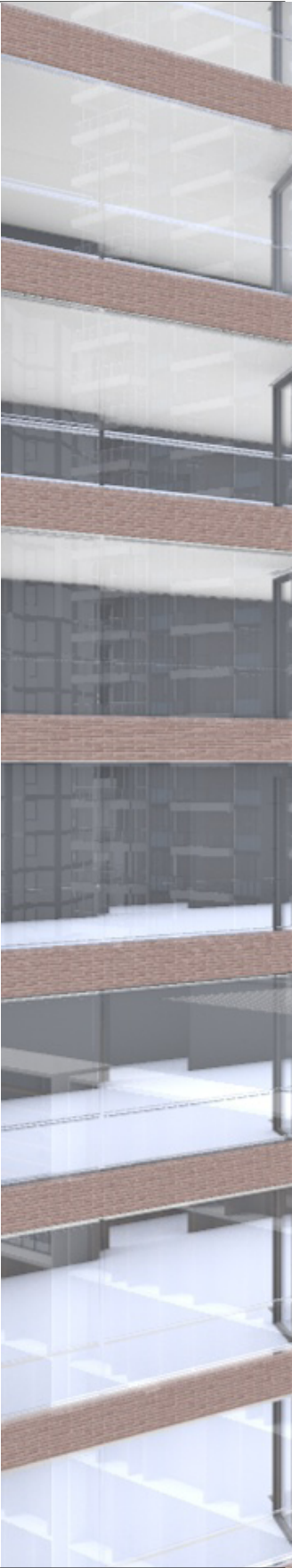
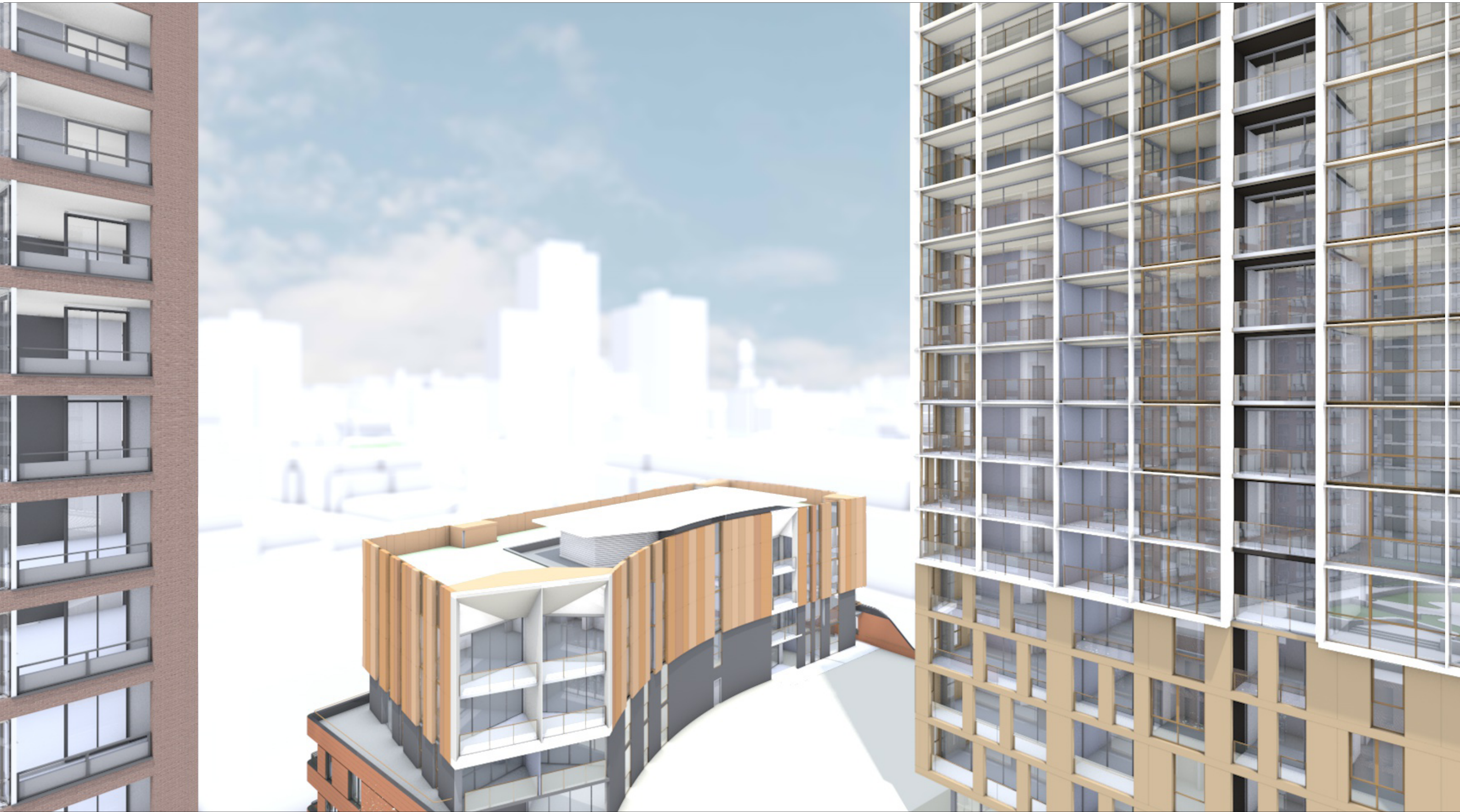


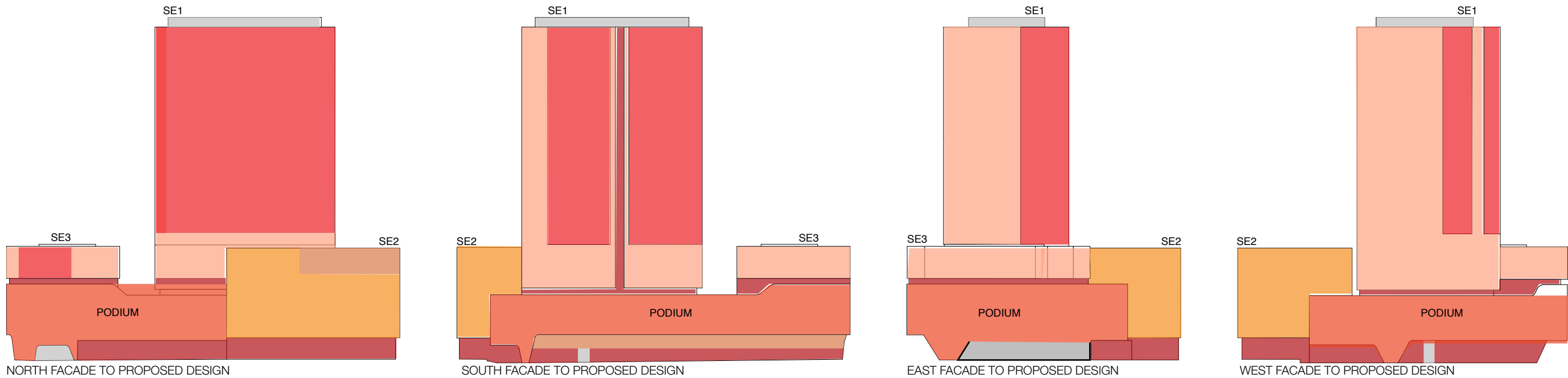
Technical

FACADE SYSTEMS	64
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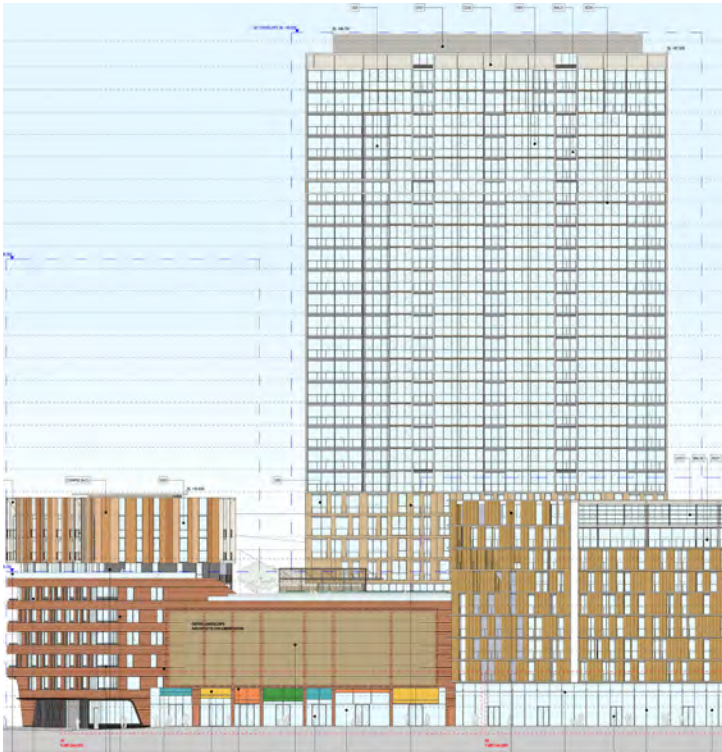


FACADE SYSTEMS



Glazed Facades	Precast Concrete	Brise Soleil	Perforated Metal Screens	Terracotta	Timber Cladding	Plant & Services
Retail shopfront design by tenants, subject to future application. Aluminium framed performance glazed window wall with sliding door systems to residential facades on level 7.	Precast concrete wall with framed aluminium glazing.	Folded aluminium sheet horizontal and vertical louvres. Paint finished concrete slab projections in lieu of horizontal louvres in locations shown on architectural drawings.	Perforated metal screens. Operable to the northern facades of SE2, and fixed to other areas as shown including to the retail space under SE2.	Terracotta or similar cladding.	Blackbutt or similar faced marine grade plywood to colonnade soffit. Profiled Blackbutt similar timber battens. Blackbutt timber clad structural steel t-sections to SE2 penthouse level.	Louvre and painted concrete walls.

