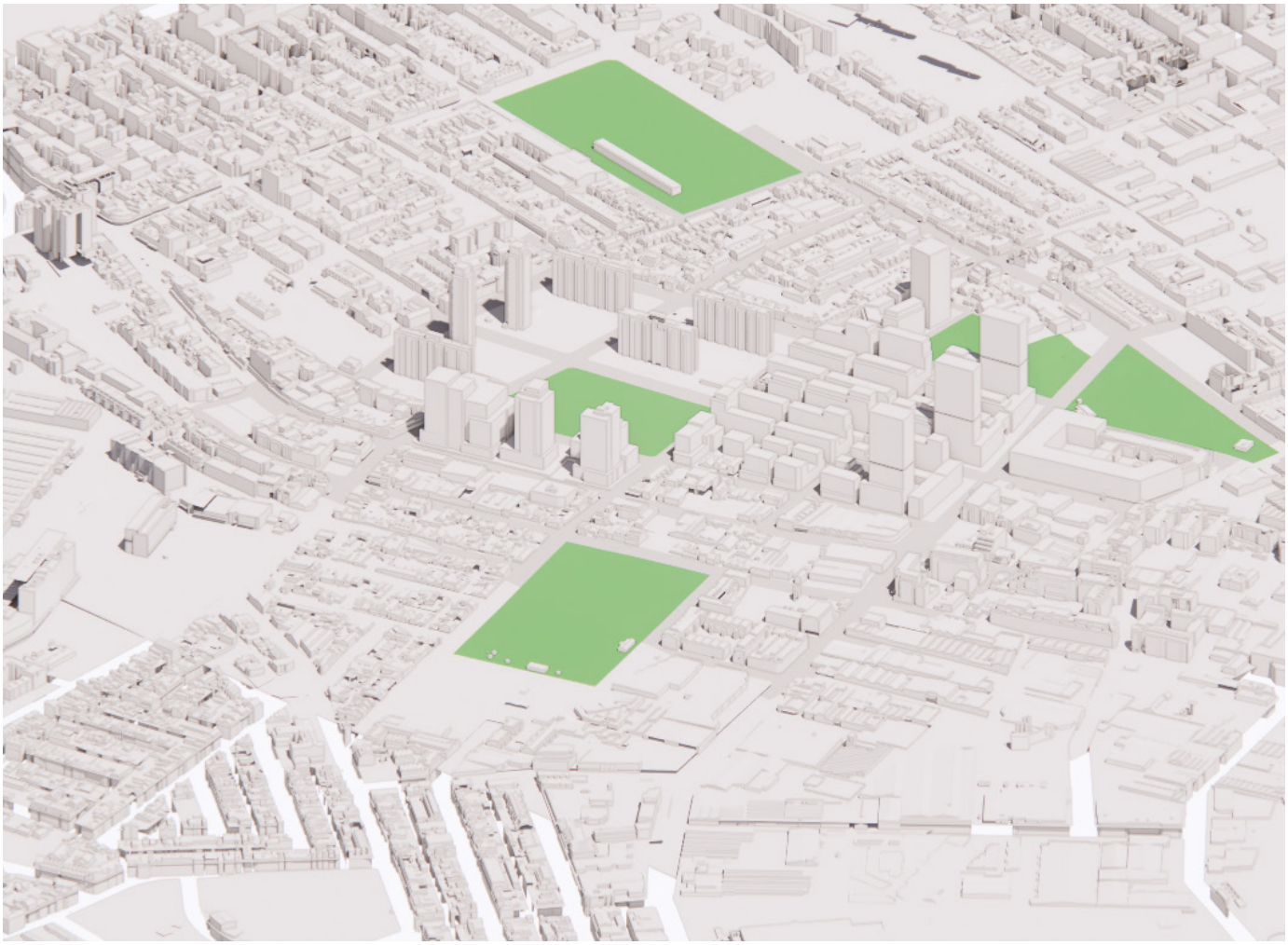
Additional to the City of Sydney envelope

Contextual considerations

The figures on this and the following pages show the proposed envelope in the context of the surrounding neighbourhoods. Comparison images with the views identified in the City of Sydney's urban design report are also provided.



Axonometric of the proposed envelope and surrounding built form - view towards McEvoy Street



Axonometric of the amended envelope and surrounding built form - view towards Botany Road

View from Redfern Park looking south west

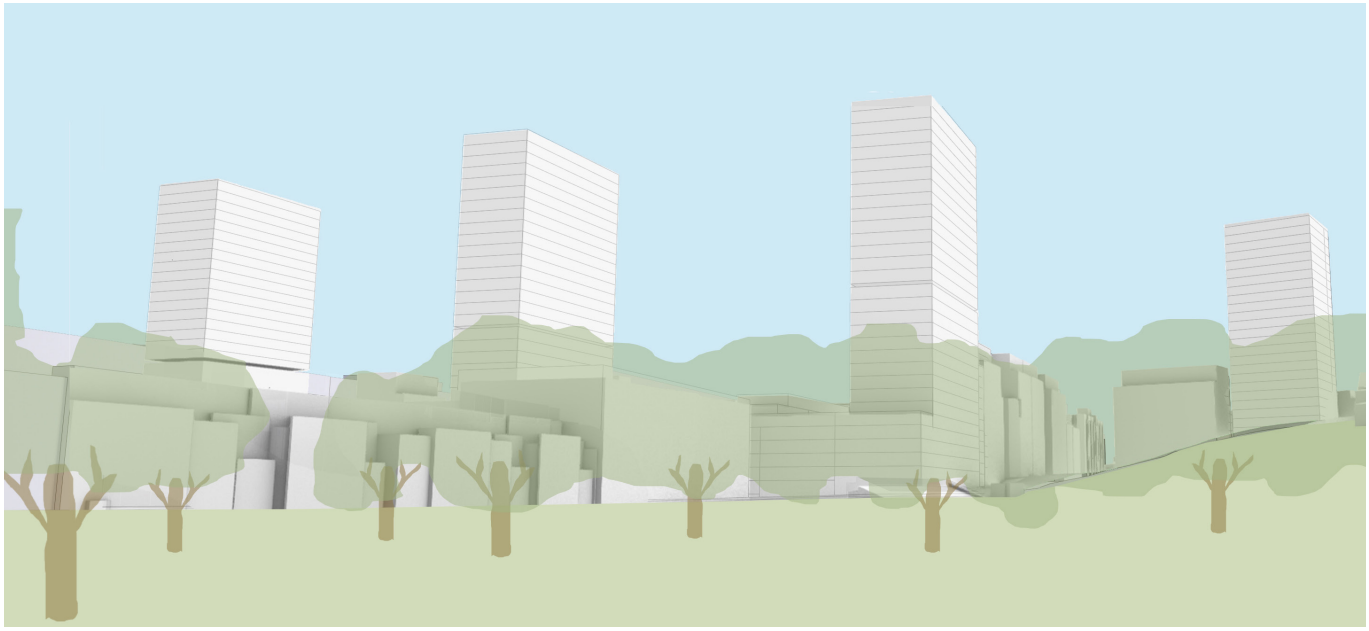
Above, City of Sydney proposal
Below, Amended envelope

View from Alexandria Park looking east

Above, City of Sydney proposal
Below, Amended envelope

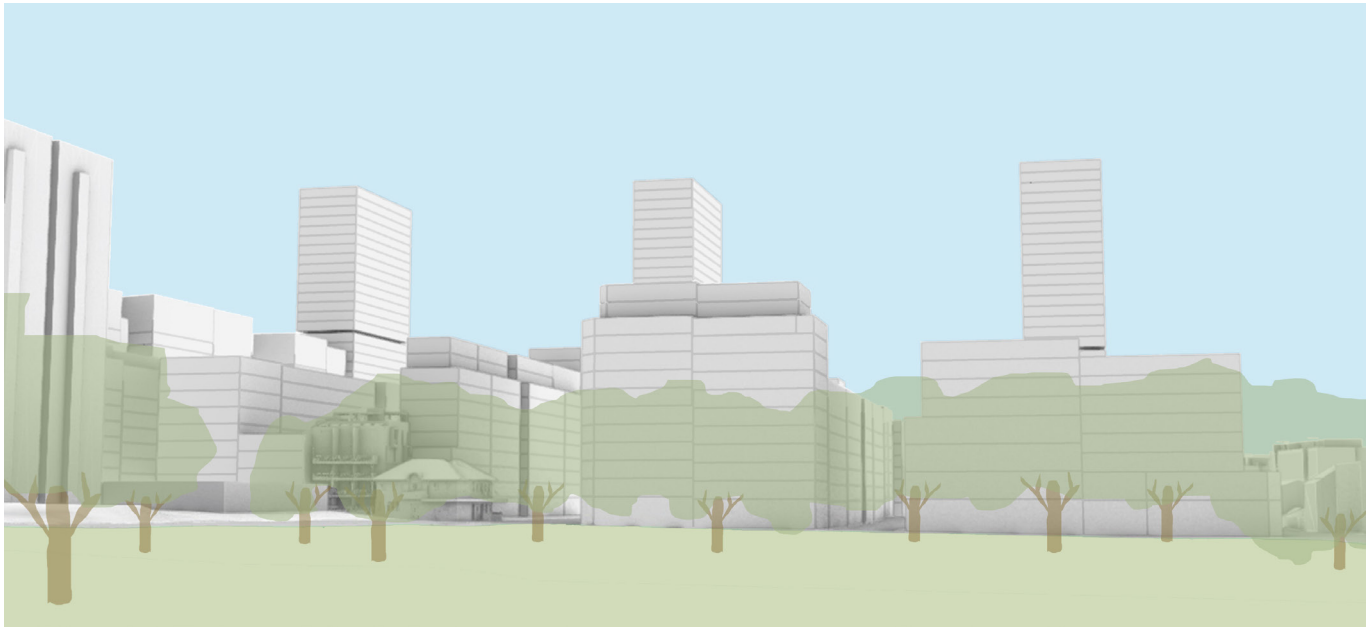
View from Waterloo Park south looking north west

Above, City of Sydney proposal
Below, Amended envelope



View from large park looking south

Above, City of Sydney proposal
Below, Amended envelope



PEER REVIEW

An independent review by Ken Maher, AO

01 INTRODUCTION

This peer review report on the urban design proposals for Waterloo Estate South addresses recommendations provided in the Hassell Urban Design Review Waterloo Estate South report (referred to as the UDR in this document). In his role as a nominated team member of the UDR, the author has engaged in the study process, progressively reviewing the urban design analysis and studies undertaken with reference to the Planning Proposal and issues raised by DPIE, the IAG and the Gateway Determination during the report preparation, as well as through consultation with the City of Sydney. This review endorses the process undertaken by the URD, and is structured under the chapter headings that report.

In summary this review supports the UDR recommendations for modifications to the Planning Proposal, namely reducing selected building heights and simplifying height controls for greater flexibility, improving open space amenity, increasing setbacks in selected locations, improving potential apartment amenity with greater design flexibility, and providing for retention of additional significant trees .These important changes are facilitated without loss of yield through the proposed introduction of an additional tower in the north eastern block and this is supported, given the retention of significant trees addresses the transition in scale to the adjacent conservation zone. The resultant variation in building heights and tower dispersal is consistent with the built form diversity if the locality, and this combined with the application of design excellence provisions will support an outcome consistent with the character of Waterloo.

02 KEY ISSUES

Key issues noted in the DPIE brief and addressed in the UDR are:

_Specific individual street blocks

_Heights and FSRs mapping

_Interface with surrounding development

_Setbacks and heights

_Street pattern and layout

_Mapping maximum building heights

_IAG report and Gateway determination matters

_CPTED principles

_Open spaces

_Retention of mature fig trees

Additional issues considered include: provision of social and affordable housing; urban comfort including retention of tree canopy, wind conditions and solar access; zoning of the proposed public park; and, design excellence bonus provisions.

The UDR has undertaken a comprehensive first principles urban design and detailed technical analysis to address the study brief.

03 PLACE ANALYSIS

As noted in the UDR, while predominately residential Waterloo communities are diverse in their demographic, cultural and industry mix, and specific to the communities surrounding the central city. The 2012 City of Sydney DCP outlines place-specific qualities of the neighbourhood and provides important direction for the development of the place and proposed refinements recommended in the UDR are consistent with these. Critical to this overall character is the diverse and dispersed nature of buildings and public realm scales - from tall towers to small terrace houses and larger footprint industrial buildings - from generous parks, community spaces and streets to intimate laneways. This diversity has underpinned the approach to the Planning Proposal and is effectively described in this section of the UDR.

04 OBSERVATIONS ON PLANNING PROPOSAL

The UDR rightly observes the Planning Proposal is seeking to balance the challenge of meeting LAHC business case yields while achieving an amenable and comfortable neighbourhood. The overarching urban design principles of the Planning Proposal, and its resultant urban arrangement, are found to be sound. Amenity, urban comfort and character are identified to be the drivers for any changes to the proposed built form as a result of this urban design review.

While the Planning Proposal can be argued to be in-principle capable of delivering an acceptable outcome there needs to be more flexibility provided to an optimum outcome through the delivery processes, and adjustments are found by the UDR to be necessary to address the issues raised by the IAG, the Gateway Determination, and the urban design analysis. Of particular concern are matters of heights and density, urban comfort and activation, setbacks, connectivity and permeability, and apartment amenity.

05 TECHNICAL ANALYSIS OF PLANNING PROPOSAL

The comprehensive technical analysis addressing matters raised in the Gateway Determination and the Apartment Design Guide (ADG) to ensure key objectives are met is undertaken in this chapter of the UDR is supported, notably in its focus on urban amenity, and apartment amenity taking into account the flexibility required to allow for likely market based demands. In this chapter of the UDR it is noted that redistribution of floor space resultant from the urban design review is focussed on:

_Neighbourhood amenity, via tree canopy cover, retention of trees, wind impact amelioration and pedestrian permeability

_Apartment amenity, via access to sunlight, appropriate building separation and envelope flexibility for innovative design

The detailed content that follows investigates specific issues raised and provides responses to these to inform recommended amendments. The coverage is comprehensive addressing matters of FSR and area assumptions, heritage, tree canopy, building separation, and solar access (apartments and open space), as well potential tower locations and potential massing adjustments.

Not addressed in detail in this analysis are issues of wind and acoustic impacts, however these are noted and can appropriately be subject of detailed studies within the Stage One application process for LAHC sites, and the development approval process for private sites given the relatively modest scale of these.

06 COMMENTS ON RECOMMENDATIONS

Envelope flexibility

Simplification of the development envelopes avoids the potential problem of limiting configurations and layouts resulting from those suggested in the Planning Proposal, and allows for greater design flexibility. The overlay of specific design guidelines addressing issues including solar access and street wall variation, as well as the buffer between FSR and envelope will protect design quality, as will the design excellence controls.

Design excellence

Given the density and the unique context of this locality a comprehensive design excellence strategy is required, including specific provisions for particular sites related to tree retention, solar access, wind, and acoustics. Furthermore it is recommended that the City of Sydney competitive design requirements be applied and specific competition briefs be prepared for the towers including where relevant contextual heritage considerations, and eminent jurors are appointed.

