

SEPP 65 COMPLIANCE ANALYSIS REPORT – INDICATIVE OSD DESIGN

APPENDIX I

Crows Nest - Over Station Development

Appendix I - SEPP65 Analysis

29 July 2020

Revision E

I.1.1 SEPP65 Design Statement

Principle 1: Context and neighbourhood character

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

Response:

The Concept Design provides activation to every interface of the Crows Nest Over Station Development. The proposal creates a vibrant human scale public domain along Hume st, where the main entrances to both commercial and residential developments are proposed. The proposed design includes ground floor activation to Pacific Highway, Hume Street, and Oxely Street with the retail opportunities in response to the local community needs and the existing urban fabric.

The proposed development is integrated into the proposed built form of the Crows Nest Station which acts as a podium building for the developments. The architectural treatment of the station buildings and the integrated OSD entrances are inspired by the rich characteristics of the surroundings and aims to enrich the public experience on the street, especially along Hume Street.

Principle 2: Built form and scale

Good design achieves a scale, bulk and height appropriate to the existing or desired future character of the street and surrounding buildings. Good design also achieves an appropriate built form for a site and the building's purpose, in terms of building alignments, proportions, building type, articulation and the manipulation of building elements.

Appropriate built form defines the public domain, contributes to the character of streetscapes and parks, including their views and vistas, and provides internal amenity and outlook.

Response:

The development, spread over three sites, is comprised of 22-storey commercial buildings on Site A, an 18-storey residential building on Site B and a 9-storey commercial building on Site C. The 2-storey station (3-storey on site B) buildings forming the base on Site A and B are designed to be sympathetic to the scale of the surrounding Crows Nest precinct and take their cues from the character of their neighbours.

The built forms of the development respond to the diverse built forms of the surroundings, ranging from high-rise buildings of St Leonards to 2-storey buildings of Crows Nest. Varying heights on each site, gradually descending from the highest point on the north of Site A down towards Hume Street, the proposal mediates these ranging built forms of the surrounding, and acts as a transition between them. It also brings down the scales on Hume Street where the bulk and scale of the building viewed from the street is more appealing for pedestrian activities.

The proposed scheme further breaks down the scale and bulk of the overall volume, by introducing horizontal and vertical recesses into the building, creating a reading of smaller volumes within the overall form, which is articulated into the 'vertical village' concept.

The building heights have been informed by Crows Nest Place making & Principle Study (2016). The massing responds to the current neighbourhood character, as well as considering the nature of the district. The forms will sit comfortably on the site and surroundings now and into the future.

The form of the buildings endeavour to maximise the inhabitant's exposure to the extremely attractive northern and southern vistas.

Principle 3: Density

Good design achieves a high level of amenity for residents and each apartment, resulting in a density appropriate to the site and its context. Appropriate densities are consistent with the area's existing or projected population.

Appropriate densities can be sustained by existing or proposed infrastructure, public transport, access to jobs, community facilities and the environment.

Response:

The proposed density responds to Sydney's evolving status as a global city, and the associated increasing demand for residential, and commercial uses within central Sydney and inner city suburbs. The proposal is located above the Crows Nest Sydney Metro Station, one of 31 stations along the metro rail network, and 1 of 7 new city centre metro stations that will provide a modern, and frequent transport service to meet the needs of a growing population, one train every 4 minutes when fully operational. This will provide capacity for an estimated extra 100,000 customers per hour across the Central Sydney rail network. The proposed density is consistent with that envisaged for the site and locality, and can be sustained by the existing infrastructure and services within the location.

The future infrastructure, extensive nearby public transport and the proposed communal facilities will sustain the proposed design density of Sites A and B, as well as the existing neighbourhoods nearby.

Principle 4: Sustainability

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

Response:

Passive design and lower energy use is encouraged through natural ventilation. The typical layout of the apartment floors allows cross-ventilation on all corner apartments, which have two aspects. Further dual aspect façades have been created through the façade slots between apartments, where additional exposed façade is created.

North-Eastern and North-Western façades receive high solar access and comply with the solar and daylight access criteria. Where appropriate, apartments will be arranged for the living areas to be located on the qualifying façades. The risk of overheating in summer is reduced through the location of balconies on the façades to prevent direct solar access.

Adequately sized recycling facilities, waste storage and collection facilities have been included in the development plans and a waste management plan is to be developed at the detailed design stage. Further shading and façade development will be undertaken during the detailed design stage.