NOTE: ALL RETAIL SHOPFRONTS SUBJECT TO FURTHER APPROVAL



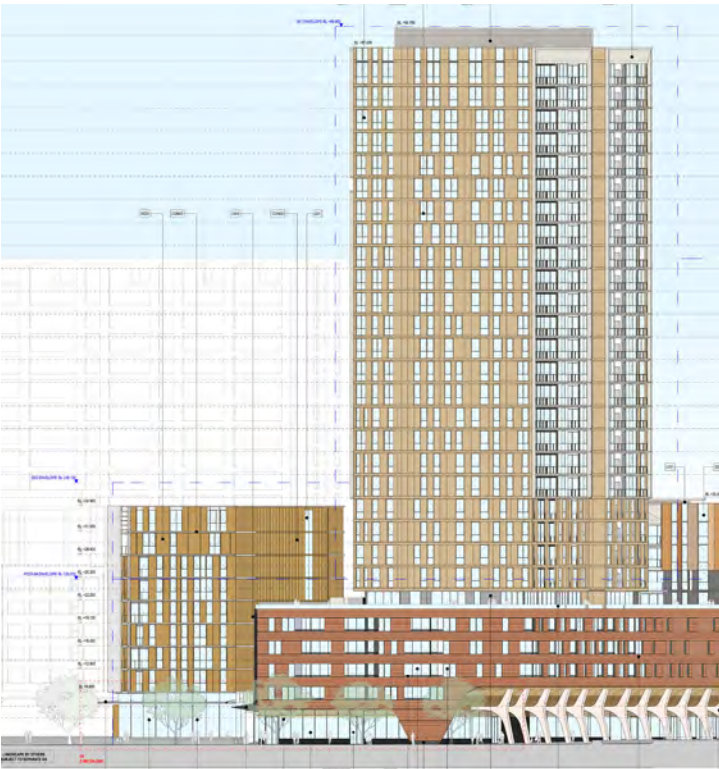
NORTH FACADE TO PROPOSED DESIGN



EAST FACADE TO PROPOSED DESIGN



SOUTH FACADE TO PROPOSED DESIGN

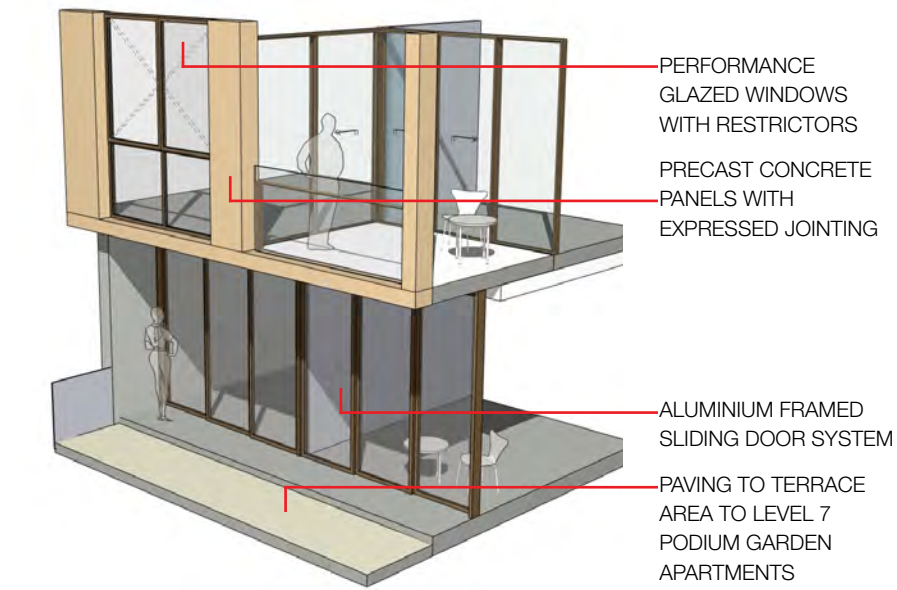


WEST FACADE TO PROPOSED DESIGN

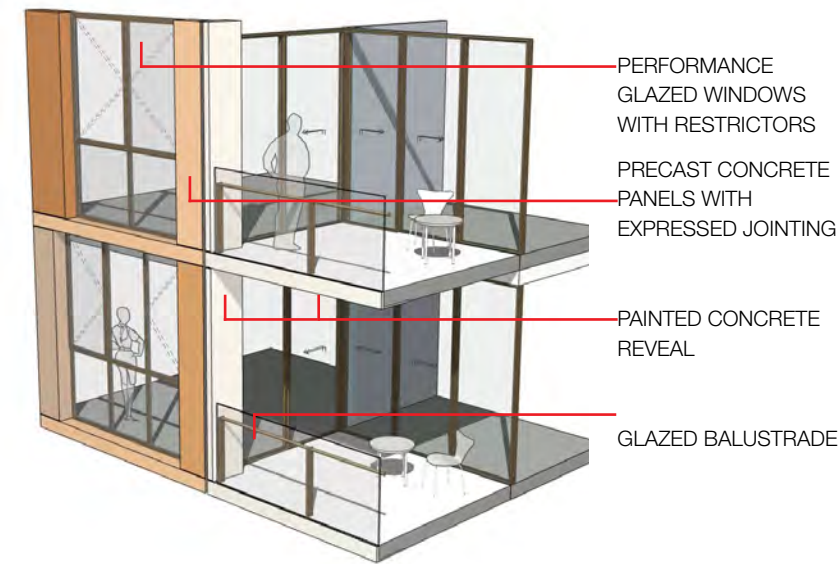


DETAILED VIEWS OF FACADE SYSTEM

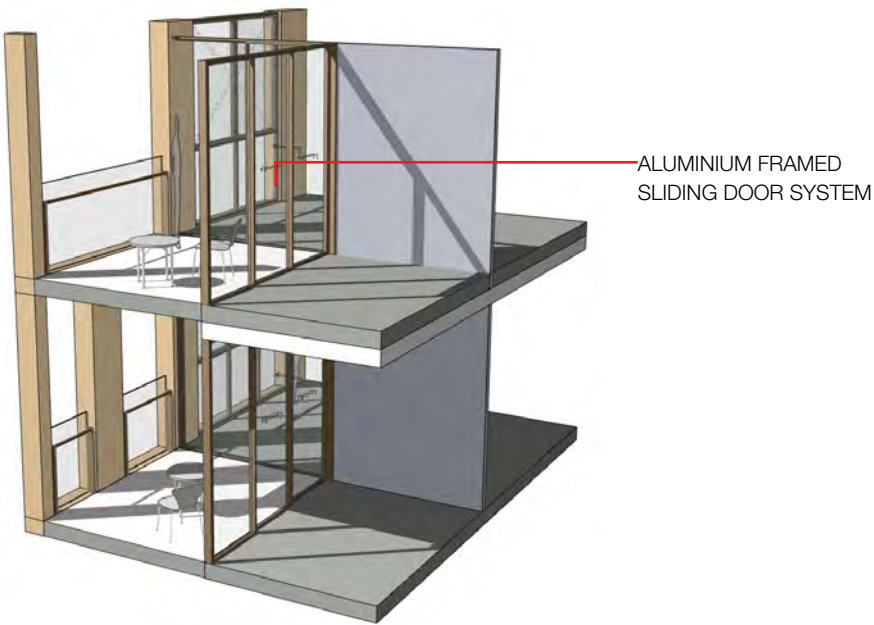
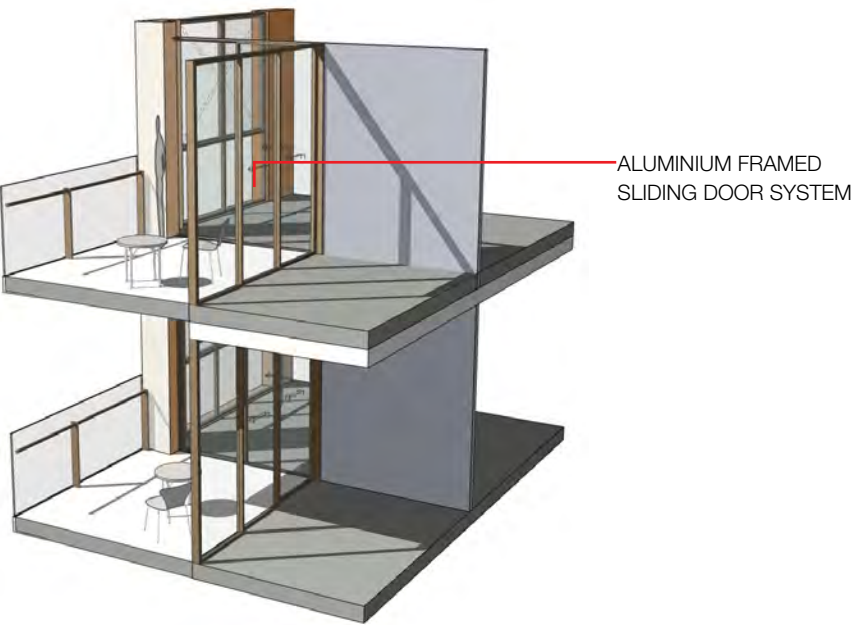
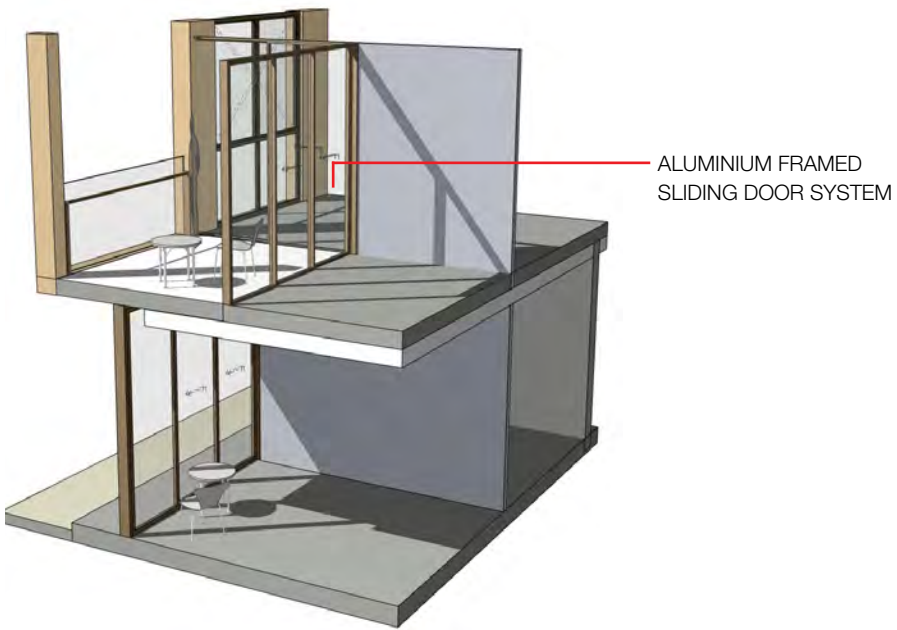
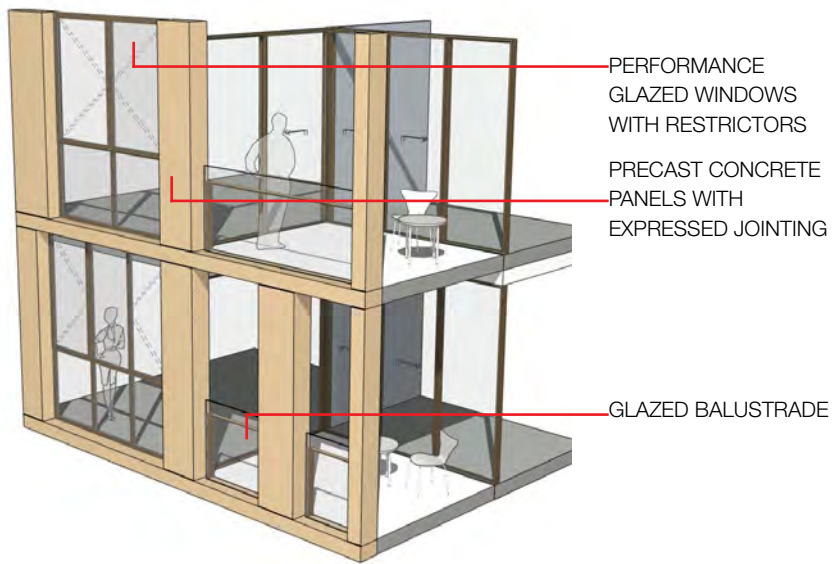
TERRACE LEVEL FACADE (LEVEL 7)