Heights and courtyards

It is critical that any permitted increase in building heights in for courtyard block typologies are limited to locations that protects sun penetration to the central courtyards. Additional design guidelines will be needed to ensure variation in street wall heights to protect the variation in scale characteristic of the locality.

Tree retention

The more specific provisions for significant tree retention is important to retaining local landscape character as well as providing a better interface with McEvoy Street. It is also important to the north east block and the proposal for the additional tower.

Permeability and noise impacts from McEvoy Street

The proposal to open up Mead Street is proposed on the basis that noise impacts could be controlled in a similar way as proposed for George Street. While this will place constraints on the design of some apartments in proximity to McEvoy Street, the greater benefits for the clarity of permeability and block structure is a worthwhile trade off.

Wind amelioration

Rather than the specific proposal by the City of Sydney for breaks in the tower forms, greater flexibility in the design opportunities. Additionally, specific provisions will need to be included in the design competition briefs for these three towers to ensure the wind amelioration issues are addressed in the design of the towers. The floor space requirements relative to the envelope controls support the capacity to respond effectively to the resolution to wind impacts.

Interface to heritage items and conservation areas

The built form controls respond generally to this issue, although detailed design guidelines are needed to guide appropriate design responses. Retention of the trees at the corner of Gibson and Kellick streets will be critical in mitigating the transitions in scale from the proposed additional tower to the adjacent low scale conservation area, and consequently provisions will be required to ensure these trees are adequately protected and the design of the tower avoids any risk to their survival.

Recommended built form controls

The proposed reduction in height of perimeter block buildings is important to achieving adequate amenity in the central courtyards, and the surrounding buildings. This reduction in maximum height is possible through the transfer of floor space to the proposed additional tower in the north eastern block.

APPENDICES

6.0 APPENDIX A

6.1 Design Guideline Drawings

The following drawings are updated to reflect the amended envelope as recommended by this urban design study.

They will be incorporated into the body of the design guideline document.

6.2 Amended Height of Building

This drawing provides a simplified consolidated building height of each building lot.

A	3m	T3	28m
E	6m	U1	30m
J	9m	U2	33m
M	12m	V	35m
N	13m	W1	40m
O	15m	W2	42m
P	18m	X1	45m
Q	20m	X2	47m
R	22m		>100m 126.4 RL
S2	24m		Maximum Building Height - m (RL)
T2	27m		

SCALE 1:1000 @ A3

6.3 Street block and lot plan

The amended street blocks and building lots provide a detailed plan of areas for the redevelopment of Waterloo Estate (South).

6.4 Land dedication and easements

Amended proposal outlines the through site road from Mead Street to McEvoy Street.

- Precinct boundary
- Existing lot boundary
- New lot boundary (Indicative)
- Through-site link (Indicative)
- New streets to be dedicated to the City
- Street widenings to be dedicated to the City
- Through site links to be provided as easements
- New park to be dedicated to the City
- City-owned land to be incorpated into new park

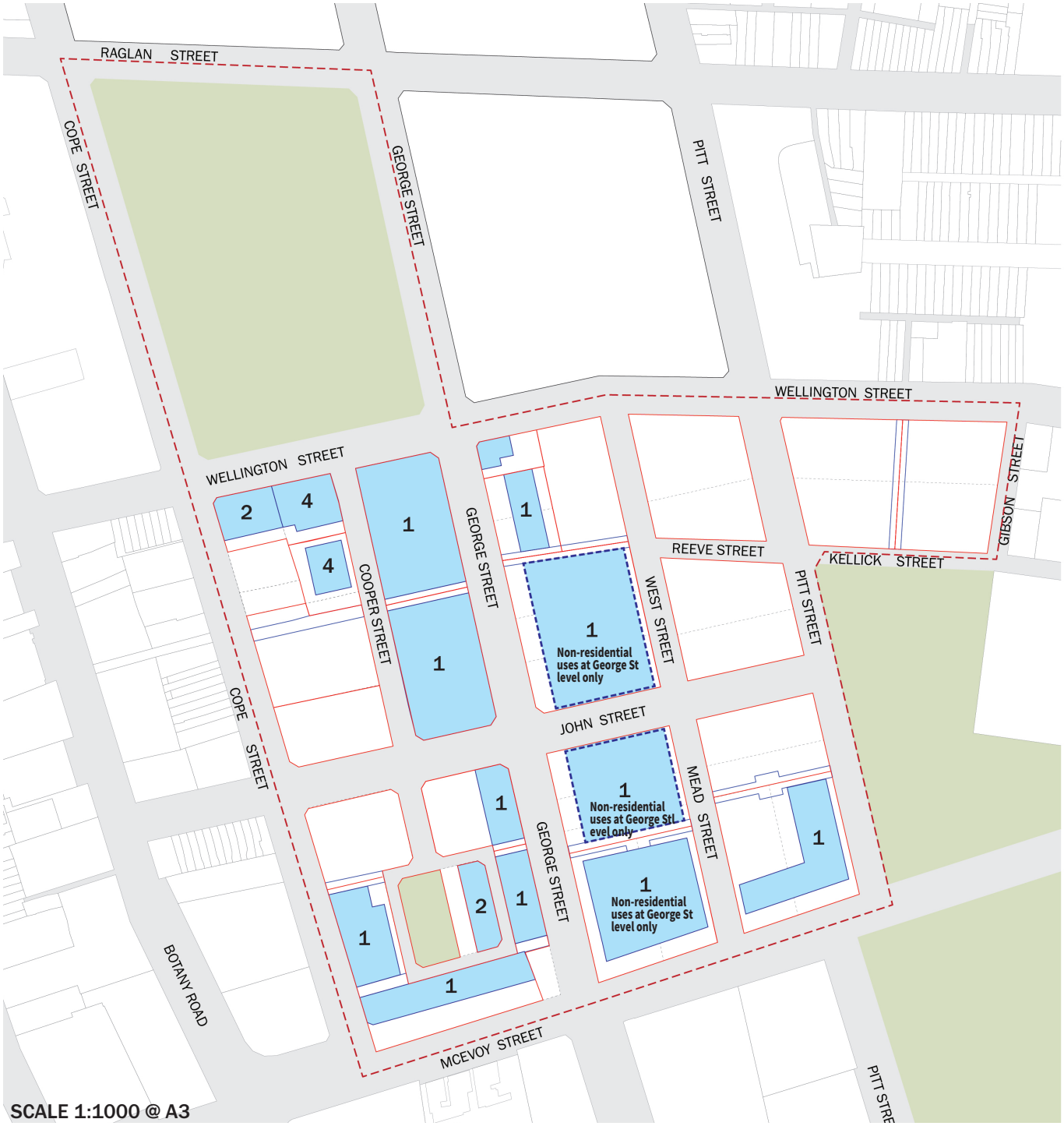
SCALE 1:1000 @ A3

6.5 Through site link plan

The through site links provide additional connection to all parts of the precinct, the new parks and to Waterloo metro station.

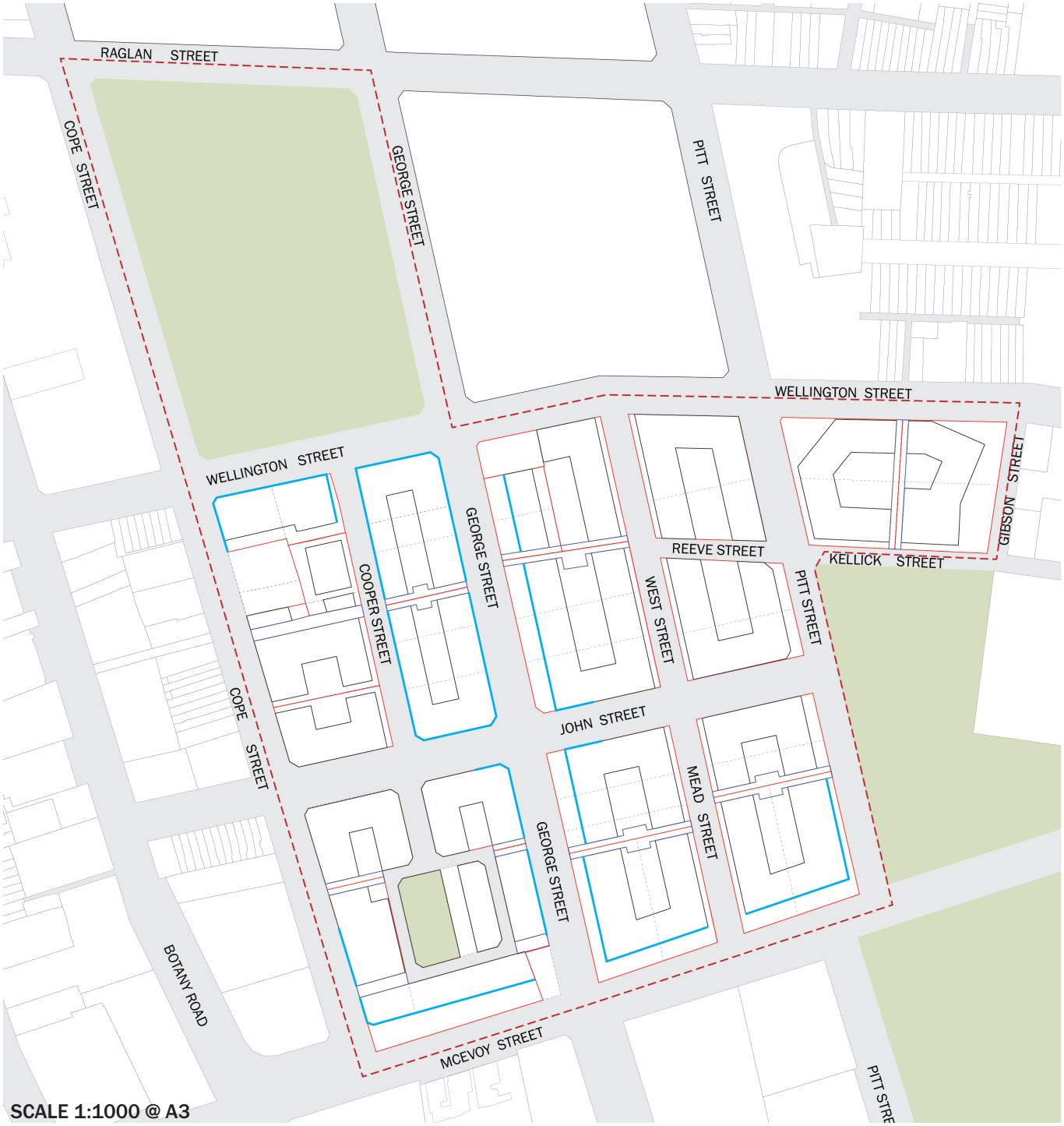
6.6 Land use

The distribution of land uses in Waterloo Estate (South) ensure a mix of uses, dwelling sizes and a continuous ground level retail in the precinct.



6.7 Active frontage

The provisions of the amended active frontages on George Street and McEvoy Street are in accordance with Sydney DCP 2012 applied in Waterloo Estate (south).



6.8 Street network

The street network is to be design in accordance with the City of Sydney Public Domain Manual and the City of Sydney Streets Design Code and Technical Specifications as they apply from time to time. The amended street network outlines Mead street connecting John Street to McEvoy Street.

6.9 Access and circulation

The amended access and circulation provide a connection between John street and McEvoy Street through Mead Street.

6.10 Significant Trees

The provision relation to trees, urban ecology, deep soil and landscaping in the Sydney DCP 2012 apply to Waterloo Estate (South). The amended provisions consider recommendations to remove moderate and high value trees north east of the site.

6.11 Height in Storeys

The amended design proposal provides the height in storeys to ensure a predominantly low to medium rise across the precinct, with additional tall buildings located in the south on McEvoy Street and north east on the intersection of Kellick Street and Gibson Street.

6.12 Height of Building

The amended design proposal provides the height of building to ensure a predominantly low to medium rise across the precinct, with additional tall buildings located in the south on McEvoy Street and north east on the intersection of Kellick Street and Gibson Street.

A	3m	T3	28m
E	6m	U1	30m
J	9m	U2	33m
M	12m	V	35m
N	13m	W1	40m
O	15m	W2	42m
P	18m	X1	45m
Q	20m	X2	47m
R	22m		>100m 126.4 RL
S2	24m		Maximum Building Height - m (RL)
T2	27m		

SCALE 1:1000 @ A3

6.13 Ground level setbacks

Primary ground level setbacks are to be provided to enable clear line of sight between building entrance, any facade window and adjoining public domain. Amended primary ground level setback in the south ensure additional deep soil and landscaping.

6.14 Upper level setbacks

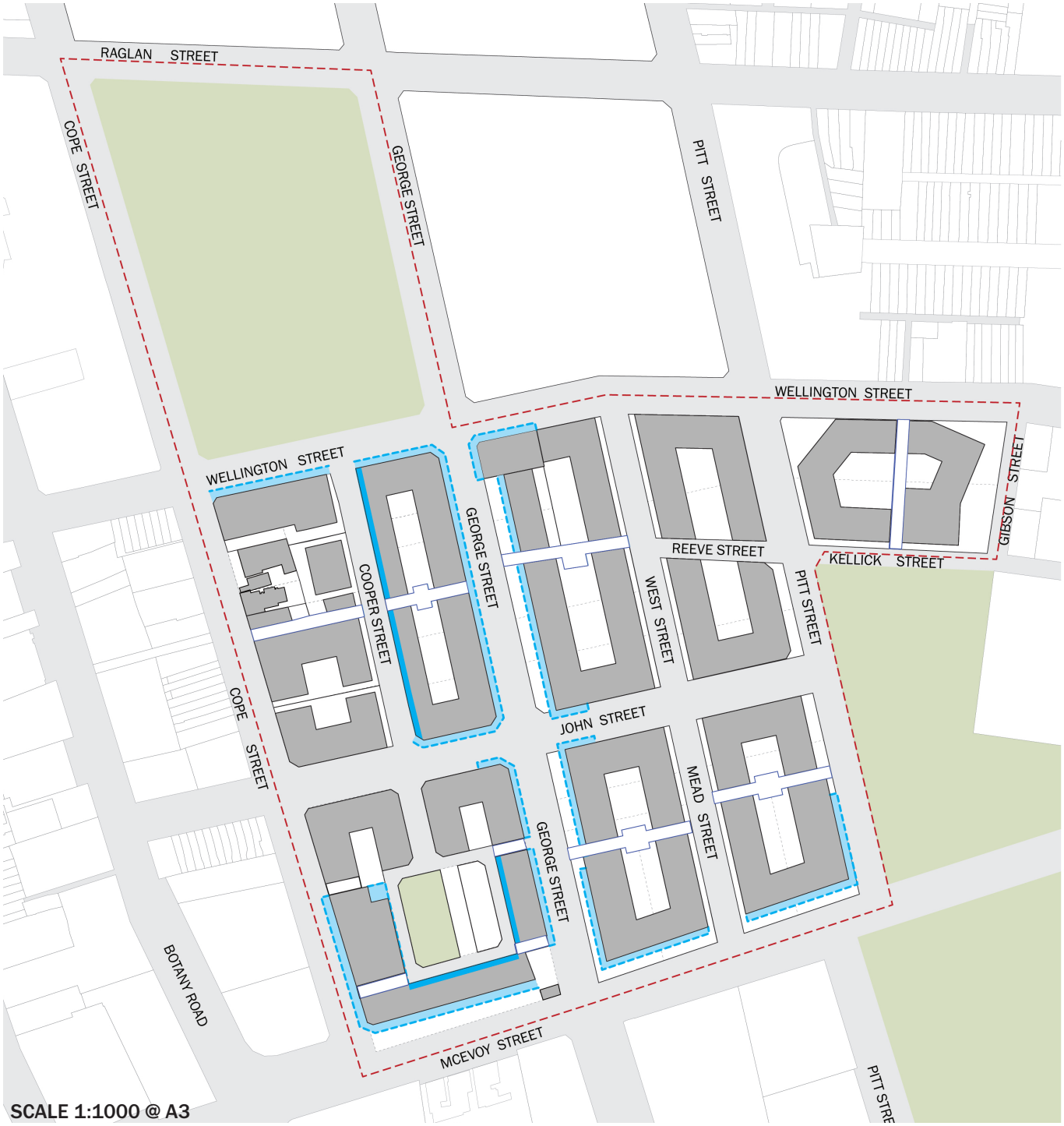
Upper level setbacks are to be provided to ensure buildings facilitate adequate sunlight to public space and reduce the apparent height of buildings and increase the view of the sky from public space.