Principle 5: Landscape

Good design recognises that together landscape and buildings operate as an integrated and sustainable system, resulting in attractive developments with good amenity. A positive image and contextual fit of well designed developments is achieved by contributing to the landscape character of the streetscape and neighbourhood. Good landscape design enhances the development's environmental performance by retaining positive natural features which contribute to the local context, co-ordinating water and soil management, solar access, micro-climate, tree canopy, habitat values, and preserving green net-works. Good landscape design optimizes usability, privacy and opportunities for social interaction, equitable access, respect for neighbours' amenity, provides for practical establishment and long term management.

Response:

With limited access to ground level, due to the station building podium, the design proposes landscaped roof areas as communal open spaces. The landscape gardens and communal terrace will provide amenity to the residents which also benefits from the view of the Sydney CBD and North Sydney over the leafy suburbs of the lower north shore.

Hume Street is envisaged as a pedestrian and cyclist friendly street with vibrant street activities which is seen as an extension to the already well established Willoughby Road area. With combination of soft and hard landscaping, with generous provision of street furnitures, weather protection and street activation, Hume Street improves the liveability of the proposed development.

Further landscape development will be undertaken at the detailed design stage.

Principle 6: Amenity

Good design positively influences internal and external amenity for residents and neighbours. Achieving good amenity contributes to positive living environments and resident well being. Good amenity combines appropriate room dimensions and shapes, access to sunlight, natural ventilation, outlook, visual and acoustic privacy, storage, indoor and outdoor space, efficient layouts and service areas, and ease of access for all age groups and degrees of mobility.

Response:

The Concept Design provides generous communal corridors inside the proposed buildings with accessed to natural light and natural ventilation. The communal corridors and associated façade recesses have informed the building envelope and will assist in articulating the massing and enabling cross-flow ventilation.

Floor layouts are designed to maximise the proportion of dual aspect units and the provision of natural ventilation.

Private open space is well proportioned to allow for furniture and comfortable outdoor living zones. The depth of the balcony also introduces a passive shading device to prevent direct sunlight penetrating into the apartments during the summer months.

Residential apartments will enjoy a variety of outlooks, including park views, district views and city views. Building separation is in accordance with the Apartment Design Guideline and will maintain residential amenity, privacy and views.

The apartment layouts are designed to maximise solar access and, where possible, apartments will have living areas located on the façades with north-western and north-eastern exposure, where solar exposure is the greatest.

Principle 7: Safety

Good design optimizes safety and security, within the development and the public domain. It provides for quality public and private spaces that are clearly defined and fit for the intended purpose. Opportunities to maximise passive surveillance of public and communal areas promote safety. A positive relationship between public and private spaces is achieved through clearly defined secure access points and well lit and visible areas that are easily maintained and appropriate to the location and purpose.

Response:

The building lobbies and entrances address the highly activated Hume Street, which provides good passive surveillance to all the major points of access into the development.

The new development will benefit from the mix of uses envisaged for the site (which includes the Metro Station component). The Metro Station public domain design has fostered a pedestrian and cycle friendly environment by implementing footpath widening and cycle path connections.

The station will be opened from 04:00 to midnight which will facilitate improved street activities by providing a safe and secure setting throughout the day and night.

The design of Sites A and B contributes to safety and security in the following ways:

- Visual connection of the lobbies from the street;
- Retail along the street providing vibrant activities at all times of the day;
- The strata management will provide security to the individual components and precinct;
- Public spaces, gardens and open balconies will assist with passive surveillance;
- Strategically located landscaping elements will deter vandalism and graffiti on ground level walls;
- Robust vandal resistant materials will be used at ground level.

Principle 8: Housing Diversity and Social interaction

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

Response:

The concept design offers a mix of uses including retail, residential and commercial which will collectively generate a vibrant and diverse precinct.

Local residents, occupiers and day visitors will be able to enjoy retail offerings available at street level and at the sky lobby of the commercial building on site A.

The public domain and station concourse will offer a good setting for a range of community activities.

Site B offers a total of 143 units. There is a diverse range of unit types and configurations which include 1 bedroom, 2 bedroom and 3 bedroom units, in various sizes and plan types.

The unit mix has been thoroughly considered to align as closely as possible with the Apartment Design Guideline. The range of units on offer is aimed at satisfying the diverse needs and demographics of the current and future Crows Nest residents.