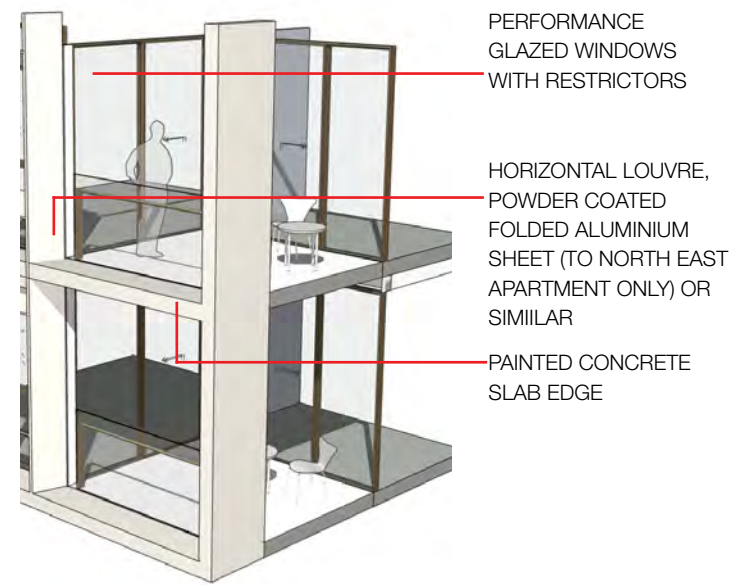
SE3 PRECAST FACADE (TYPICAL)



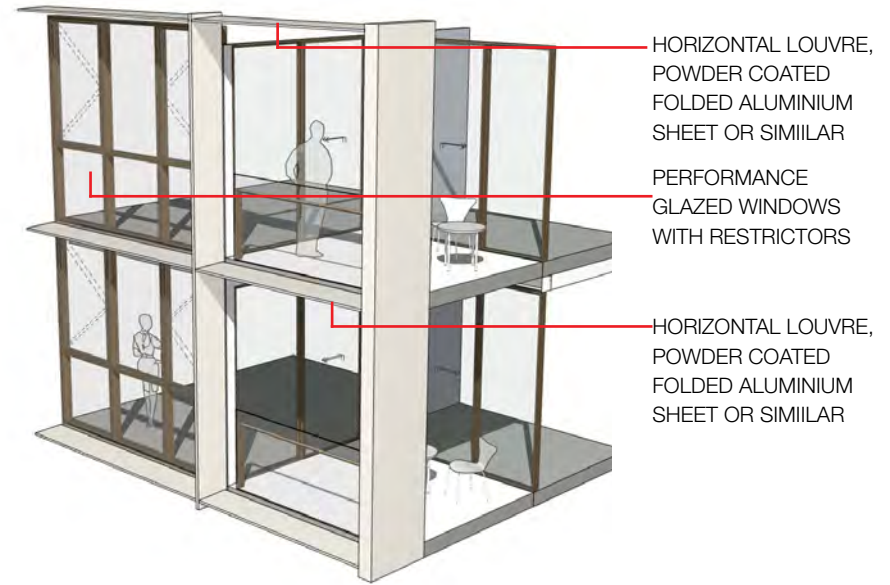
SE1 PRECAST FACADE (TYPICAL)



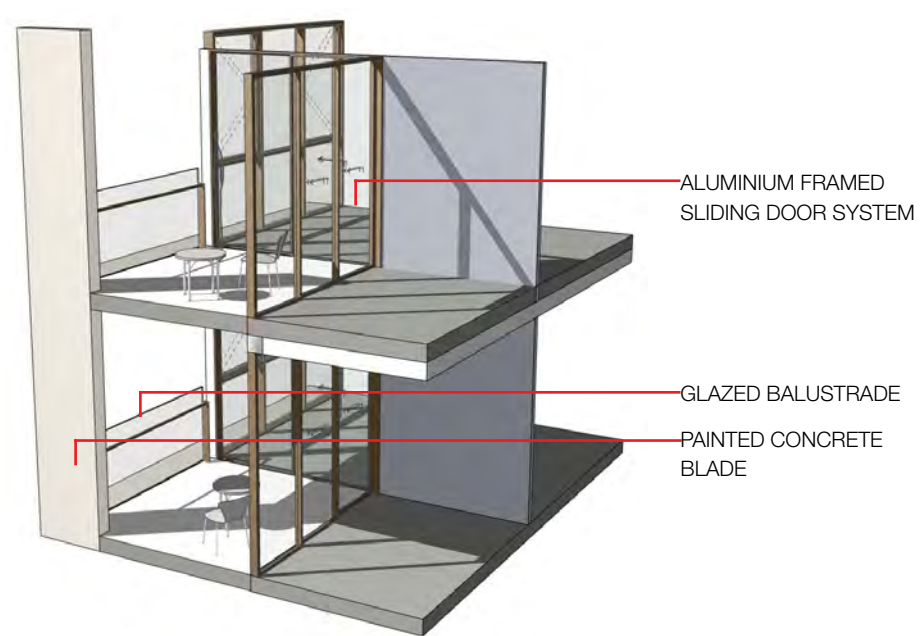
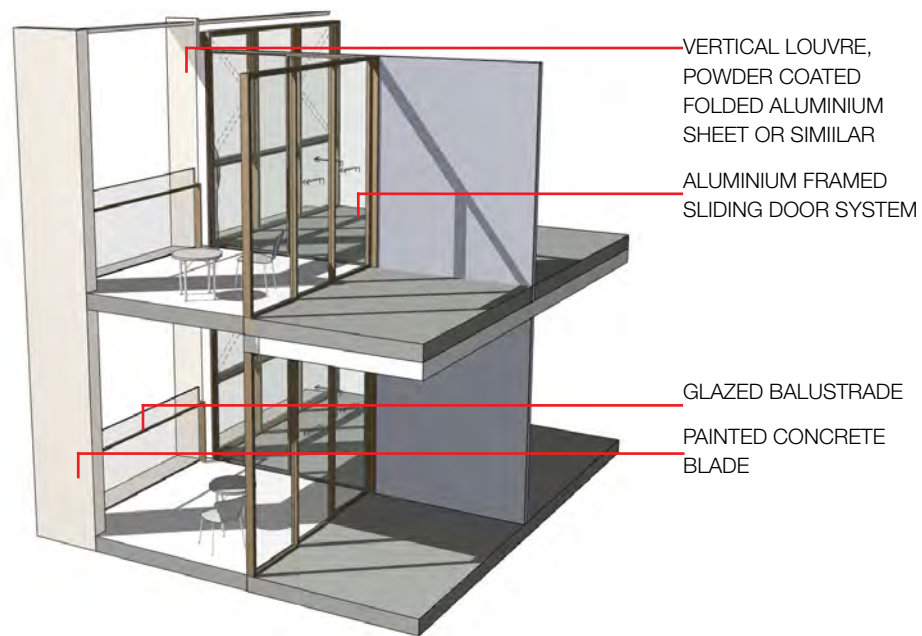
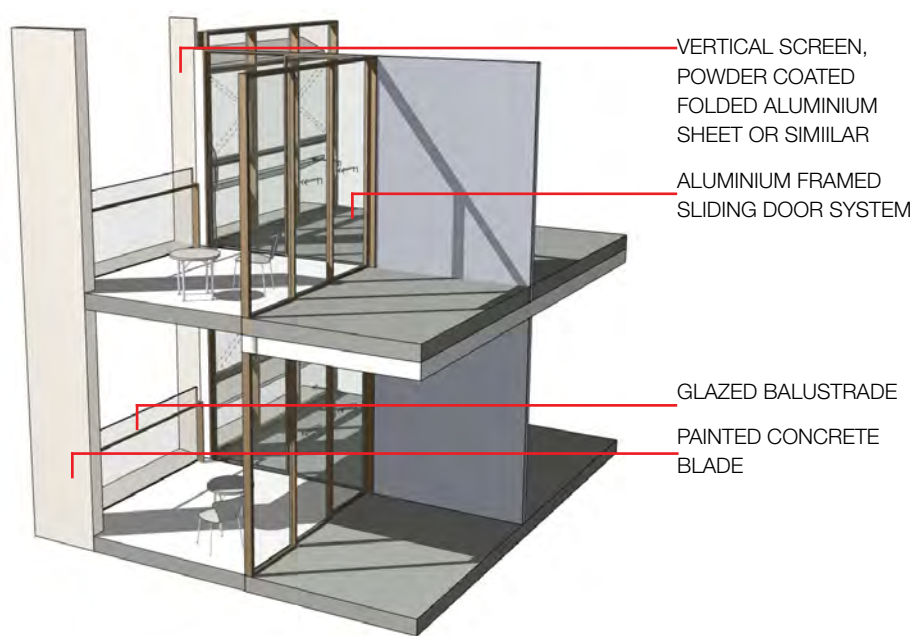
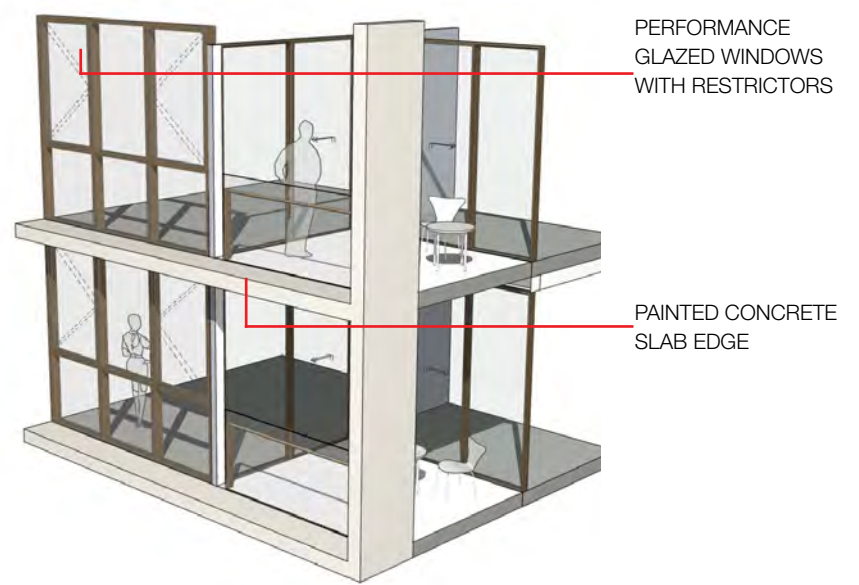
SE3 EAST FACADE SCREEN (TYPICAL)