- Precinct boundary
- Existing lot boundary
- New lot boundary (Indicative)
- Primary upper level setback 0-4m
- Primary upper level setback 3m
- Primary upper level setback 4m
- Primary upper level setback 5m
- Primary upper level setback varies between 9-15m

SCALE 1:1000 @ A3

6.15 Awning and colonnades

The amended awnings and colonnades are located to maximise pedestrian amenity and provide for continuous unrestricted pedestrian access alongside Cooper Street and Cooper Place where there is ground floor non-residential frontage.



6.16 Roof level open spaces and green spaces

The roof level communal open space and green roofs are in accordance to the amended design proposal in alignment with the City of Sydney Landscape code.

6.17 Ground level soil and planting

Landscape areas and 'planting on structure' are to align in type, location and size with the areas as shown in the amended design proposal.

6.18 Competitive design process sites

The following design excellence strategy applies to all competitive design process sites in the amended Waterloo Estate (south) design proposal relating to 'Design excellence and competitive design processes' in Sydney DCP 2012.

6.19 Car park locations

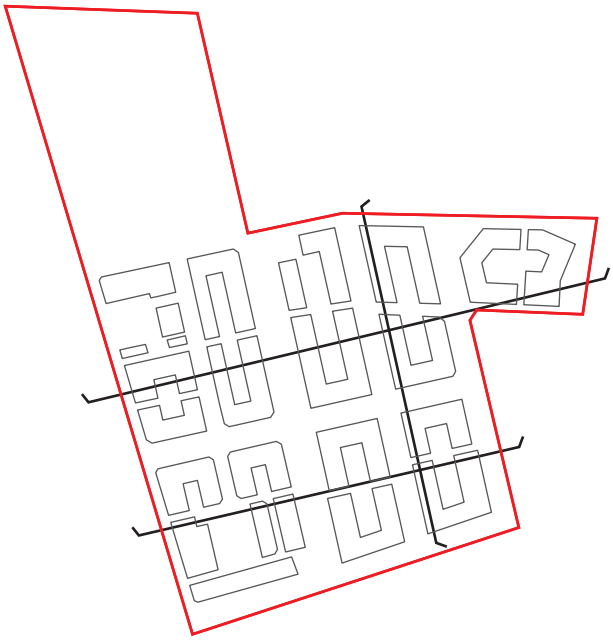
Vehicular access and egress points are to be located on the street frontages identified in the amended Waterloo Estate (south) design proposal.

6.20 Stormwater

Stormwater is to be generally managed with the amended Waterloo Estate (South) design proposal in accordance with the City of Sydney Interim Floodplain Management Policy.

6.21 Section

The street is to be designed in accordance with the indicative street specifications with the amended Waterloo Estate (South) design proposal.



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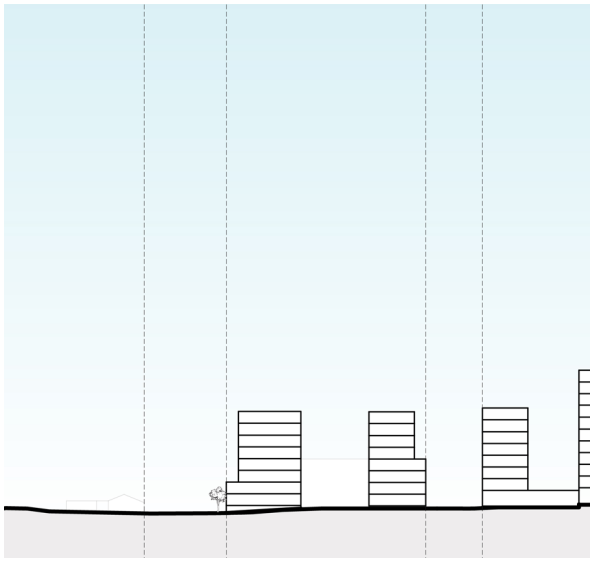
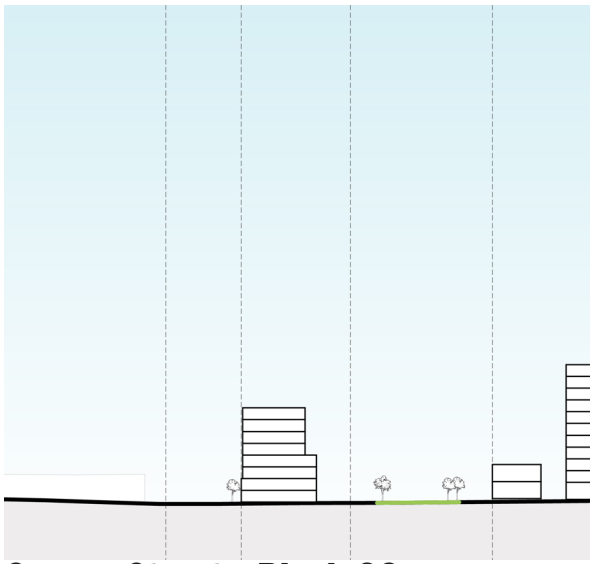
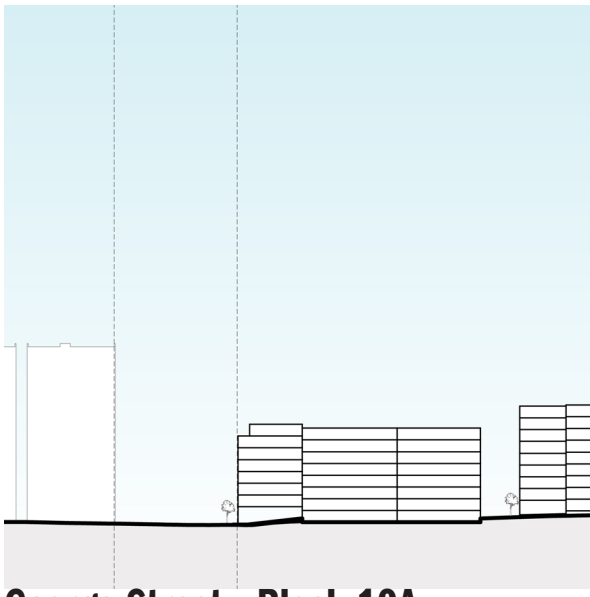