Principle 9: Aesthetics

Good design achieves a built form that has good proportions and a balanced composition of elements, reflecting the internal layout and structure. Good design uses a variety of materials, colours and textures. The visual appearance of well designed apartment development responds to the existing or future local context, particularly desirable elements and repetitions of the streetscape.

Response:

The concept design endeavours to deliver an aesthetically pleasing design via the following measures:

- The massing of the buildings has been articulated and componentised by the provision of balconies, vertical recesses and external shading devices;
- The massing is scaled down horizontally by modulating the facade components;
- The visibility of the structural components in the building’s façades has been minimised in order to maximise the façade transparency and appearance of ‘lightness’. The structural interface with the Metro Station box below is complex and restrictive but the building’s structural design has been optimized in order to achieve maximum façade openness and transparency.

Further facade development and refinement will be undertaken at the detailed design stage.

I.2.1 ADG Compliance Summary

Introduction

The indicative design for the residential scheme has been reviewed for compliance with key SEPP 65 Apartment Design Guidelines in order to validate the suitability of the use to the envelope.

Listed below are the key ADG sections that require consideration for high rise residential apartment planning:

- Visual Privacy
- Solar and daylight analysis
- Natural Ventilation
- Ceiling heights
- Apartment size and layout
- Private open space and balconies
- Communal Open Space
- Common circulation and spaces
- Storage

Visual Privacy

Objective 3F-1. Adequate building separation distances are to be 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 & balconies	Non-habitable rooms
Up to 12m (4 storey)	6m	3m
Up to 25m (5-8 storey)	9m	4.5m
Over 25m (9+ storey)	12m	6m

The indicative design achieves more than 24m separation between to Hume St and Pacific Highway.

Along Clarke Lane, the lower floors of the residential building (below 25 m) achieve a minimum separation of 10 m from the adjacent buildings. Along all other facades, the buildings acheives a separation of more than 12 m.The indicative design acheives compliance with the above criteria.

No habitable rooms are facing south-west and 6m separation to the boundary is provided.

Windows do not look towards neighbouring units. The majority of the proposed balconies are at adequate distances from each other, and privacy screens will be installed where necessary to achieve privacy.

The indicative design achieves compliance with the above criteria

Solar Access

The Apartment Design Guide 2015, Part 4A-1, stipulates the minimum amount of sunlight that should be received in habitable rooms and private open space.

The minimum amount of light acceptable to be included in calculations is 1sq.m of direct sunlight, measured at 1m above floor level, for a minimum of 15 minutes. The calculation needs to be made with the building in the correct global location and orientation, but also within it's known surrounding context – topological and built-form.

In the calculations below and accompanying diagrams at section I.3, the Crows Nest OSD Indicative Design has been correctly oriented and located within the current built form surrounding the site as well as completed versions of any significant nearby buildings under construction or planning approved. Diagrams I.3.1 - 3.1.5 demonstrate the periods within which apartments, including living areas, receive a minimum of 2 hours of direct sunlight in Mid Winter – 21st June. Diagrams I.3.4 also provide valuable information for the subsequent detailed design with respect to areas where some design adjustments can further improve performance.

Design Criteria (dense urban context)	Demonstrate Performance
Living rooms and private open spaces of at least 70% of apartments in a building receive a minimum of 2 hours direct sunlight between 9am and 3pm at mid winter in sydney Metropolitan Area and in the New Castle and Wollongong local government area.	Approximately 75% of apartments received 2 hours or more of direct sunlight. Indicative design achieves the requirement. (Refer to diagrams)
A maximum of 15% of apartments in a building receive no direct sunlight between 9am and 3pm at mid winter.	Approximately 15% of apartment receive no direct sunlight. Indicative design achieves the requirement.

Note: Further detailed design refinements are likely to decrease the number of apartments that do not receive solar access.

The indicative design acheives compliance with the above criteria.

Natural Ventilation

Objective 4B-3. The number of apartments with natural cross ventilation is maximised to create a comfortable indoor environment for residents.

Design Criteria

1. At least 60% of apartments are naturally ventilated in the first nine storeys of the building. Apartments at ten storeys or greater are deemed to be cross ventilated only if any enclosure of the balconies at these levels allow adequate natural ventilation and cannot be fully enclosed.

As demonstrated in Diagram I.3.7, the indicative design demonstrates that, 42 out of the 66 apartments in the first nine storeys (Levels 3 to 9) are cross-ventilated (64% compliance) and therefore this standard will be satisfied.

Furthermore, all apartments including those at the first nine storeys have balconies and can therefore be adequately ventilated.