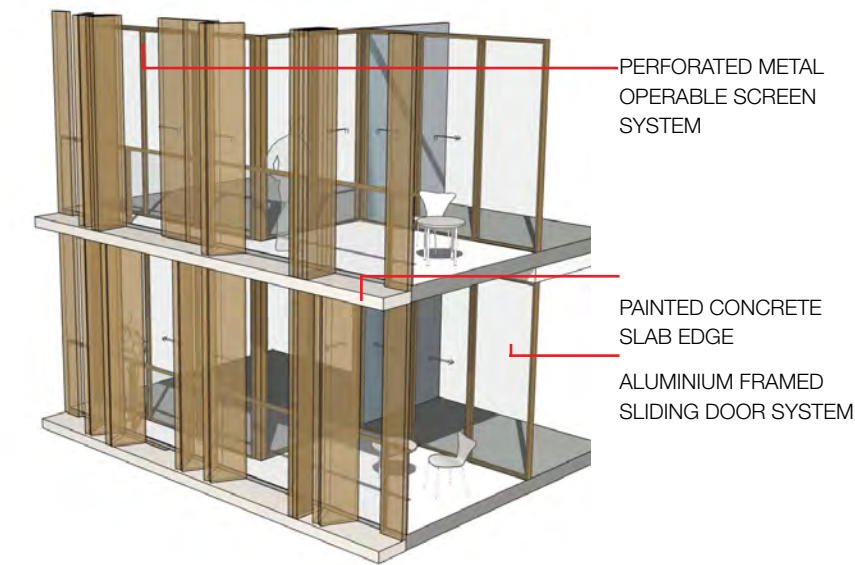
SE1 NORTH FACADE SCREENS



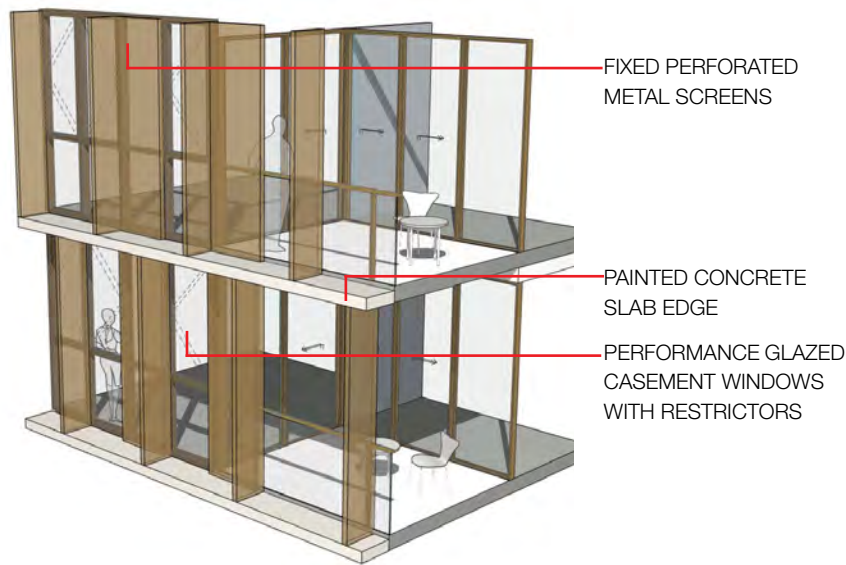
SE1 SOUTH FACADE SCREENS



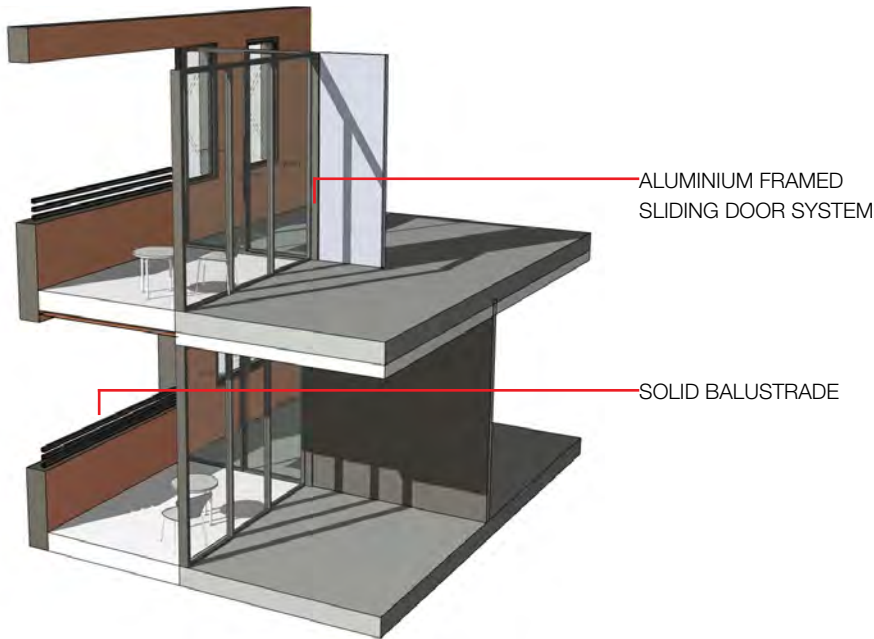
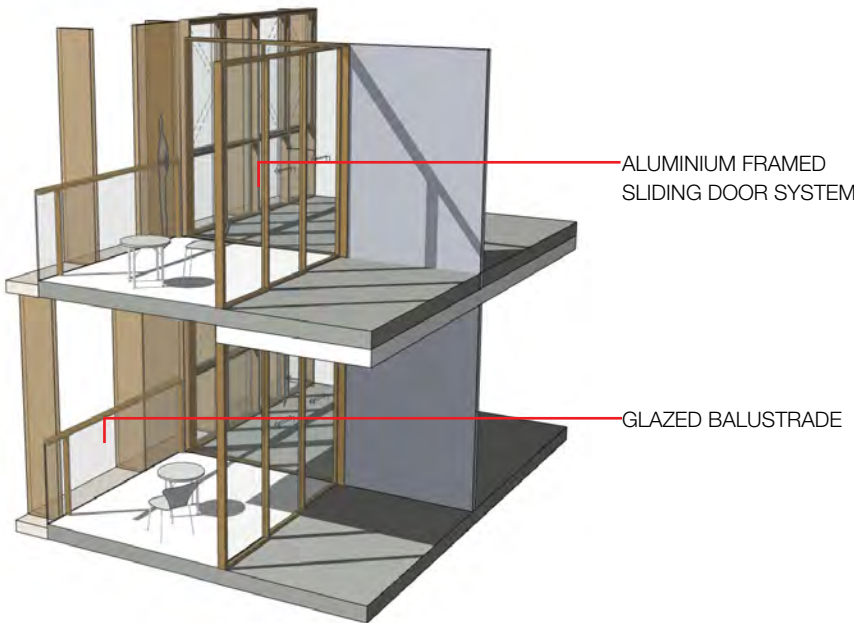
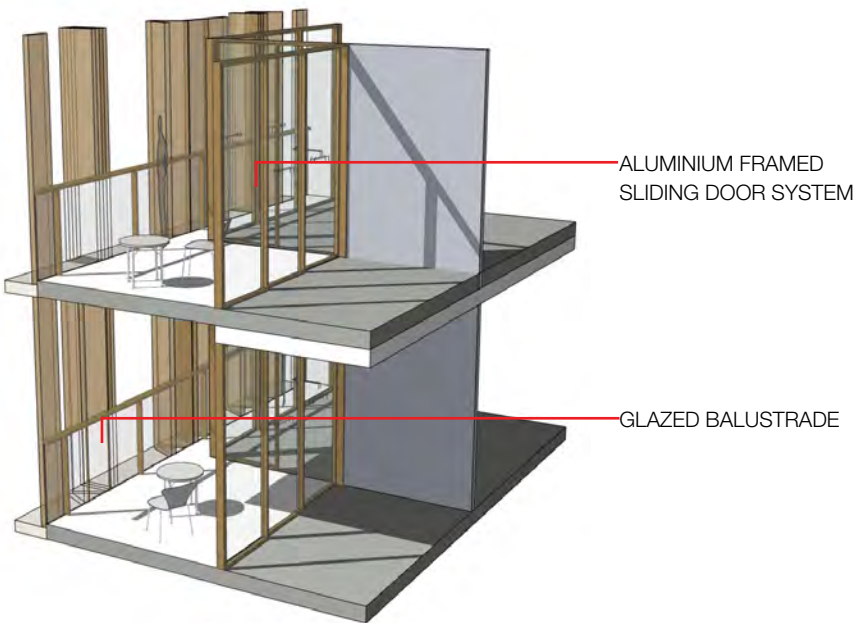
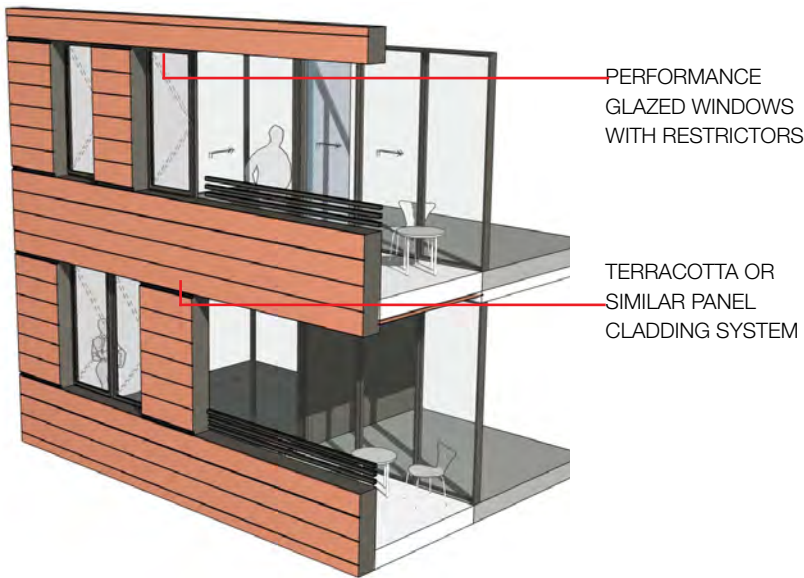
SE2 OPERABLE SCREENS (NORTH)