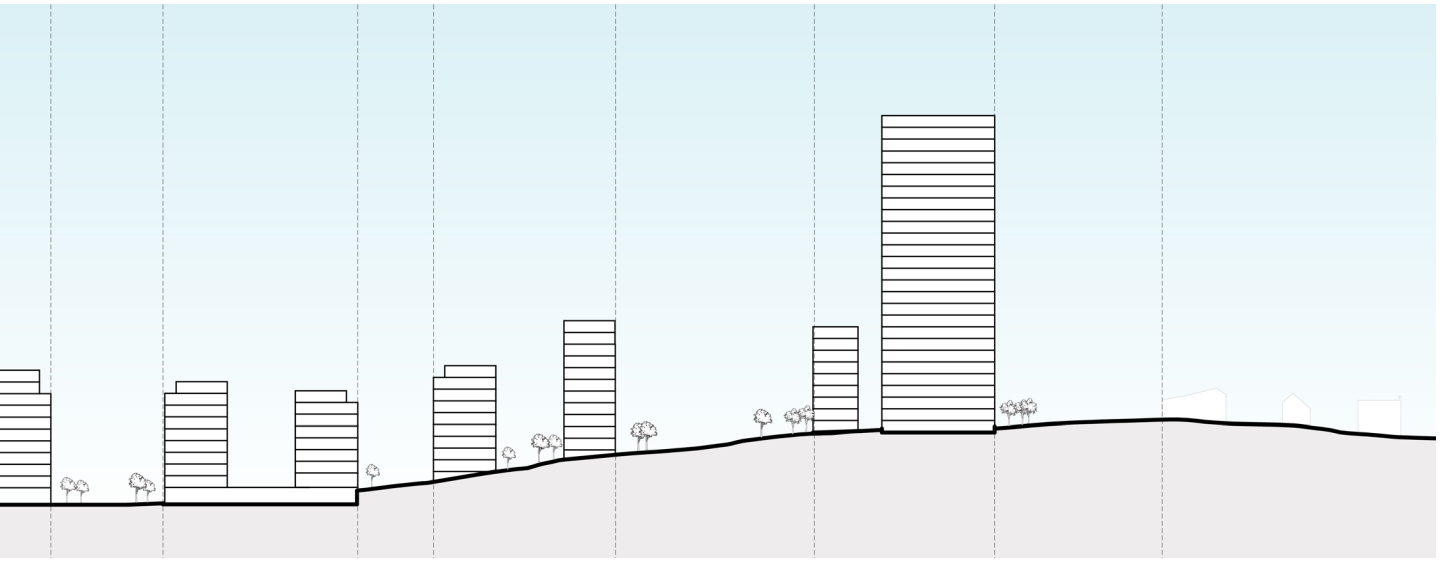
George Street - Block 3C



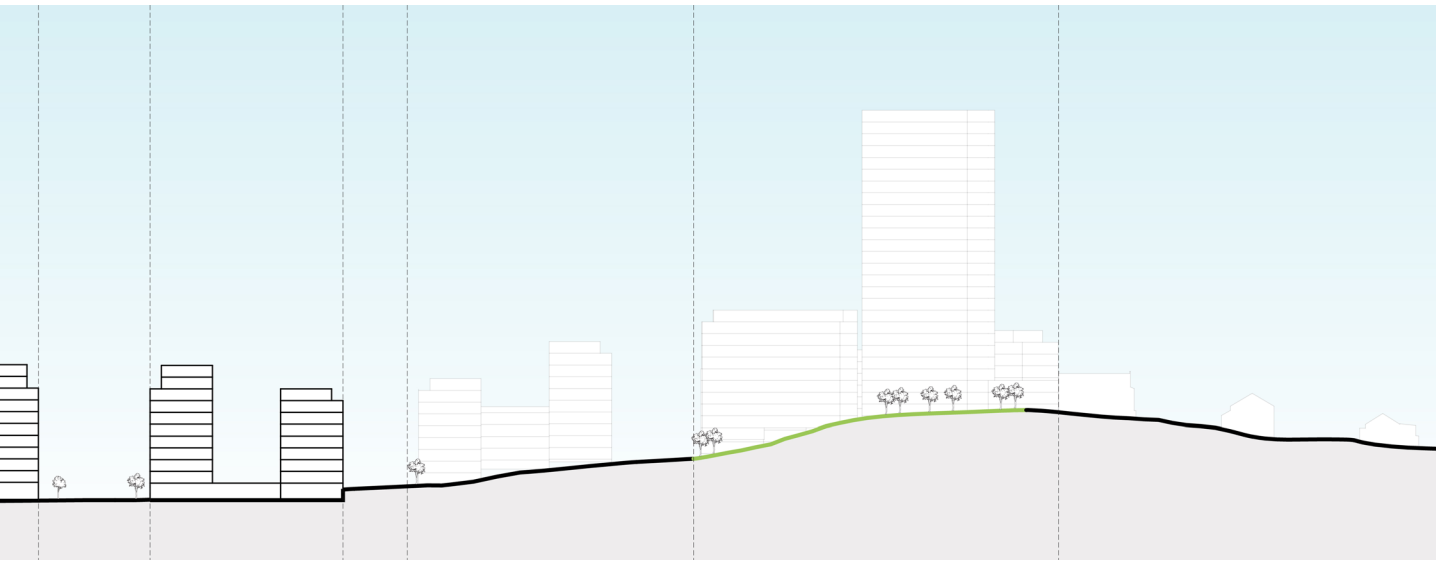
George Street - Block 8C



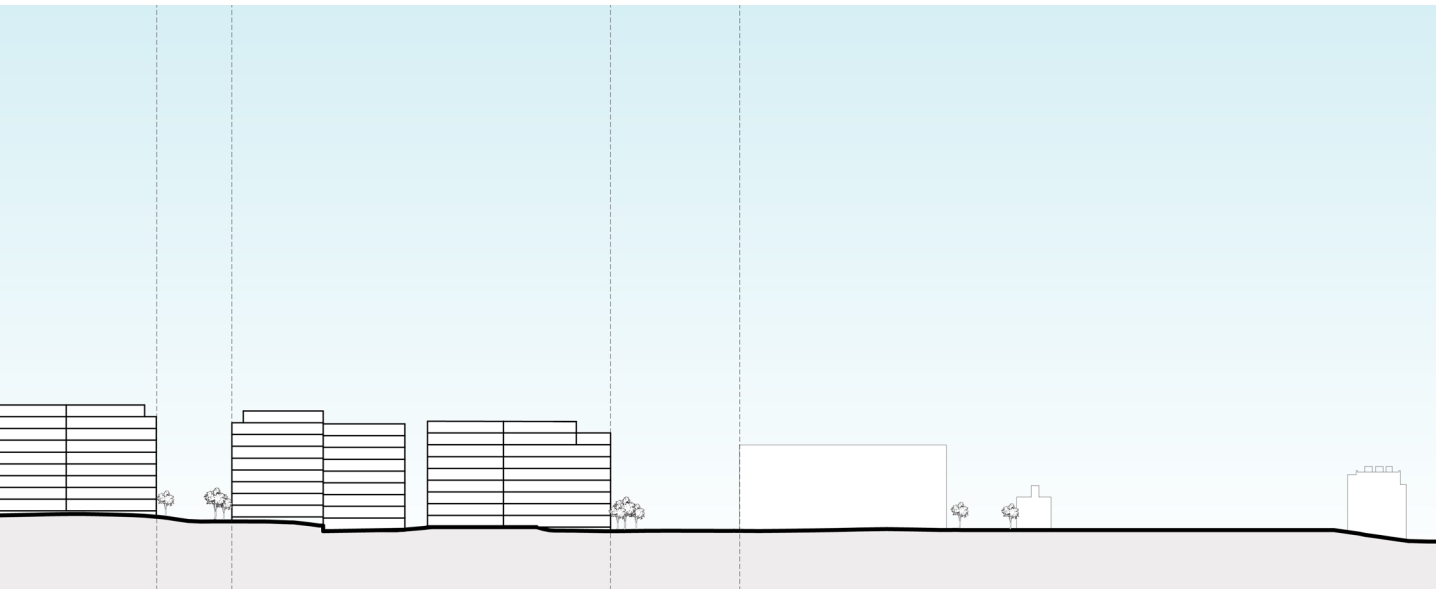
George Street - Block 10A



Section of Amended Planning Proposal built form and surrounding context



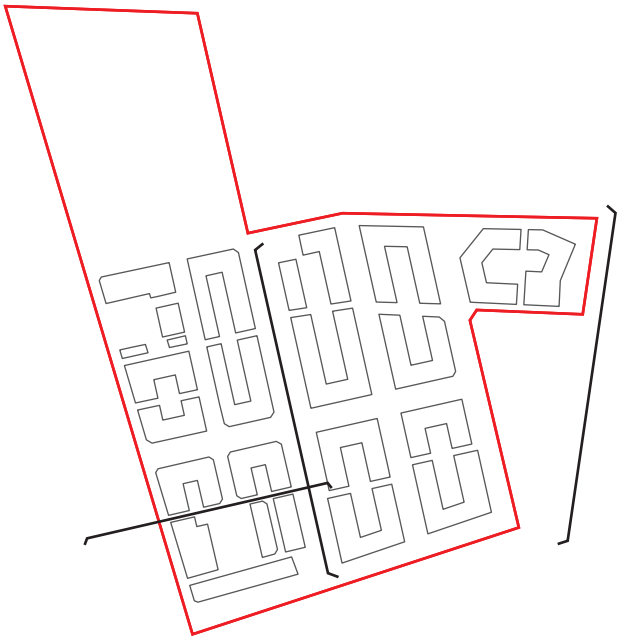
Section of Amended Planning Proposal built form and surrounding context



Section of Amended Planning Proposal built form and surrounding context

6.22 Section

The street is to be designed in accordance with the indicative street specifications with the amended Waterloo Estate (South) design proposal.



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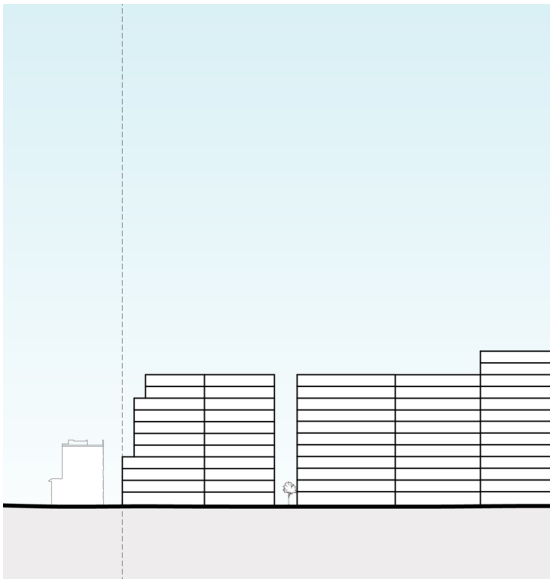
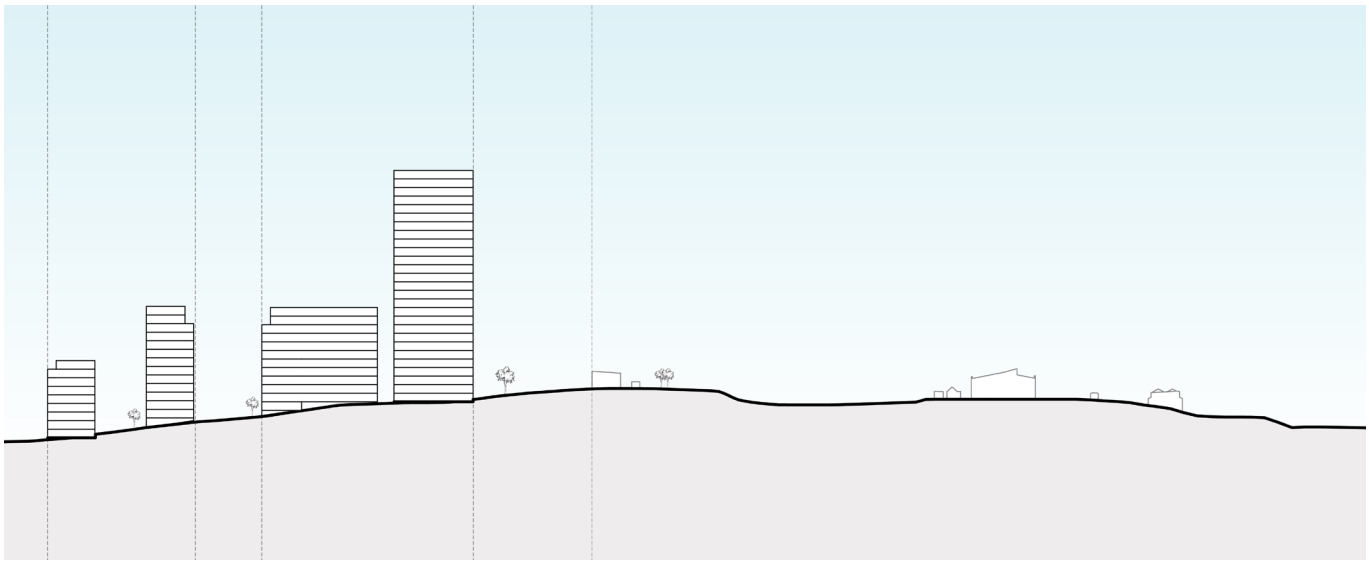


Section A3 - Block 9A

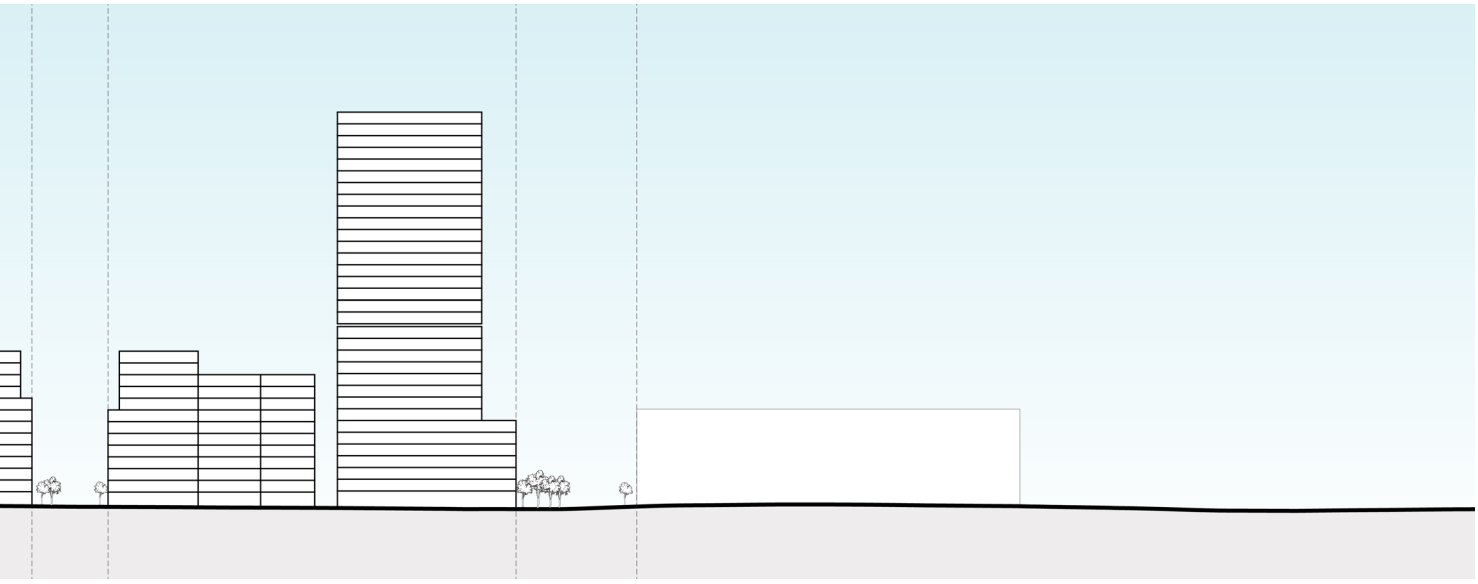


Section A1 - Block 7A

Section of Amended Planning Proposal built form and surrounding context

Section A2 - Block 7A

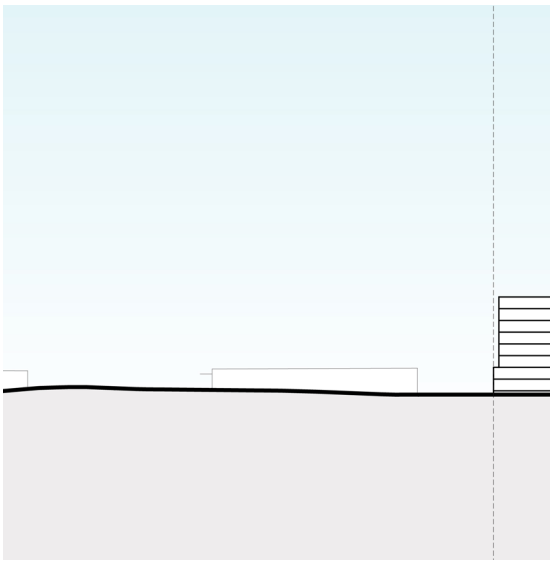
Section of Amended Planning Proposal built form and surrounding context



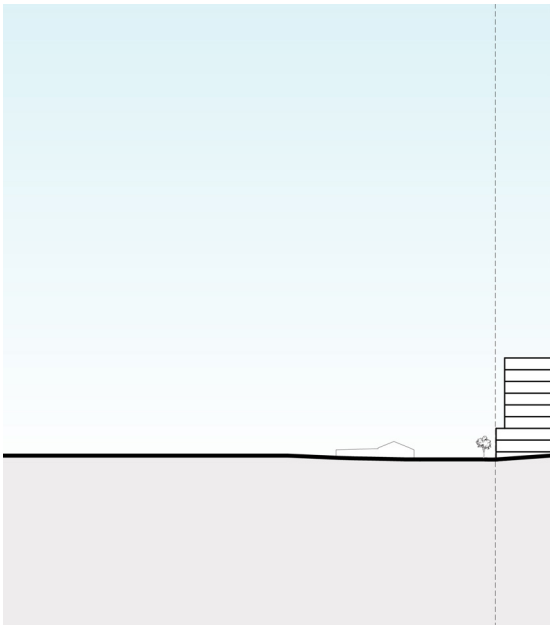
Section of Amended Planning Proposal built form and surrounding context

6.23 Section

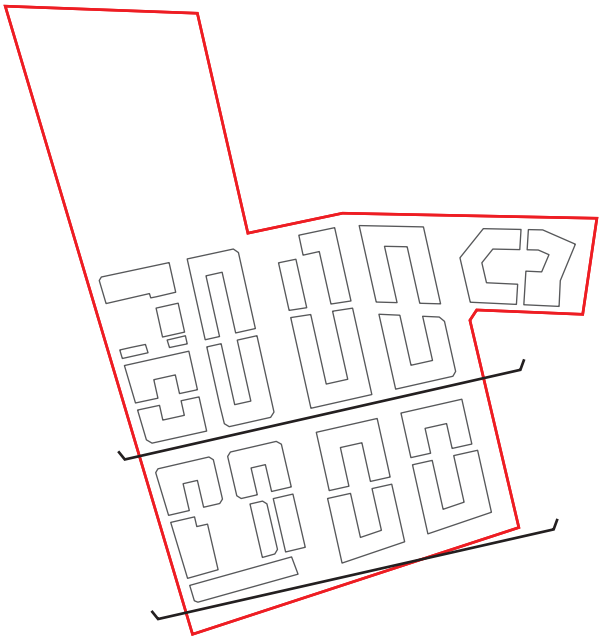
The street is to be designed in accordance with the indicative street specifications with the amended Waterloo Estate (South) design proposal.



Mead Street

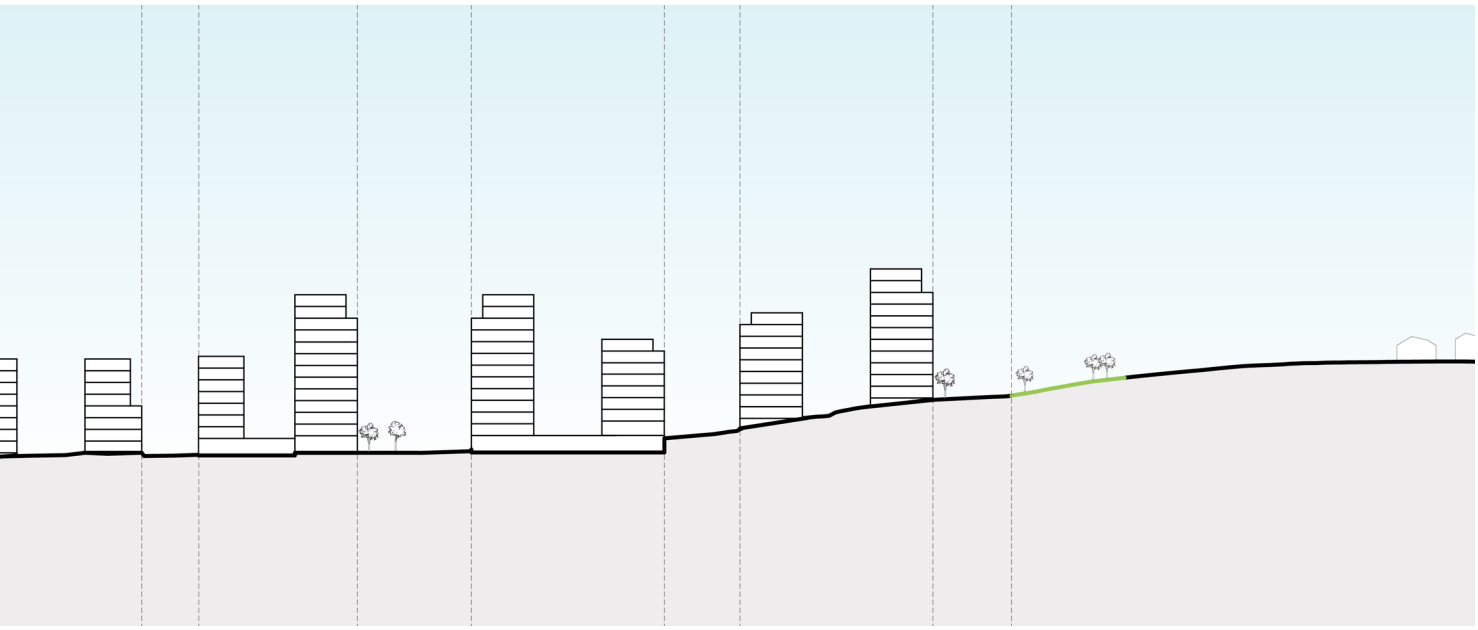


West Street



SCALE 1:1000 @ A3

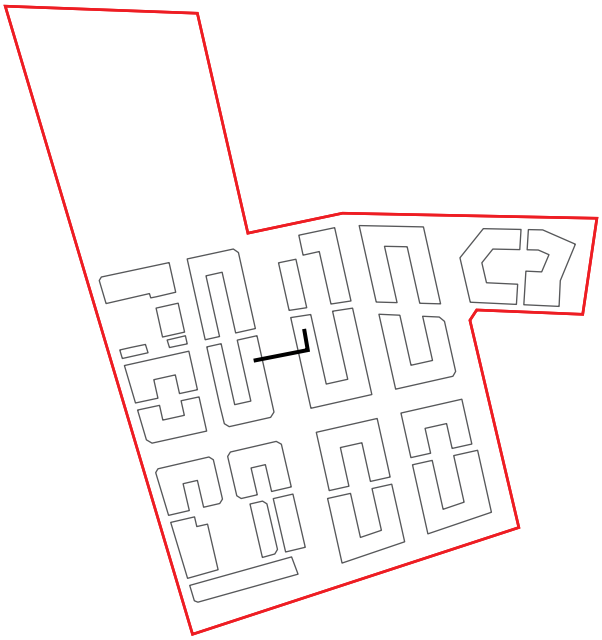
Section of Amended Planning Proposal built form and surrounding context



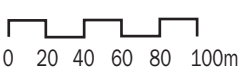
Section of Amended Planning Proposal built form and surrounding context

6.24 Street Cross Section - George Street

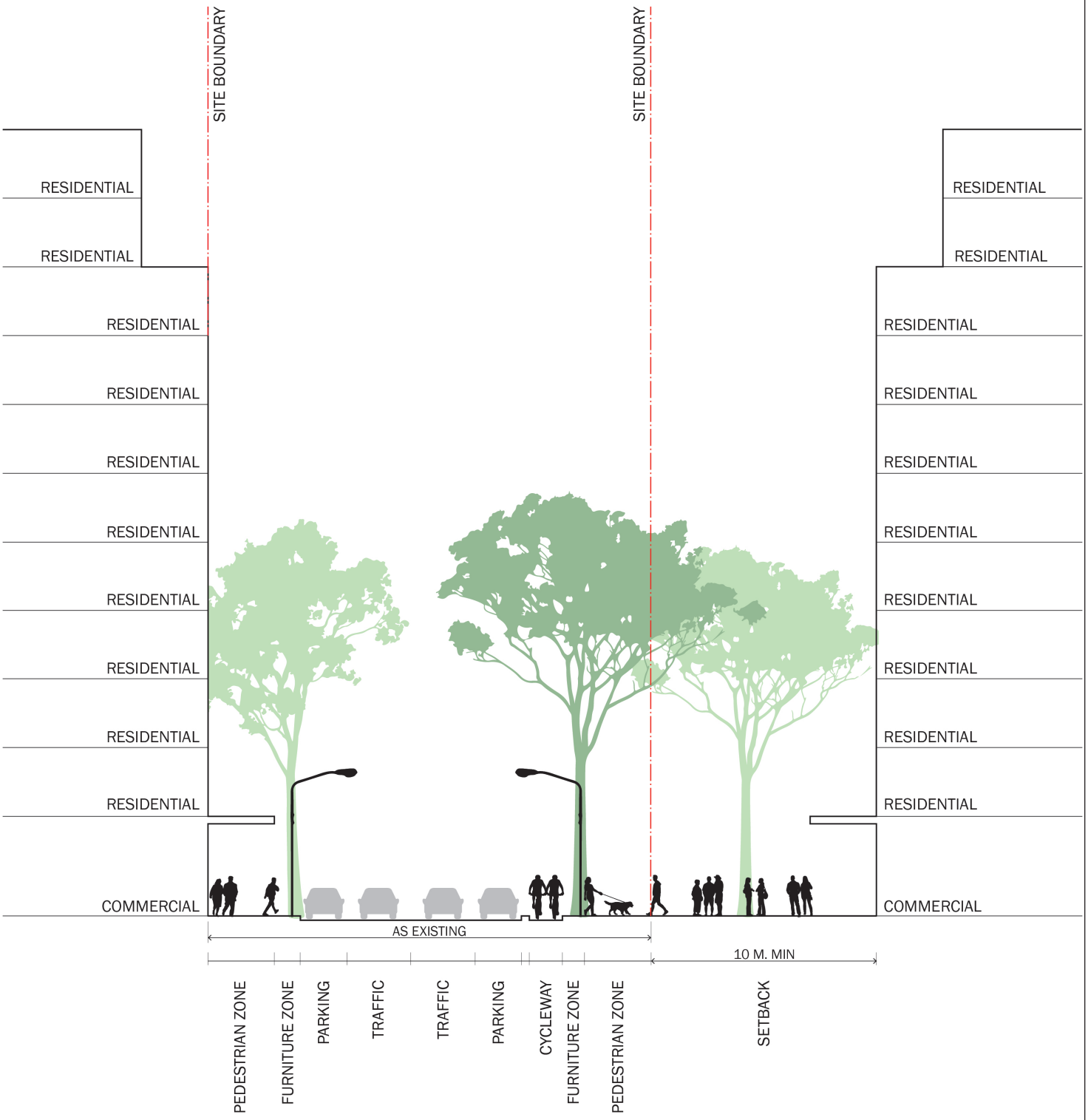
The street is to be designed in accordance with the indicative street specifications with the amended Waterloo Estate (South) design proposal.



SECTION LOCATION



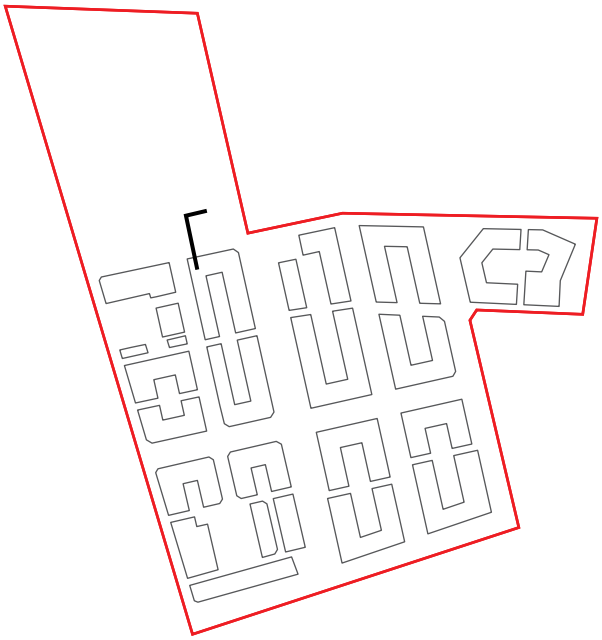
SCALE 1:250 @ A3



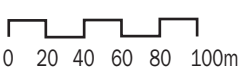
Section of Amended Planning Proposal built form and surrounding context

6.25 Street Cross Section - Wellington Street

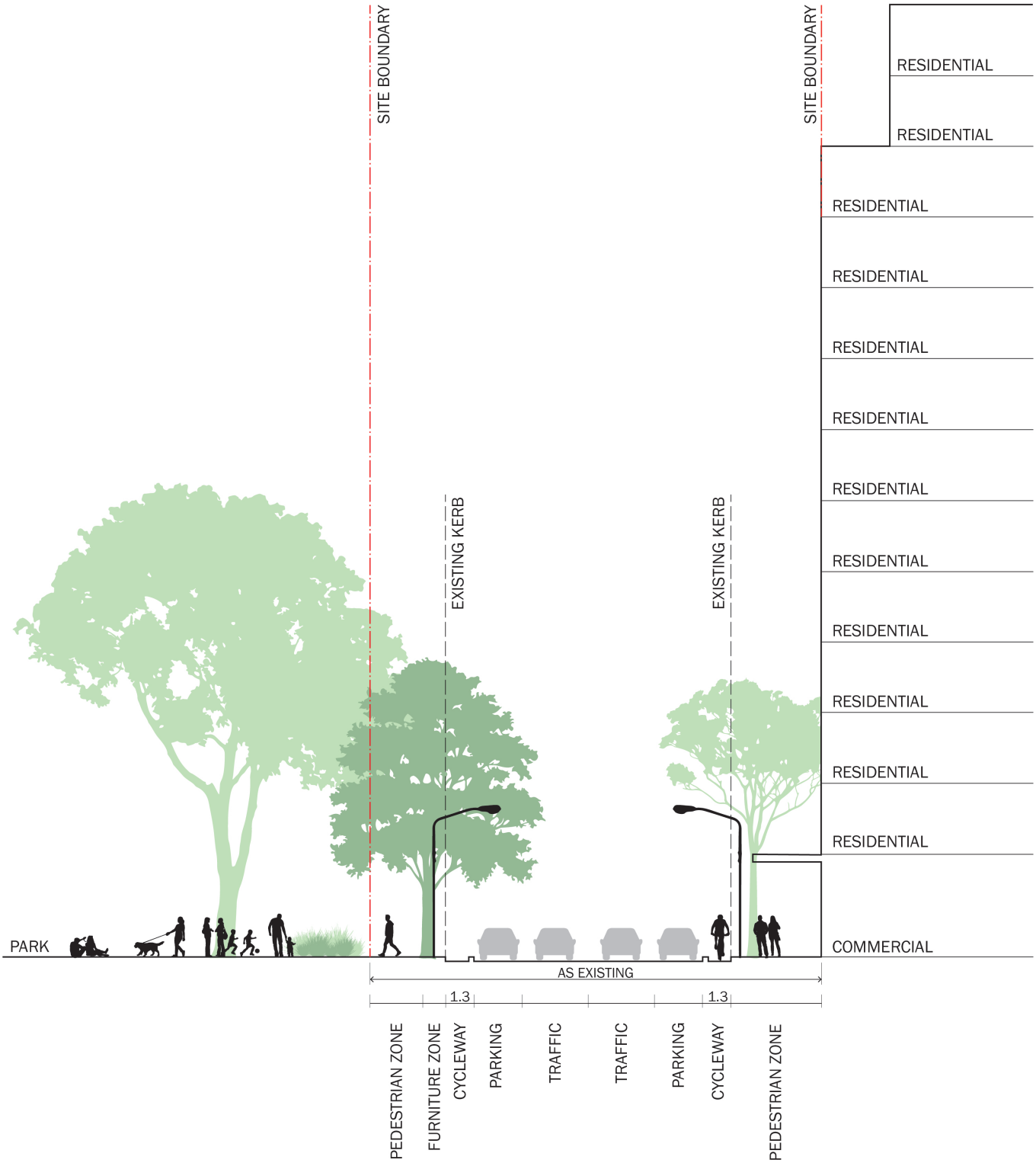
The street is to be designed in accordance with the indicative street specifications with the amended Waterloo Estate (South) design proposal.



SECTION LOCATION



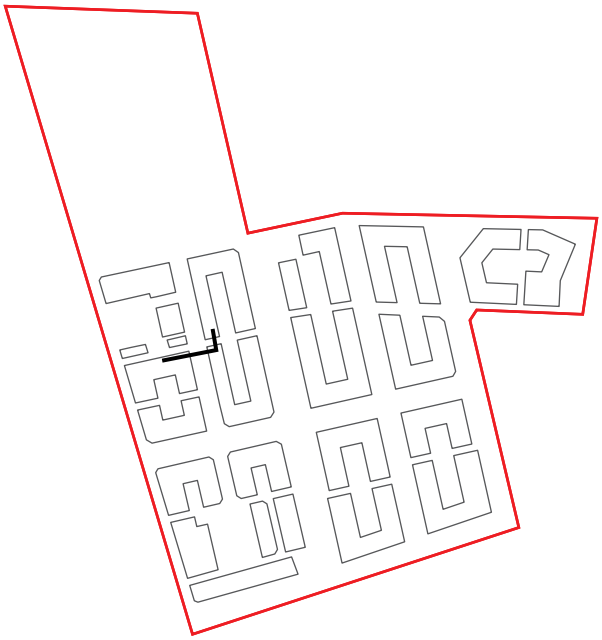
SCALE 1:250 @ A3



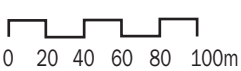
Section of Amended Planning Proposal built form and surrounding context

6.26 Street Cross Section - Cooper Street North

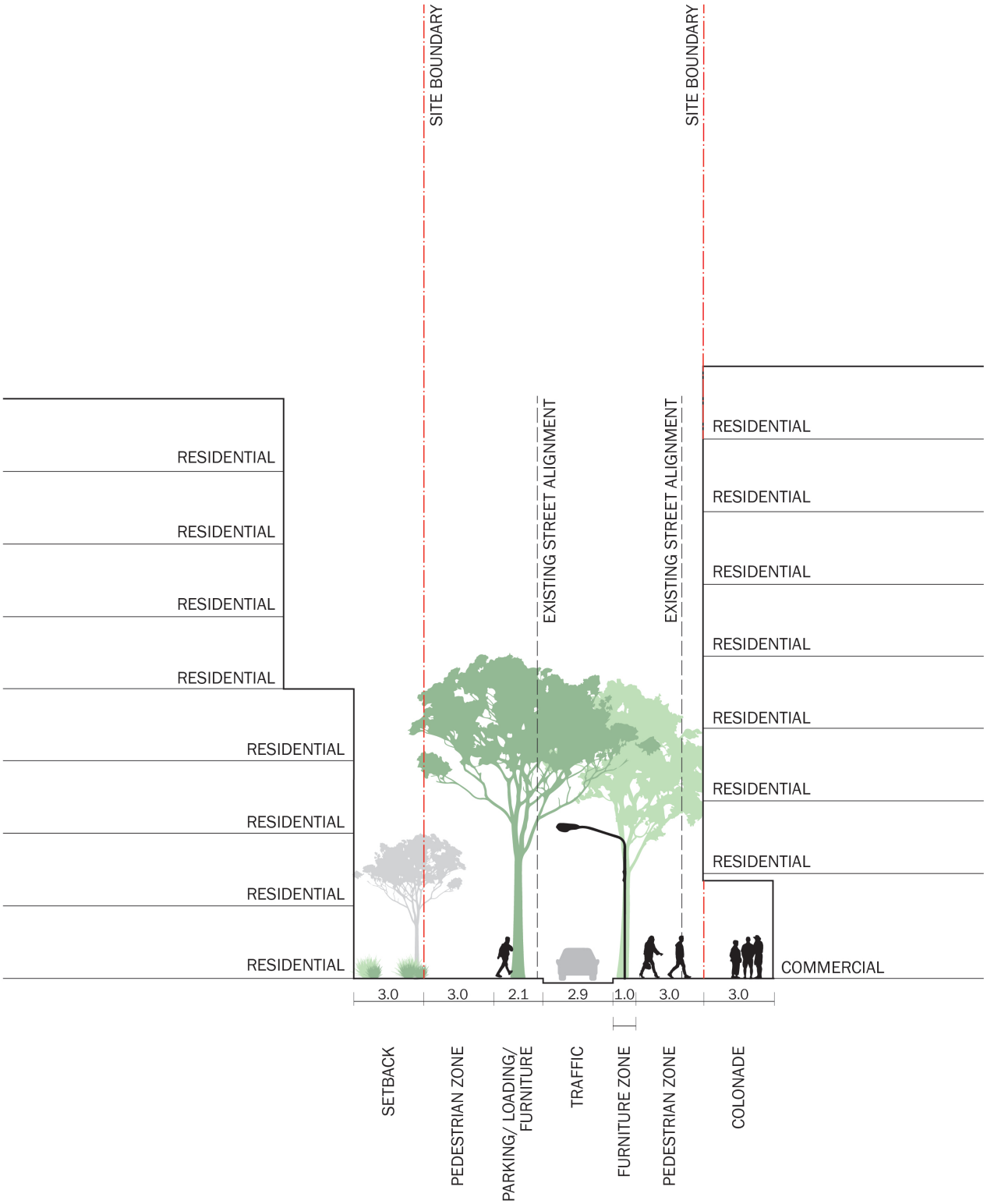
The street is to be designed in accordance with the indicative street specifications with the amended Waterloo Estate (South) design proposal.