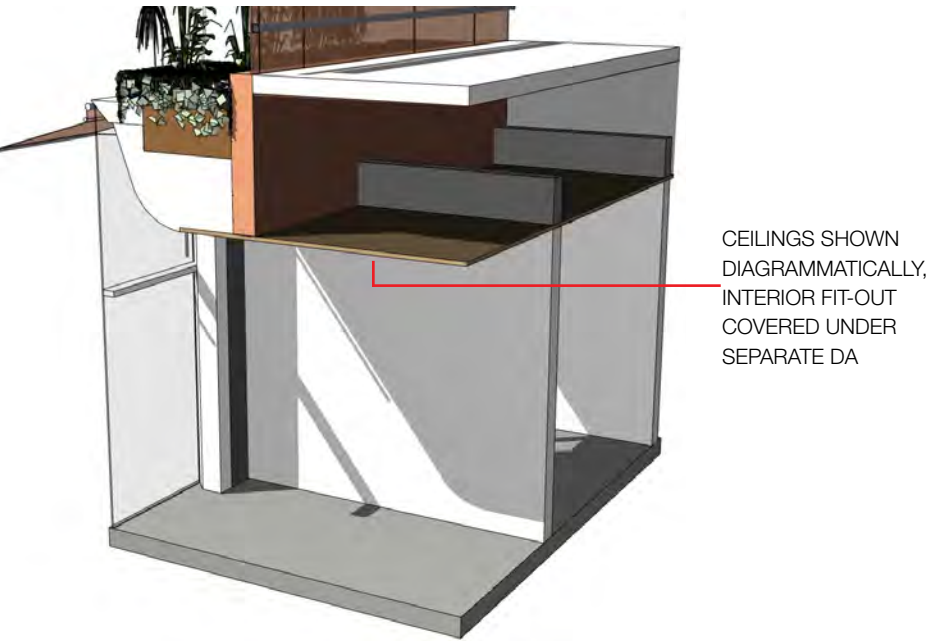
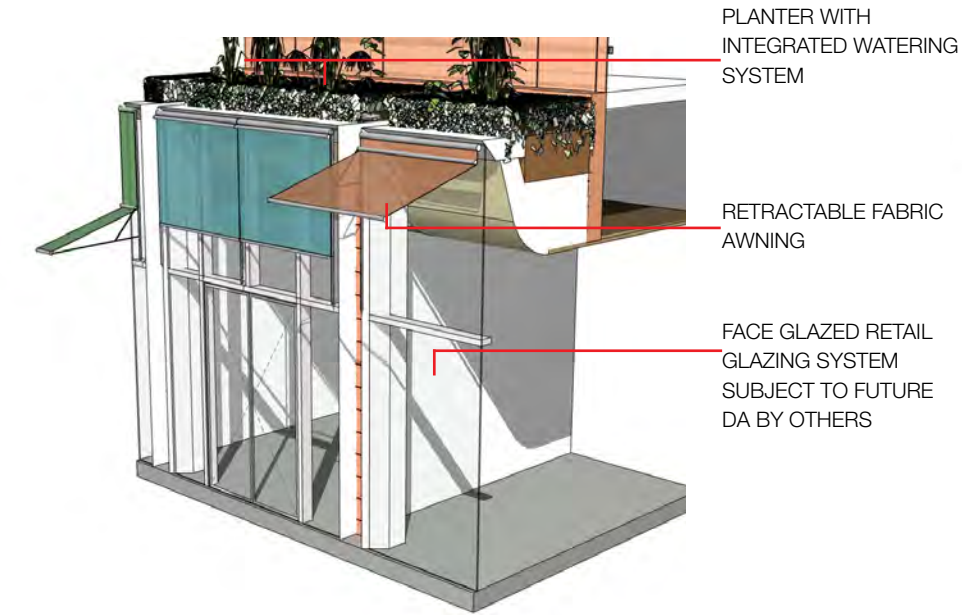
SE2 FIXED SCREENS (WEST AND EAST)



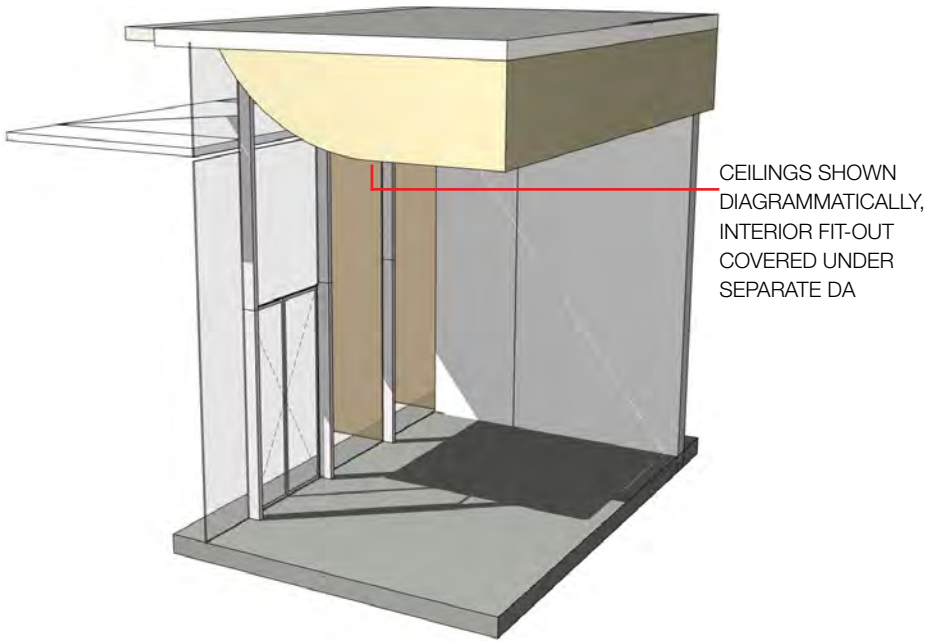
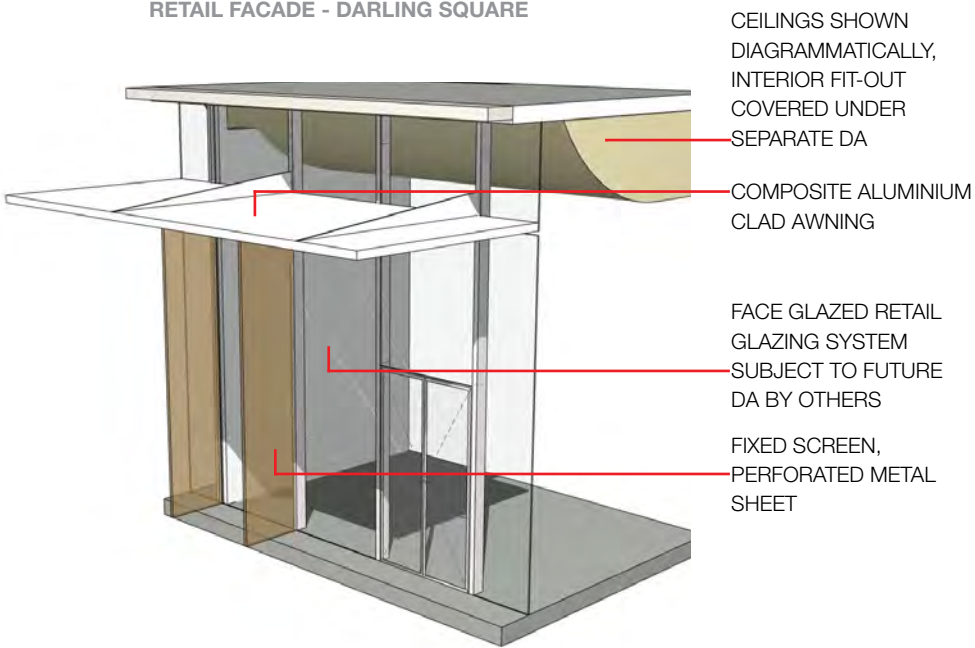
PODIUM TERRACOTTA OR SIMILAR FACADE



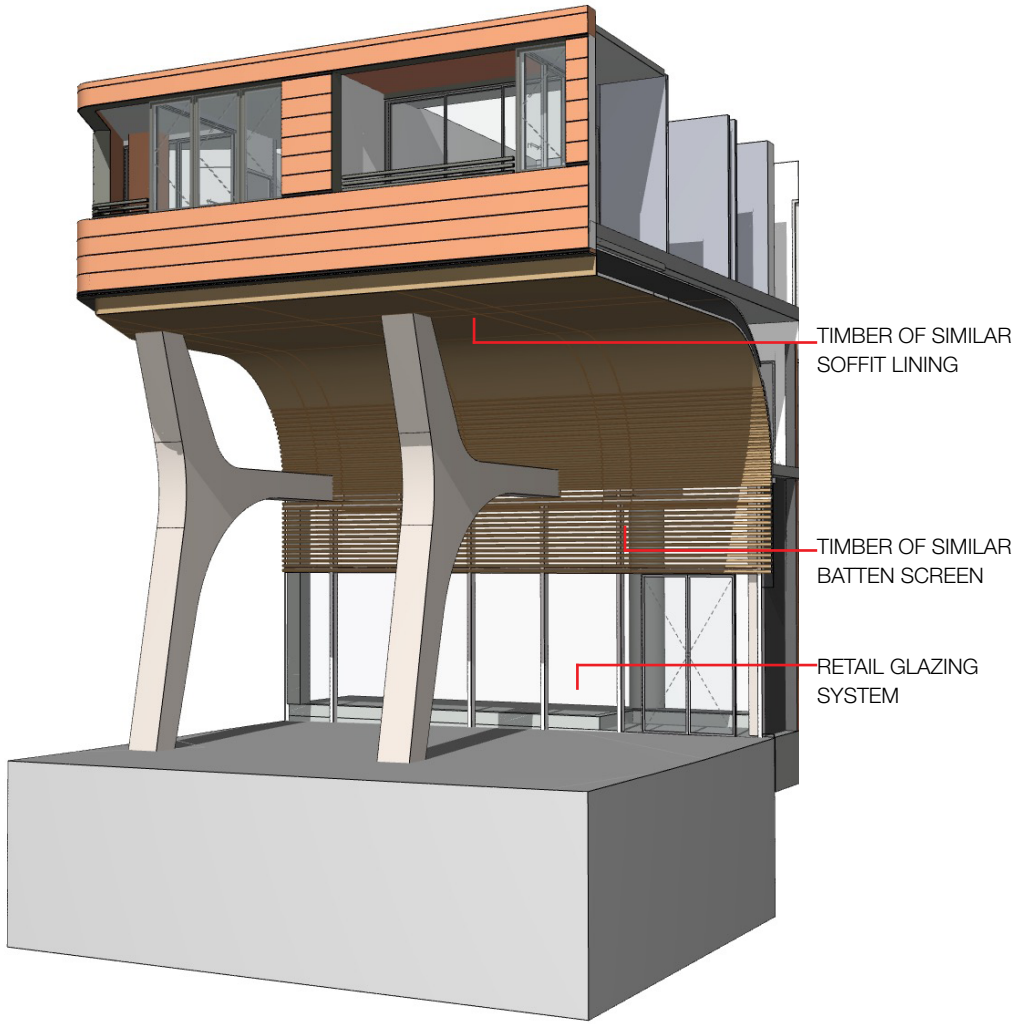
RETAIL FACADE - LITTLE HAY STREET



RETAIL FACADE - DARLING SQUARE



HAY STREET COLONNADE



SUSTAINABILITY, BASIX & GREEN STAR

INTRODUCTION

The proposed development focuses on creating a building of exceptional performance, being a comfortable and efficient residential building designed for Sydney’s diverse climate.