SECTION LOCATION



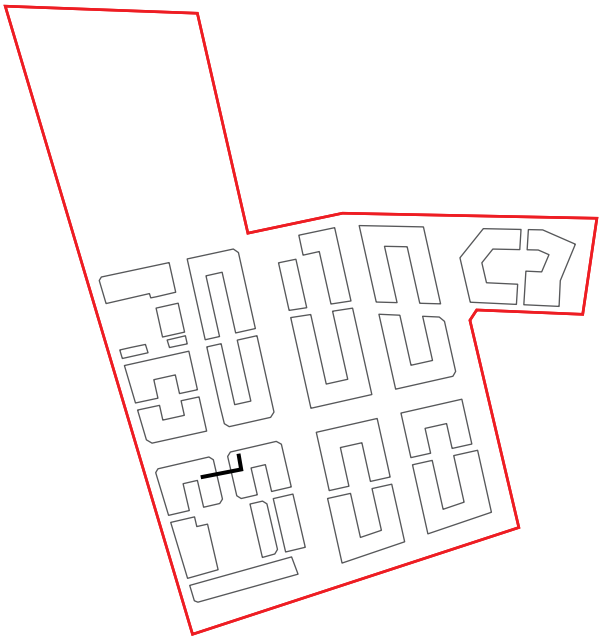
SCALE 1:250 @ A3



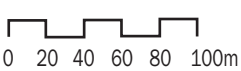
Section of Amended Planning Proposal built form and surrounding context

6.27 Street Cross Section - Cooper Street South

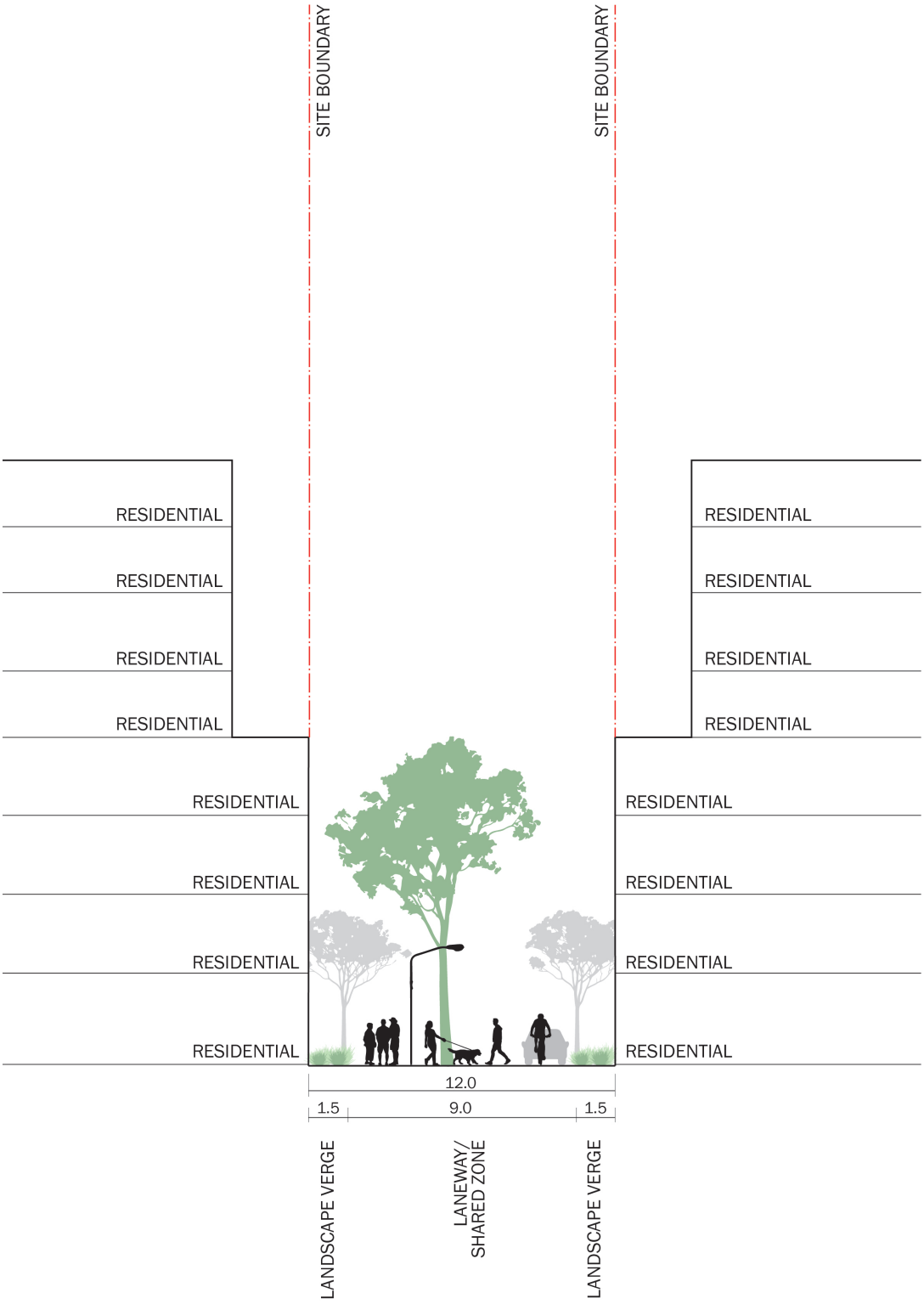
The street is to be designed in accordance with the indicative street specifications with the amended Waterloo Estate (South) design proposal.



SECTION LOCATION



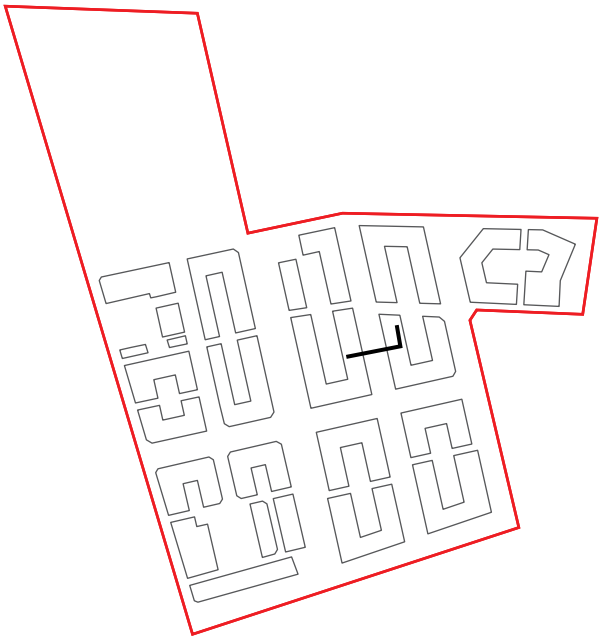
SCALE 1:250 @ A3



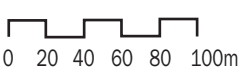
Section of Amended Planning Proposal built form and surrounding context

6.28 Street Cross Section - West Street

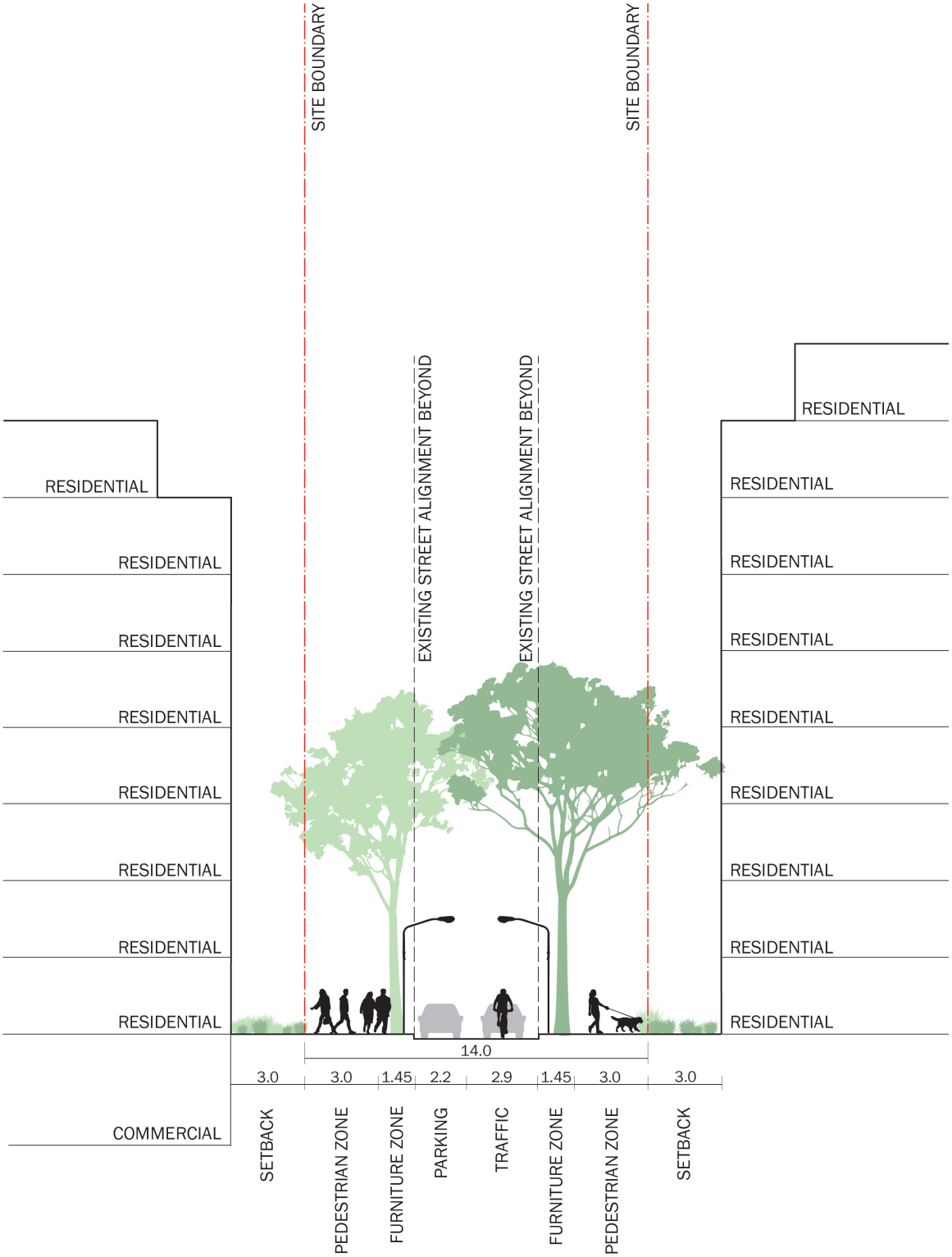
The street is to be designed in accordance with the indicative street specifications with the amended Waterloo Estate (South) design proposal.



SECTION LOCATION



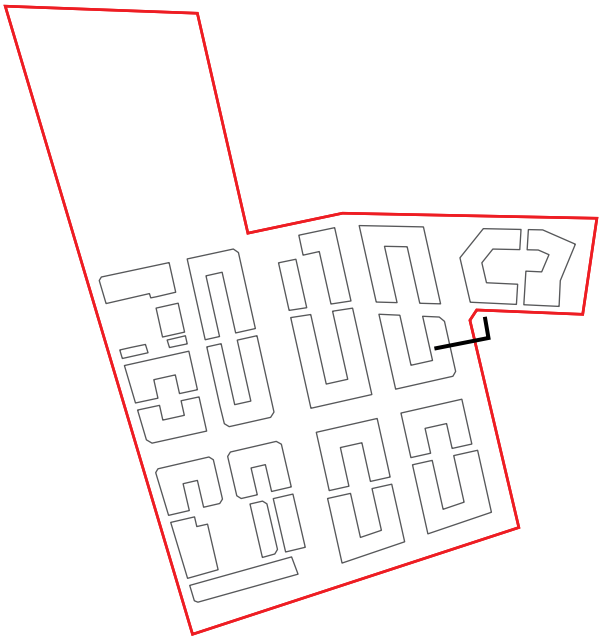
SCALE 1:250 @ A3



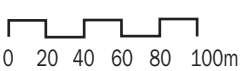
Section of Amended Planning Proposal built form and surrounding context