The significant design targets include high levels of energy performance, environmentally low-impact materials, and efficient water management.

These targets are directed at reducing environmental impacts for the whole life cycle of the building.

The building design will embrace the social and health enhancing role of sustainability by demonstrating technology, nature and design initiatives to the larger public.

ESD AND BUILDING SERVICES

The design is based on initiatives that are capable of achieving the following industry benchmarks;

- BASIX and
- a minimum of 4 Green Star Multi-unit Residential rating V1 in line with the approved SSDA 2.

Initiatives to reduce energy demand, to increase indoor environmental quality of the building, and to minimise environmental impact from the whole-of-life of the building were divided in this document in the following sections:

- Energy and Indoor Environmental Quality: Demonstrated through the selection of low energy mechanical cooling, individual kitchen exhausting, low energy lighting, careful material selections and high performance building envelopes using operable external shading.
- Water Efficiency: Achieved through water efficient fixtures, rainwater reuse for landscaping and sprinkler test water reuse to the fire tank. A storm water management strategy will be adopted to encourage natural drainage and minimize discharge to sewer where possible.
- Materials and Waste: Dematerialisation will be targeted followed by a green procurement of building materials and components in accordance with their entire life cycle assessment (from cradle-to-cradle); Dedicated recycling waste storage is provided in the GF loading area.
- Emissions: Light pollution is to be avoided by careful integration of lighting to balconies and external areas.
- Site and Social Sustainability: The design addresses Sydney CBD’s community and visitors through a dynamic space with visible references to passive envelope design.

HIGH PERFORMANCE BUILDING ENVELOPE

Operable façade screens respond to North orientation allowing for screens to be deployed in response to solar load while maintaining view.

High performance glazing has been used with high light transmission that allows apartments to achieve excellent amenity and day lighting.

The building envelope comprise of a number of different façade types, with the proposed scheme using a combination of glass and screen performance. Glazing consists of a variety of high performance low-e glazing and double glazing with high visibility.

LOW ENERGY MECHANICAL SYSTEMS

Low energy centralised cooling condenser plants are located in the carpark and roof top utilising natural cross through ventilation to the plant area. A variable refrigerant flow system will service multiple apartments with day/night zone control between living and bed rooms.

LIGHT AND POWER

- Low power lighting for background lighting to be provided as part of the base building works with highly efficient fittings and luminaries.
- Internal lighting will be appropriately zoned with accessible control by building occupants.
- Lighting quality will focus on providing a balance of lighting on all surfaces so minimise eye fatigue rather than lighting only the horizontal surface. This is done through combination of direct and indirect lighting, wall washing and daylight control.
- Minimisation of light pollution;
- Minimum 300 lux levels at work surfaces such as kitchen workbench, cook-top and vanity;
- Energy metering provided to monitor common areas to enable building performance monitoring; and
- Individual authority metering to apartments.

WATER

The following strategies are proposed:

- Water efficient fixtures and fittings including dishwashers:
- Water metering to common areas to enable building performance monitoring against targets so that consumption can be managed and excess usage or leakage can be controlled;
- Major water uses will be metered separately (such as changing facilities with showers);
- Hot water to be delivered by a central gas fired storage system;
- A stormwater management strategy will be adopted to encourage natural drainage and minimize storm water pollution where possible;
- Flood mitigation and refuge zones provided;

Ground floor levels determined in accordance with the flooding solutions letter prepared by Hyder

MATERIALS AND WASTE

Building materials and components such as floors, roofs, walls, windows, partitions, insulation and landscaping will be evaluated and considered for specification in accordance with their entire life cycle assessment (from cradle-to-cradle).

Materials will be assessed based on the ‘Green Guide to Specification’ methodology and ratings aiming to minimise impacts related to materials and building components, such as climate change, water extraction, mineral resources, human toxicity to water and land, fossil fuel depletion, waste disposal amongst others.

Recycling waste is available to residents on every floor by selecting the recycling option on the waste chute which diverts to a separate recycling bin. An additional bulky goods recycling store is available on ground floor to enable re-use of items and/ or collection.

LOW EMISSION MATERIALS

In addition to the benefits of indoor environmental quality derived from energy efficient measures, the use of natural low-emission materials in the apartment fit out are proposed to minimise impacts to occupant’s health and to improve occupant productivity. This will be accomplished by using low-voc (Volatile Organic Compounds from carpets, adhesives and sealants) and non-formaldehyde (from composite timber) materials. Low ODP (Ozone Depleting Potential). Insulation will also be used to reduce impacts on climate.

GREEN STAR

The following initiatives form part of the core strategy to achieve the Green Star environmental targets:

- High performance facade with good levels of daylight penetration, thermal comfort, improved energy performance and reduction of glare whilst delivering good access to views.
- Highly efficient mechanical system with improved air quality above minimum standards.
- High efficiency centralised hot water plant
- High efficiency lighting system with dedicated zoning
- Highly efficient water fittings.
- Good ventilation
- Fit out package to include efficient appliances
- Reduction of waste in materials and extensive use of recycled or reused materials.
- Minimization of emissions associated with ozone depleting materials, light spill into the night sky and reduction of storm water pollution into the storm mains and watercourses.

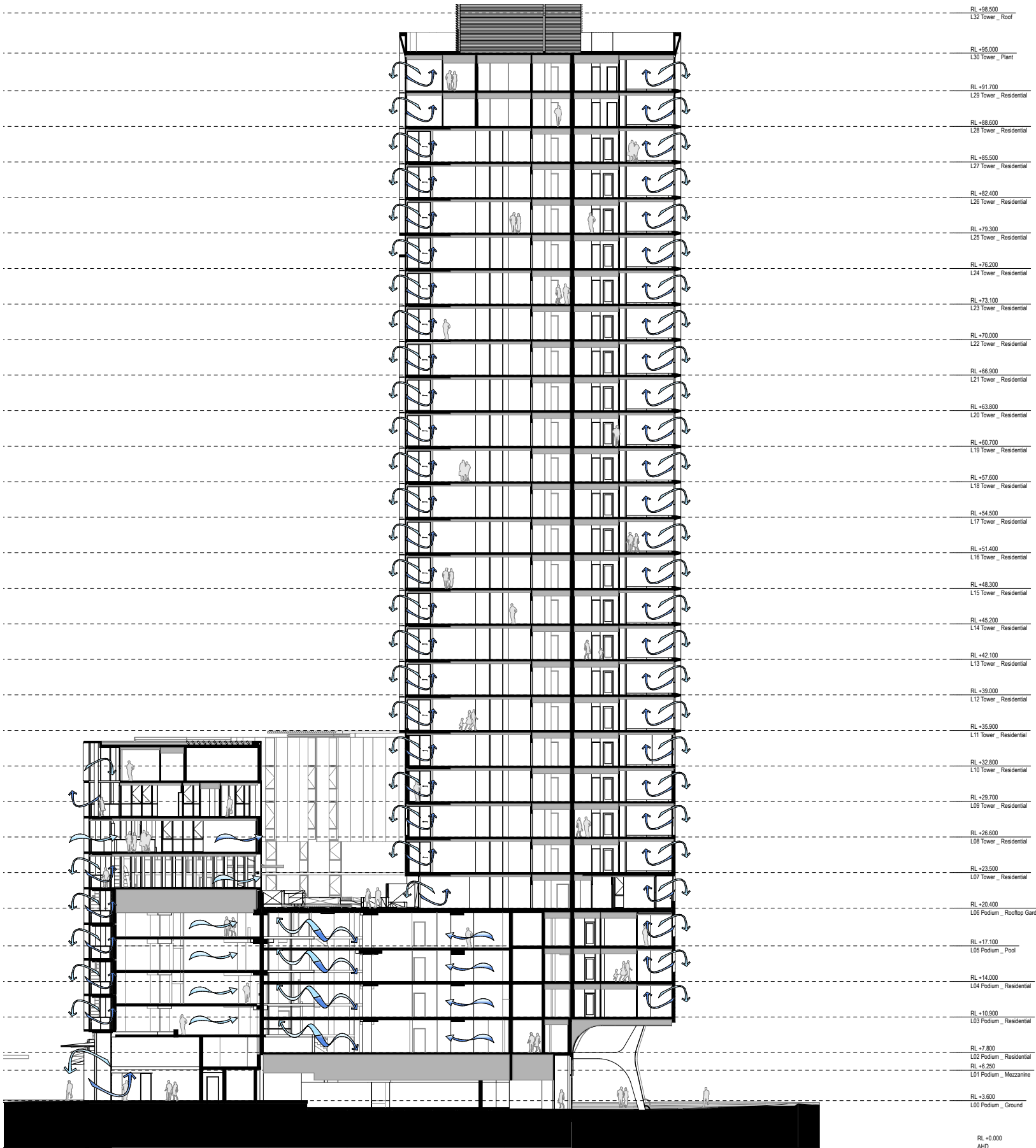


NATURAL VENTILATION ANALYSIS

The proposed development provides a balance of dual-orientated and single orientated configurations. All dual orientated apartments receive natural ventilation in line with the SEPP 65 requirements. The facade has also been appropriately considered incorporating extended articulation with elements such as fins to capture breezes to facilitate natural ventilation and shield against undesirable weather.

The Stage 1 Concept Proposal (SSDA 2) assumes 43% of apartments across the precinct and 38% of apartments within the SEP comply with the requirements under the previous RFDC. Under the new ADG method of measurement 46% (179/391) apartments are naturally ventilated.