6.29 Street Cross Section - Pitt Street Extension

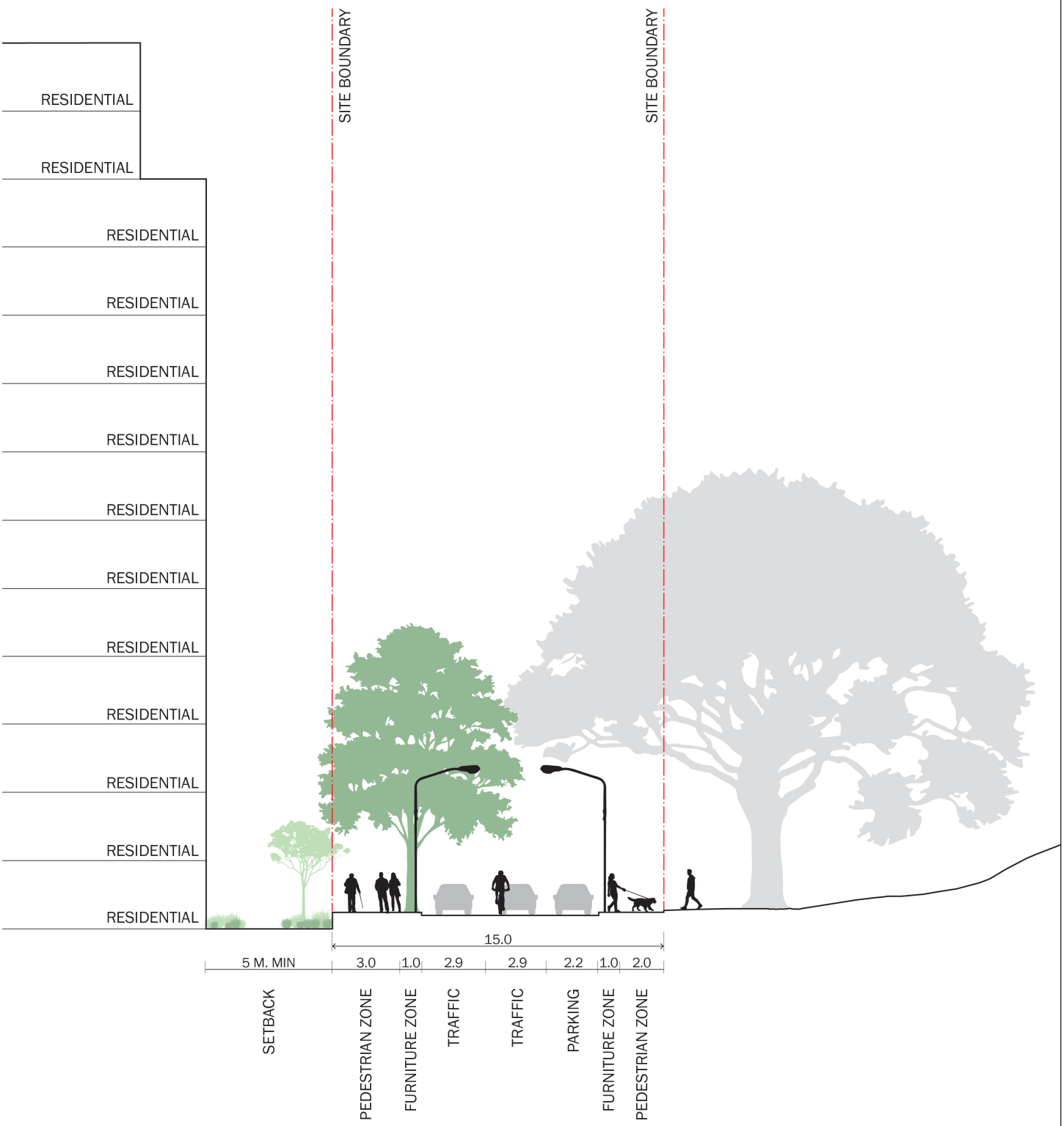
The street is to be designed in accordance with the indicative street specifications with the amended Waterloo Estate (South) design proposal.



SECTION LOCATION



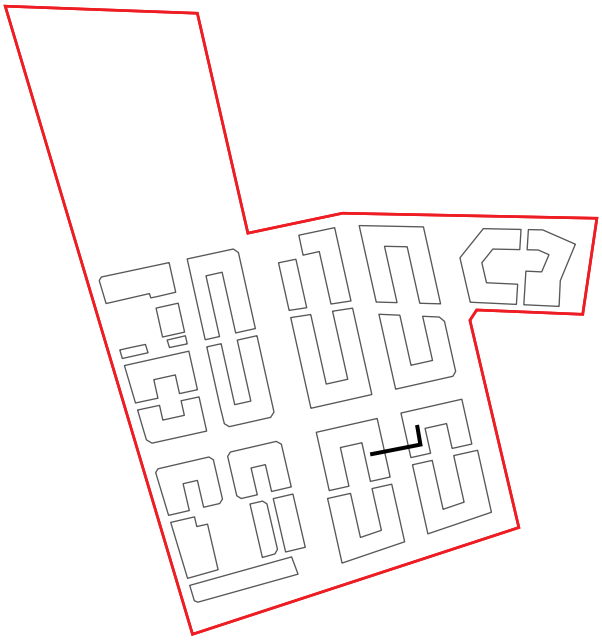
SCALE 1:250 @ A3



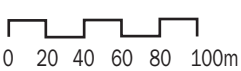
Section of Amended Planning Proposal built form and surrounding context

6.30 Street Cross Section - Mead Street

The street is to be designed in accordance with the indicative street specifications with the amended Waterloo Estate (South) design proposal.



SECTION LOCATION



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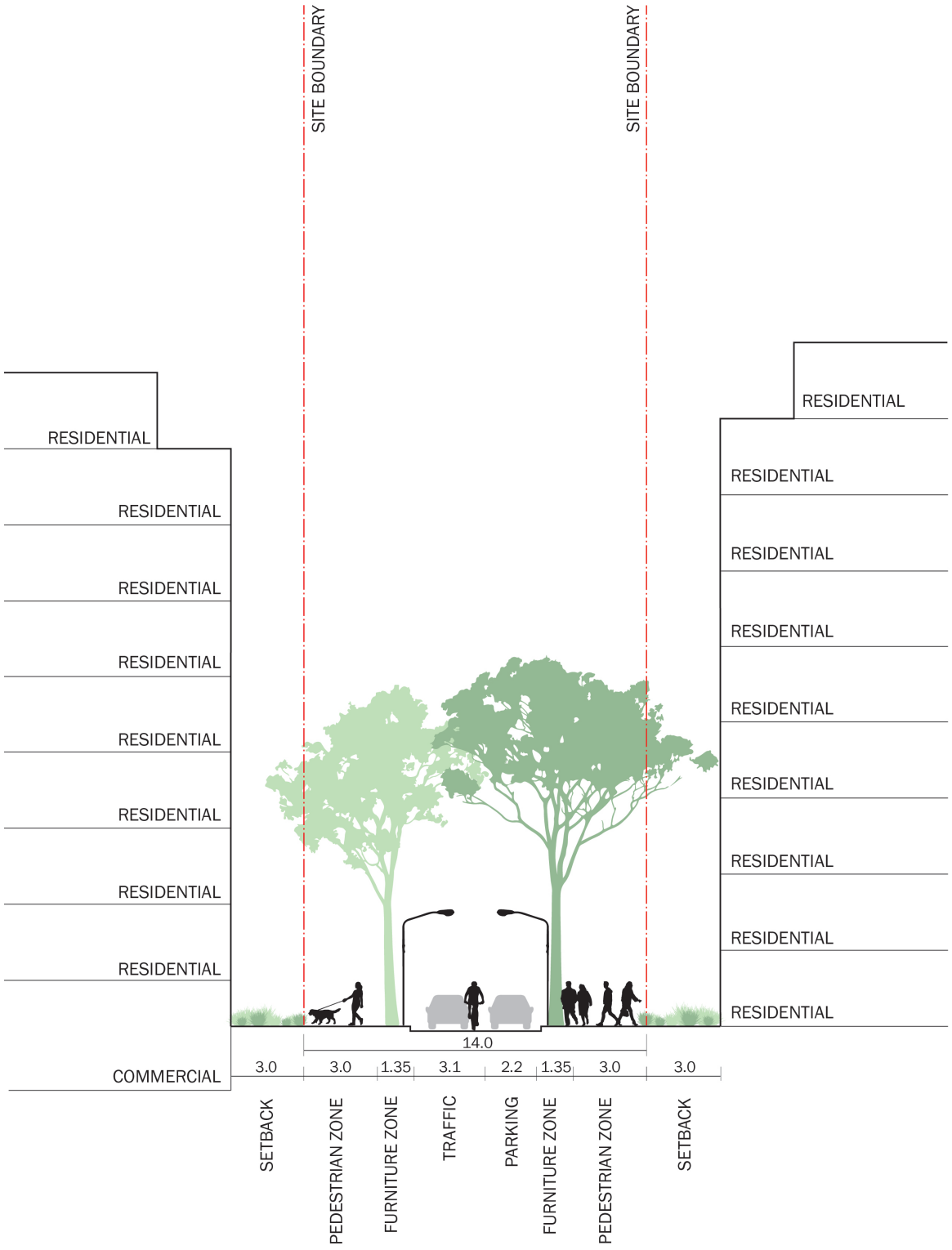
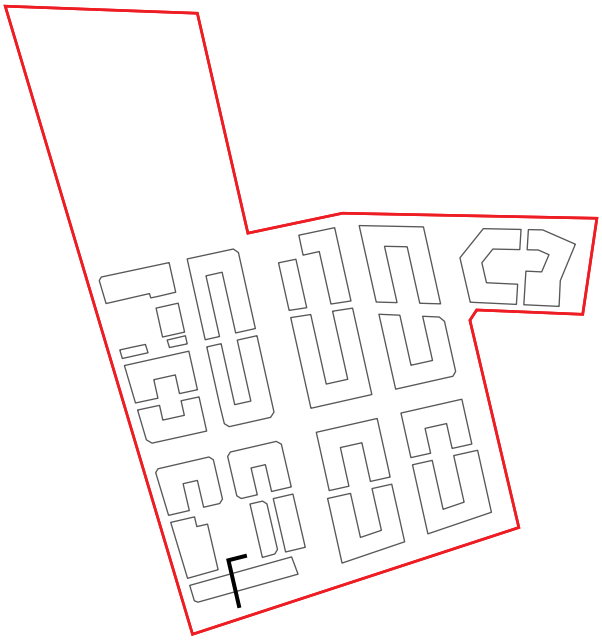


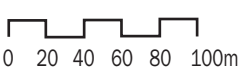
Section of Amended Planning Proposal built form and surrounding context

6.31 Street Cross Section - Cooper Place

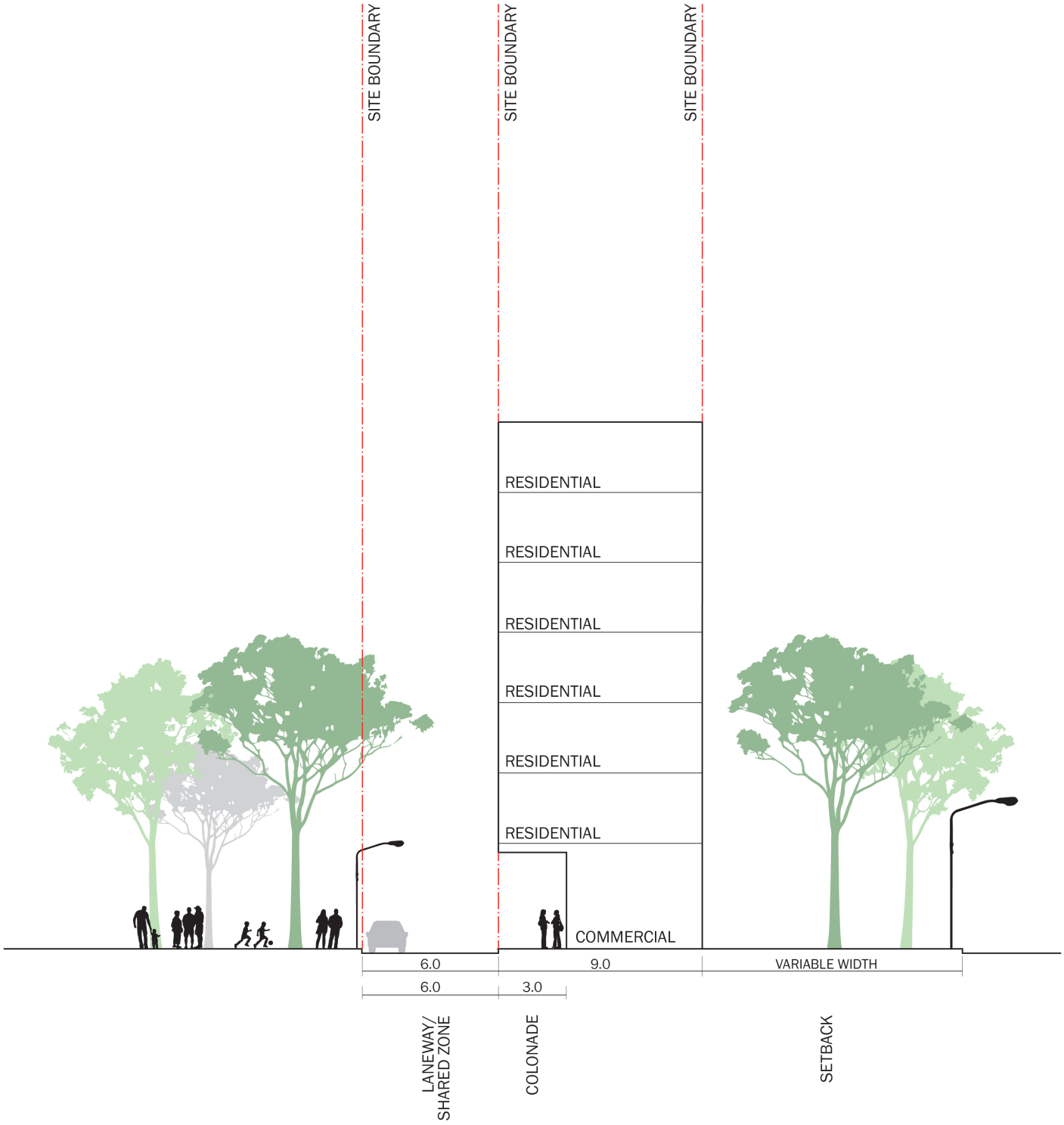
The street is to be designed in accordance with the indicative street specifications with the amended Waterloo Estate (South) design proposal.



SECTION LOCATION



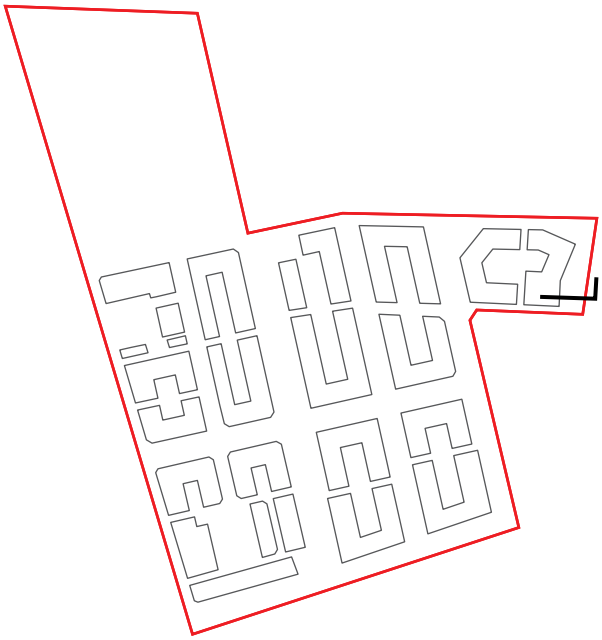
SCALE 1:250 @ A3



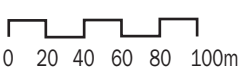
Section of Amended Planning Proposal built form and surrounding context

6.32 Street Cross Section - Gibson Street

The street is to be designed in accordance with the indicative street specifications with the amended Waterloo Estate (South) design proposal.



SECTION LOCATION



SCALE 1:250 @ A3

Section of Amended Planning Proposal built form and surrounding context

APPENDIX B

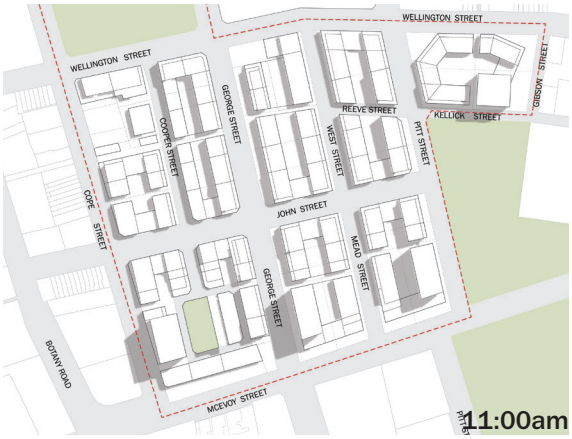
Overshadowing Drawings

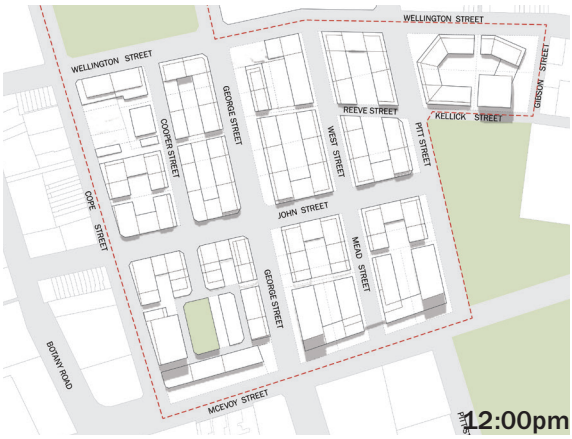
Access to direct sunlight to the living space and private open space of apartments is one of the key aspect of providing good resident amenity.

The built form needs to be designed and planned to maximise solar access to the living room and POS in accordance to ADG.

The diagrams on the adjacent page illustrates the overshadow from 9:00am to 3:00pm on the summer solstice, mid winter, and equinox.

Summer Solstice





Winter Solstice

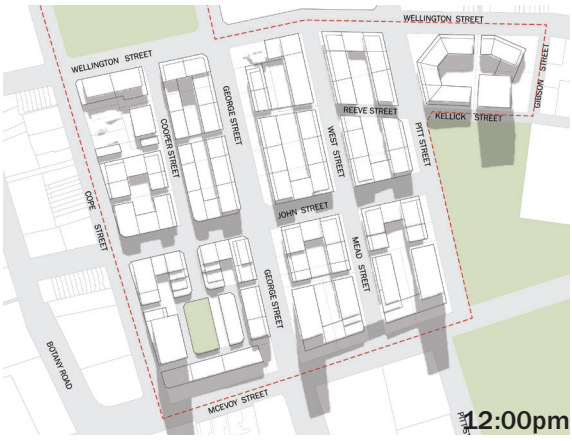
Equinox


WELLINGTON STREET
WELLINGTON STREET
GEORGE STREET
COOPER STREET
REEVE STREET
KELLICK STREET
GIBSON STREET
WEST STREET
PITT STREET
COPE STREET
JOHN STREET
MEAD STREET
GEORGE STREET
BOTANY ROAD
MCEVOY STREET
PITT ST
9:00am - 3:00pm


WELLINGTON STREET
WELLINGTON STREET
GEORGE STREET
COOPER STREET
REEVE STREET
KELLICK STREET
GIBSON STREET
WEST STREET
PITT STREET
COPE STREET
JOHN STREET
MEAD STREET
GEORGE STREET
BOTANY ROAD
MCEVOY STREET
PITT ST
9:00am


WELLINGTON STREET
WELLINGTON STREET
GEORGE STREET
COOPER STREET
REEVE STREET
KELLICK STREET
GIBSON STREET
WEST STREET
PITT STREET
COPE STREET
JOHN STREET
MEAD STREET
GEORGE STREET
BOTANY ROAD
MCEVOY STREET
PITT ST
10:00am


WELLINGTON STREET
WELLINGTON STREET
GEORGE STREET
COOPER STREET
REEVE STREET
KELLICK STREET
GIBSON STREET
WEST STREET
PITT STREET
COPE STREET
JOHN STREET
MEAD STREET
GEORGE STREET
BOTANY ROAD
MCEVOY STREET
PITT ST
11:00am


WELLINGTON STREET
WELLINGTON STREET
GEORGE STREET
COOPER STREET
REEVE STREET
KELLICK STREET
GIBSON STREET
WEST STREET
PITT STREET
COPE STREET
JOHN STREET
MEAD STREET
GEORGE STREET
BOTANY ROAD
MCEVOY STREET
PITT ST
12:00pm


WELLINGTON STREET
WELLINGTON STREET
GEORGE STREET
COOPER STREET
REEVE STREET
KELLICK STREET
GIBSON STREET
WEST STREET
PITT STREET
COPE STREET
JOHN STREET
MEAD STREET
GEORGE STREET
BOTANY ROAD
MCEVOY STREET
PITT ST
1:00pm


WELLINGTON STREET
WELLINGTON STREET
GEORGE STREET
COOPER STREET
REEVE STREET
KELLICK STREET
GIBSON STREET
WEST STREET
PITT STREET
COPE STREET
JOHN STREET
MEAD STREET
GEORGE STREET
BOTANY ROAD
MCEVOY STREET
PITT ST
2:00pm


WELLINGTON STREET
WELLINGTON STREET
GEORGE STREET
COOPER STREET
REEVE STREET
KELLICK STREET
GIBSON STREET
WEST STREET
PITT STREET
COPE STREET
JOHN STREET
MEAD STREET
GEORGE STREET
BOTANY ROAD
MCEVOY STREET
PITT ST
3:00pm

APPENDIX C
AREA SCHEDULE

Achieved (LAHC only)	GEA	GFA	NLA/NSA
Residential	328,205	246,154	205,084
Non Residential	23,452	18,762	16,885
	351,657	264,915	221,969

Target Efficiencies

	Perimeter Block		Tower	
Residential	GFA : GEA	75.0%	GFA : GEA	75.0%
	NSA : GFA	82.5%	NSA : GFA	85.0%
Non-Resi	GFA : GEA	80.0%		
	NSA : GFA	90.0%		

Precinct	Block No.	Building No.	Site Area	Site Area (Previous)	FSR	Ownership	Total Number of Floors	Non Residential				Residential							
								No. Floors	AREA			No. Floors	AREA (Perimeter Block)			No. Floors	AREA (Tower)		
									GEA	GFA	NLA		GEA	GFA	NLA		GEA	GFA	NLA
1	1A						0			0	0				0				0
2	2A		1780	1780	2.61-2.65	Private													
	2B		1225	1296	1.32	LAHC	4	4	2222	1778	1600	0	0	0	0	0	0	0	0
	2C		2522	2522	2.40	Private													
	2D	2D-1	1691	1884	3.26	LAHC	8	0	0	0	0	8	3809	2857	2357	0	0	0	0
		2D-2				LAHC						4	1188	891	735	0	0	0	0
		2D-3				LAHC						8	3094	2321	1914	0	0	0	0
	2E		662		1.75	Private													
	2F		178		2.00	Private													
Total (LAHC only)									**2222**	**1778**	**1600**		**8091**	**6068**	**5006**		**0.0**	**0.0**	**0.0**
3	3A	3A-1	2955	2954	5.37	LAHC	13	1	2827	2262	2035	12	7911	5933	4895	0	0	0	0
		3A-2				LAHC						7	4268	3201	2641	0	0	0	0
		3A-3				LAHC						10	8078	6059	4998	0	0	0	0
	3B	3B-1	2945	2935	4.83	LAHC	13	1	2821	2257	2031	10	6446	4835	3988	0	0	0	0
		3B-2				LAHC						12	4905	3679	3035	0	0	0	0
		3B-3				LAHC						4	893	670	553	0	0	0	0
		3B-4				LAHC						7	5611	4208	3472	0	0	0	0
Total (LAHC only)									**5648**	**4518**	**4067**		**38112**	**28584**	**23582**		**0**	**0**	**0**
4	4A	4A-1	2123	2123	2.57	Private													
	4B	4B-1	1315	1315	2.83	LAHC	11	1	826	661	595	10	4582	3437	2835	0	0	0	0
	4C	4C-1	4927	4927	3.78	LAHC	13	1	3863	3090	2781	10	7685	5764	4755	0	0	0	0
		4C-2				LAHC						12	4948	3711	3062	0	0	0	0
		4C-3				LAHC						4	1189	892	736	0	0	0	0
		4C-4				LAHC						8	9364	7023	5794	0	0	0	0
Total (LAHC only)									**4689**	**3751**	**3376**		**27768**	**20826**	**17181**		**0**	**0**	**0**
5	5A	5A-1	3470	3470	4.25	LAHC	13	0	0	0	0	13	6234	4676	3857	0	0	0	0
		5A-2				LAHC						9	4908	3681	3037	0	0	0	0
		5A-3				LAHC						4	1223	917	757	0	0	0	0
		5A-4				LAHC						9	9281	6961	5743	0	0	0	0
Total (LAHC only)									**0**	**0**	**0**		**21646**	**16235**	**13393**		**0**	**0**	**0**
6	6A	6A-1	3322	3322	4.15	LAHC	13	0	0	0	0	13	10303	7727	6375	0	0	0	0
		6A-2				LAHC						4	1172	879	725	0	0	0	0
		6A-3				LAHC						9	8747	6560	5412	0	0	0	0
Total (LAHC only)									**0**	**0**	**0**		**20222**	**15167**	**12512**		**0**	**0**	**0**
7	7A	7A-1	3266	3266	5.73	LAHC	27	0	0	0	0	0	0	0	0	27	22646	16985	14437
		7A-2										9	4804	3603	2972	0	0	0	0
	7B	7B-1	3400	3400	3.10	LAHC	11	0	0	0	0	8	9331	6998	5774	0	0	0	0
		7B-2				LAHC						11	6133	4600	3795	0	0	0	0
Total (LAHC only)									**0**	**0**	**0**		**20268**	**15201**	**12541**		**22646**	**16985**	**14437**
8	8A	8A-1	4450	4655	7.64	LAHC	33	0	0	0	0	8	1174	881	726	0	0		
		8A-2				LAHC		1	1043	834	751	0	0	0	0	32	30144	22608	19217
		8A-3				LAHC		1	1301	1041	937	6	7808	5856	4831	0	0	0	0
		8A-4				LAHC		1	277	222	199	12	3228	2421	1997	0	0	0	0
		8A-5				LAHC		1	442	354	318	10	4261	3196	2636	0	0	0	0
	8B	8B-1	1928	2016	3.39	LAHC	8	0	0	0	0	8	5305	3979	3282	0	0	0	0
		8B-2				LAHC						4	792	594	490	0	0	0	0
		8B-3				LAHC						8	3494	2621	2162	0	0	0	0
	8C	8C-1	1789	1842	4.31	LAHC	13	0	0	0	0	8	3495	2621	2163	0	0	0	0
		8C-2				LAHC		0	0	0	0	4	990	743	613	0	0	0	0
		8C-3				LAHC		1	390	312	281	12	3898	2924	2412	0	0	0	0
		8C-4				LAHC		1	248	198	179	10	2250	1688	1392	0	0	0	0
	8D	8D-1	996	996	0.86	LAHC	2	2	1184	947	852	0	0	0	0	0	0	0	0
Total (LAHC only)									**4885**	**3908**	**3517**		**36695**	**27521**	**22705**		**30144**	**22608**	**19217**
9	9A	9A-1	3623	2925	7.12	LAHC	32	1	1935	1548	1393	8	6083	4562	3764	0	0	0	0
		9A-2				LAHC						6	1630	1223	1009	0	0	0	0
		9A-3				LAHC						0	0	0	0	32	28048	21036	17881
	9B	9B-1	3653	4352	3.75	LAHC	13	1	2493	1994	1795	8	7024	5268	4346	0	0	0	0
		9B-2				LAHC						4	1190	893	736	0	0	0	0
		9B-3				LAHC						12	4345	3259	2688	0	0	0	0
		9B-4				LAHC						10	4897	3673	3030	0	0	0	0
Total (LAHC only)									**4428**	**3542**	**3188**		**25169**	**18877**	**15573**		**28048**	**21036**	**17881**
10	10A	10A-1	3557	3312	7.08	LAHC	30	1	1059	847	762	0	0	0	0	29	26192	19644	16697
		10A-2				LAHC		1	272	218	196	5	1358	1019	840	0	0	0	0
		10A-3				LAHC		1	249	199	179	9	7676	5757	4750	0	0	0	0
	10B	10B-1	2947	3489	3.28	LAHC	13	0	0	0	0	13	7584	5688	4693	0	0	0	0
		10B-2				LAHC		0	0	0	0	4	1195	896	739	0	0	0	0
		10B-3				LAHC		0	0	0	0	9	5391	4043	3336	0	0	0	0
Total (LAHC only)									**1580**	**1264**	**1138**		**23204**	**17403**	**14357**		**26192**	**19644**	**16697**
Grand Total (LAHC only)									**23452**	**18762**	**16885**		**221175**	**165881**	**136852**		**107030**	**80273**	**68232**


RAGLAN STREET
COPE STREET
GEORGE STREET
PITT STREET
WELLINGTON STREET
WELLINGTON STREET
GIBSON STREET
KELLICK STREET
REEVE STREET
COOPER STREET
GEORGE STREET
WEST STREET
PITT STREET
COPE STREET
JOHN STREET
MEAD STREET
GEORGE STREET
BOTANY ROAD
MCEVOY STREET
PITT STREET
3A-1
3A-2
3A-3
2B-1
4B-1
5A-3
5A-2
5A-4
5A-1
7B-1
7A-2
7B-2
7A-1
4C-1
4C-4
4C-2
4C-3
6A-3
6A-1
6A-2
3B-1
3B-4
3B-2
3B-3
2D-1
2D-2
2D-3
10B-2
10B-1
10B-3
9B-2
9B-3
9B-1
9B-4
8C-2
8C-3
8C-1
8C-4
8B-2
8B-3
8B-1
8A-5
8D-1
8A-4
8A-1
8A-2
9A-1
9A-3
9A-2
10A-1
10A-3
10A-2
8A-3

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E sydney@hassellstudio.com


Precinct boundary
Existing lot boundary
New lot boundary (Indicative)
High value tree (Retained)
Moderate value tree (Retained)
High value tree (Removed)
Moderate value tree (Removed)
RAGLAN STREET
COPE STREET
GEORGE STREET
PITT STREET
WELLINGTON STREET
GIBSON STREET
REEVE STREET
KELLICK STREET
COOPER STREET
WEST STREET
JOHN STREET
MEAD STREET
MCEVOY STREET
BOTANY ROAD
SCALE 1:1000 @ A3