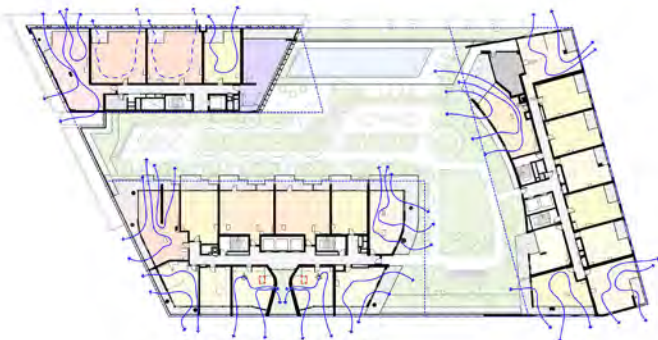
Further to above, Cermak Peterka Petersen were engaged to comment on the natural ventilation with regards to the new ADG requirements. Please refer to Cermak Peterka Petersen letter “Sydney International Convention, Exhibition and Entertainment Precinct (SICEEP), Darling Square South-East Plot, Preliminary Natural Ventilation Considerations” dated 29/01/16 for detailed analysis and findings. They note that 100% of apartments above level 8 comply, 56% of apartments on levels 6 - 7 and 54% of podium apartments on levels 2-5 comply. This takes the overall percentage to 85% across the SEP with 67% of apartments (116/173) below Level 9 being deemed as naturally ventilated.



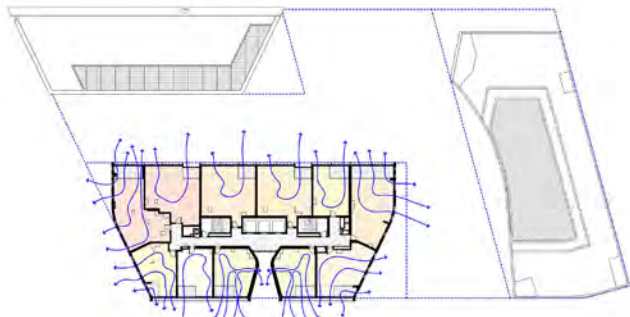
CROSS VENTILATION STRATEGY IN SECTION



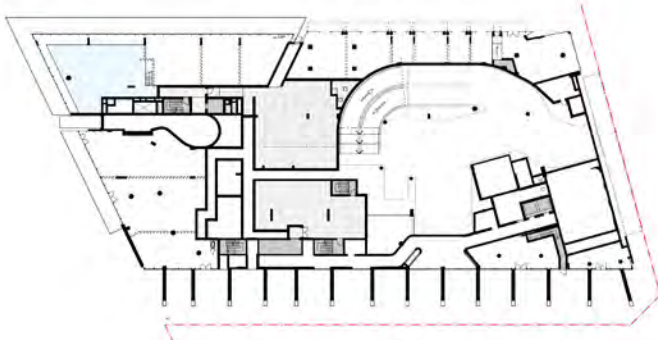
01 PLAN L00 Podium - Ground with Retail
NTS



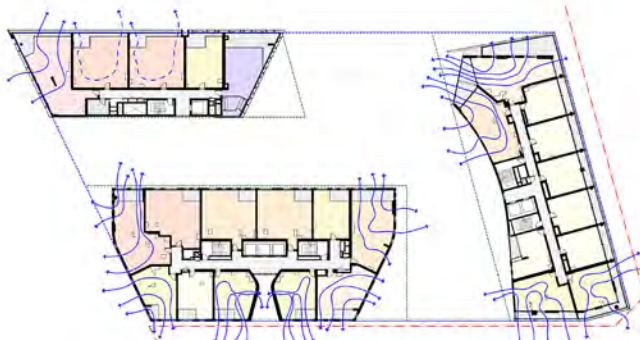
05 PLAN L06 Podium - Roof Garden
NTS



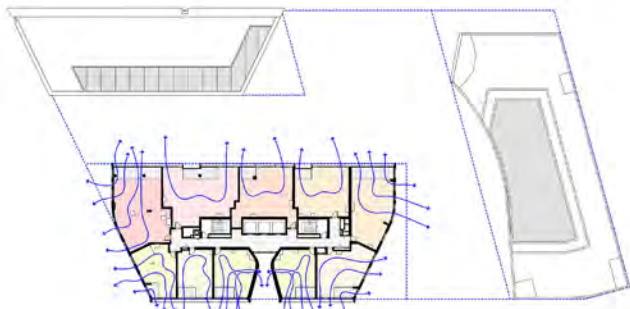
09 PLAN L10-27 Tower - Typical Residential
NTS



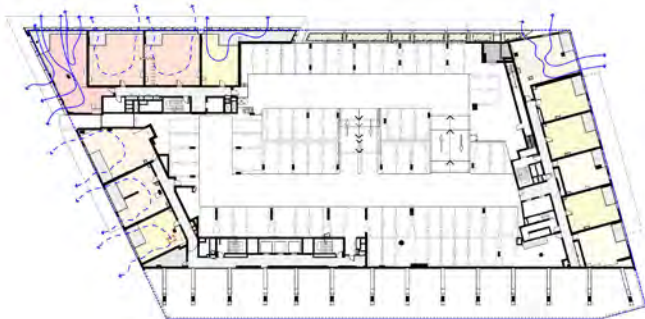
02 PLAN L01 Podium - Mezzanine
NTS



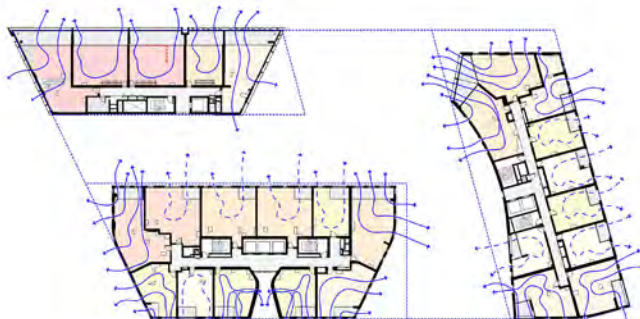
06 PLAN L07 Tower
NTS



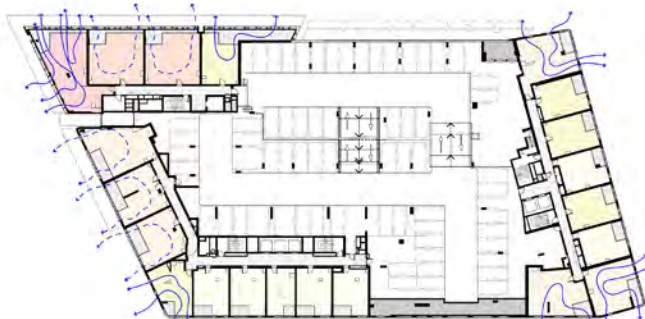
10 PLAN L28-29 Tower - Premium Residential
NTS



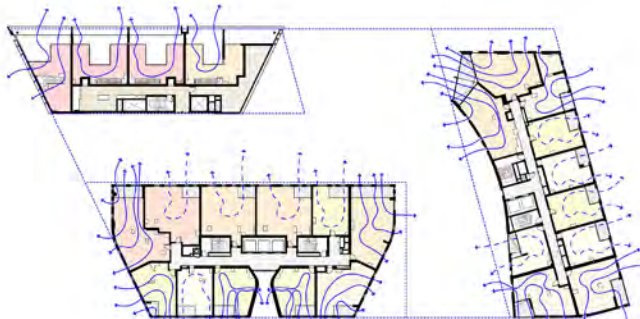
03 PLAN L02 Podium
NTS



07 PLAN L08 - Tower
NTS



04 PLAN L03-05 Typical Podium
NTS



08 PLAN L09 Tower - SE2 Mezzanine Level
NTS

Level	Natural Vent	Natural Vent CFD	%	%
L30				
L29	10			
L28	10			
L27	11			
L26	11			
L25	11			
L24	11			
L23	11			
L22	11			
L21	11			
L20	11			
L19	11			
L18	11			
L17	11			
L16	11			
L15	11			
L14	11			
L13	11			
L12	11			
L11	11			
L10	11			
L09	11	10	100%	
L08	16	10		
L07	11	2	54%	
L06	12	2		
L05	6	5		
L04	6	5		
L03	6	5		
L02	3	5		
L01				
L00				
	289	44	85%	

SOUTH FACING APARTMENT ANALYSIS

The proposal typically aims to maximise the northern frontages and utilise corner apartments to provide dual frontages on the southern boundary.

The southern facade of the tower has a deep vertical recess to provide natural light to the lobby. The location enables the North East and West frontages to be maximised.

Single Aspect south facing apartments within the South East Plot have a large separation from adjacent development due to the Hay Street and light rail corridor width, which affords excellent visual connection with the sky and therefore natural day lighting.

At podium level, single aspect apartments skin the carpark and activate the facade edge enhancing surveillance.

The Stage 1 Concept Proposal (SSDA 2) assumed an average of 17% of single orientated south facing apartments across the entire precinct with a 23% allowance for the South East Plot, measured under the previous AFDC. The number of single aspect south facing apartments achieved by the proposal is approximately 23% (90/391).

Level	South Facing	%
L30		
L29	3	
L28	3	
L27	3	
L26	3	
L25	3	
L24	3	
L23	3	
L22	3	
L21	3	
L20	3	
L19	3	
L18	3	24%
L17	3	
L16	3	
L15	3	
L14	3	
L13	3	
L12	3	
L11	3	
L10	3	
L09	3	
L08	3	
L07	3	
L06	3	
L05	6	21%
L04	6	
L03	6	
L02		
L01		
L00		
	90	23%



APARTMENT SOLAR ACCESS ANALYSIS

The proposal has aimed to maximise unit numbers to northern and eastern facades receiving direct sun. The tall (SE1) tower envelope was maximised along its east west axis to increase the number of apartments facing north. The planning shows an increase of 1 apartment on the basis of the original concept planning (SSDA 2).

The north alignment of the podium was recessed to align with the Little Hay Street opposite and provide amenity to the apartments on the Eastern end of SE2 which receive early morning sun in addition to mid afternoon. The landscaped podium receives good solar access with sun soaking the western portion of the podium mid morning to excellent midday and early afternoon sun filling the landscape to the north and between SE1 and SE2.

Overshadowing on the site comes from the adjacent Haymarket development (affecting the western facade and podium), and the recently approved Greenland tower. The Stage 1 Concept Proposal (SSDA 2) assumes an average of 70% of apartments for the entire precinct and 71% of apartments in the South East Plot would comply with the 2 hours of solar access to living spaces under the RFDC. Between the core hours of 9am and 3pm 47% (183 / 391) of apartments receive sunlight.

Between the extended hours of 8 am and 4 pm the number of apartments receiving 2 hours or more solar access is 53% (206/391). The extension in time sees an increase of 23 apartments receiving 2 hours or more of sunlight. Detailed elevational shadow analysis is provided on the following pages showing the sunlight throughout the extended hours noted above.

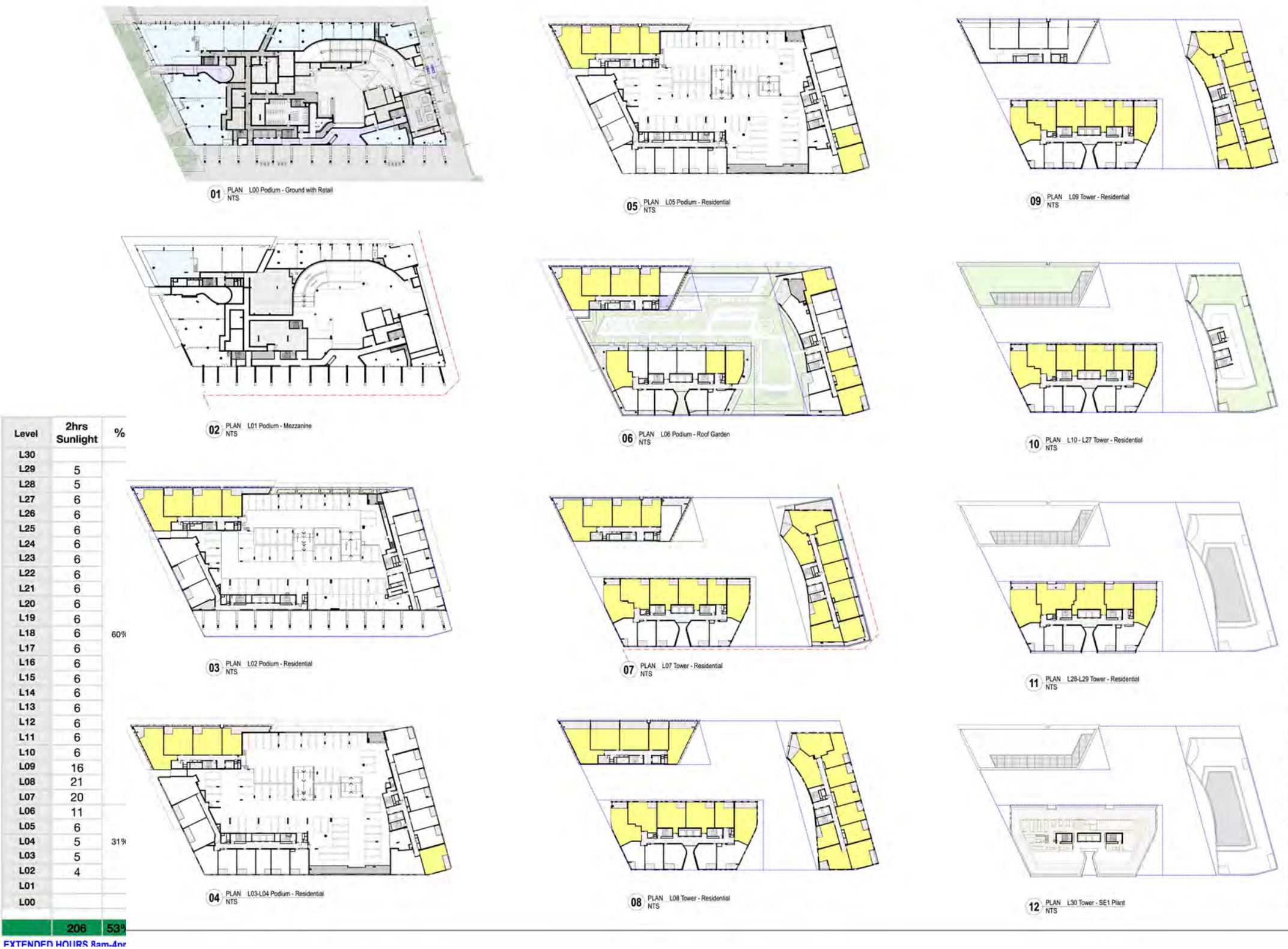
When the scheme is viewed in its Tower (L07 to L29) and Podium (L01 to L06) components the solar performance of the building is more clearly illustrated.

The Tower component contains 290 apartments of which 174 (60%) achieve compliance.

The Podium component contains a further 101 apartments of which 31 (31%) achieve compliance.

Its important to note that the podium contains only 26% of the total apartments yet accounts disproportionately for 38% of the non-conforming apartments.

The podium apartments have been designed to optimise their access to natural light whilst achieving high levels of both visual and acoustic privacy. The resulting solar performance outcome is a good result given the overshadowing of adjacent developments, and orientation of the podium.



APARTMENTS WITH NO SOLAR ACCESS

The proposal has aimed to maximise unit numbers to northern, eastern and western facades receiving direct sun. In turn this helps a southern oriented site to try and minimise the number of apartments with no direct solar access.

The number and location of the apartments is limited to the southern facade of both SE1 Tower and Podium levels.

Whilst the apartments have no direct solar access they do have sweeping vistas to the south and immediate building envelopes are in the order of 40m away and as such there is good ambient light amenity.

Detailed elevational shadow analysis is provided on the following pages.

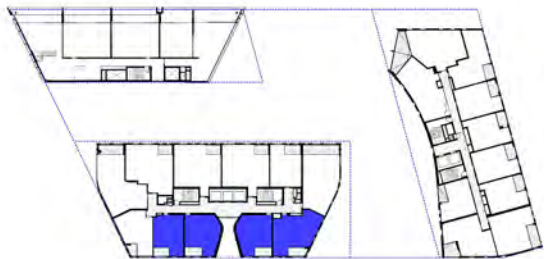
Level	No Solar	%
L30		
L29	3	
L28	3	
L27	4	
L26	4	
L25	4	
L24	4	
L23	4	
L22	4	
L21	4	
L20	4	
L19	4	
L18	4	30%
L17	4	
L16	4	
L15	4	
L14	4	
L13	4	
L12	4	
L11	4	
L10	4	
L09	4	
L08	4	
L07	4	
L06	7	
L05	10	28%
L04	10	
L03	12	
L02	3	
L01		
L00		
	132	34%



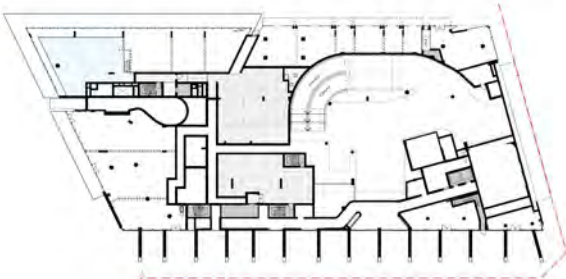
01 PLAN L00 Podium - Ground with Retail NTS



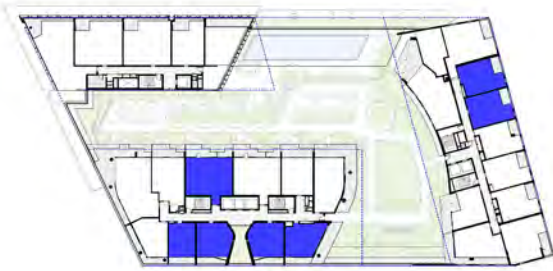
05 PLAN L04-L05 Podium NTS



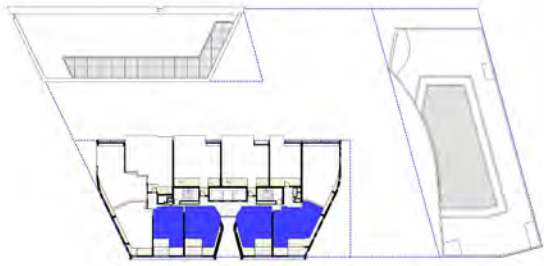
09 PLAN L09 Tower NTS



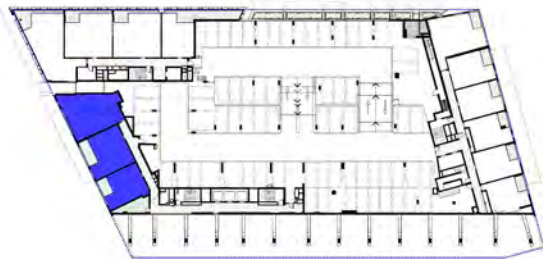
02 PLAN L01 Podium - Mezzanine NTS



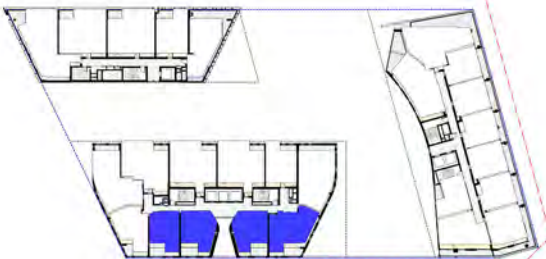
06 PLAN L06 Podium - Roof Garden NTS



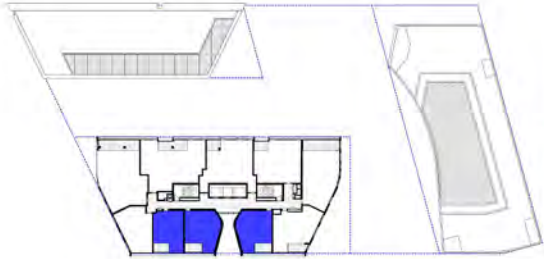
10 PLAN L10-27 Tower - Typical Residential NTS



03 PLAN L02 Podium - Residential NTS



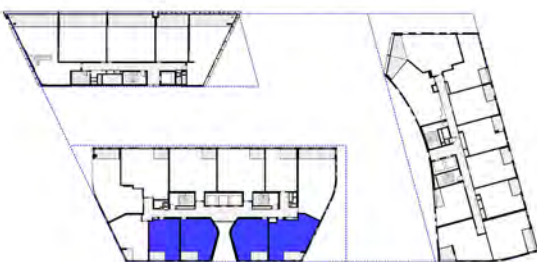
07 PLAN L07 Tower NTS



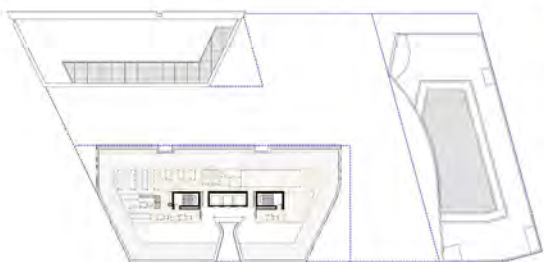
11 PLAN Level 28-29 - Premium Residential NTS



04 PLAN L03 Podium NTS



08 PLAN L08 Tower NTS



12 PLAN Level 30 - Tower Plant NTS