The indicative design achieves compliance with the above criteria.

Ceiling heights

Objective 4C-1. Ceiling height achieve sufficient natural ventilation and daylight access.

Design Criteria

1. Measured from finishes floor level to finishes ceiling level, minimum ceiling heights are:

Typical floor habitable rooms	2700mm
Assumptions:	
MEP zone	200mm
Structural Zone	200mm
Floor to Floor Height	3100

The indicative design achieves compliance with the above criteria.

Apartment Size and layout

Objective 4D-1. The layout of rooms within an apartment is functional, well organised and provides a high standard of amenity.

Design Criteria

1. Apartments are required to have the following minimum internal areas:

Apartment Type	Minimum internal area
Studio	35m2
1 Bedroom	50m2
2 Bedroom	70m2
3 Bedroom	90m2

The indicative design achieves the minimum internal areas, refer schedule in the next page.

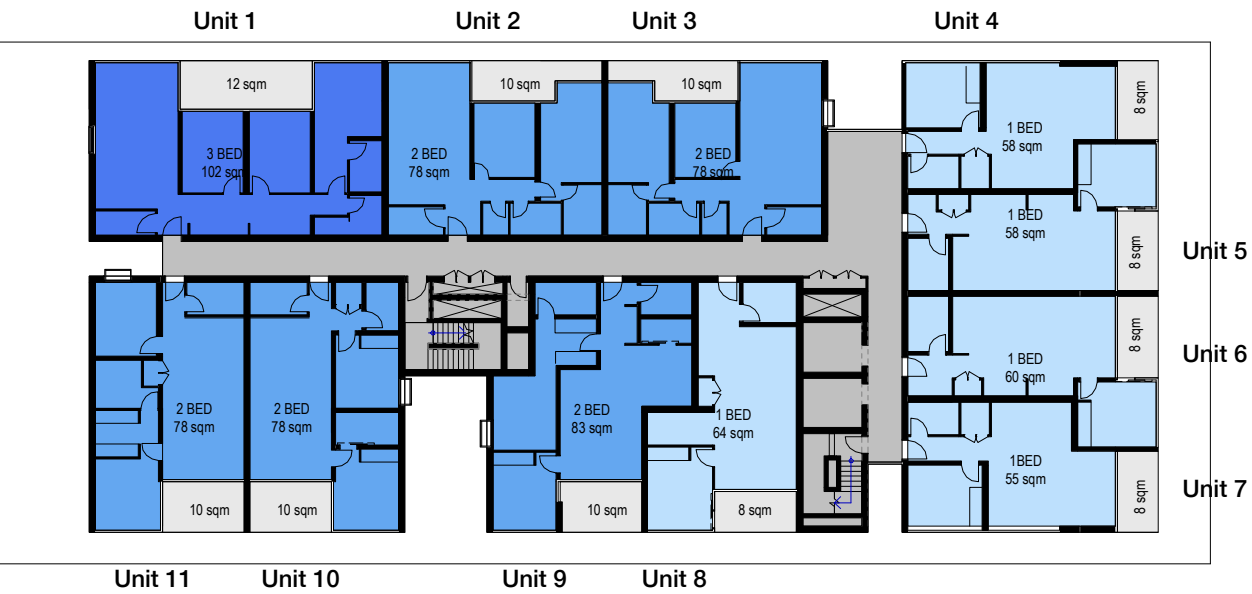
The indicative design achieves compliance with the above criteria.

Unit no.	Type	Location	Area (m²)	ADG Min. (m²)	Balcony Area (m2)	ADG Min. (m²)
Unit 1	3 Bed	L4-16	102	90	12	12
Unit 2	2 Bed	L4-16	78	70	10	10
Unit 3	2 Bed	L4-16	78	70	10	10
Unit 4	1 Bed	L4-16	58	50	8	8
Unit 5	1 Bed	L4-16	58	50	8	8
Unit 6	1 Bed	L4-16	60	50	8	8
Unit 7	1 Bed	L4-16	55	50	8	8
Unit 8	1 Bed	L4-16	64	50	8	8
Unit 9	2 Bed	L4-16	83	70	10	10
Unit 10	2 Bed	L4-16	78	70	10	10
Unit 11	2 Bed	L4-16	78	70	10	10

Table 2.1

Every habitable room must have a window in an external wall with a total minimum glass area of not less than 10% of the floor area of the room. Daylight and air may not be borrowed from other rooms.

The indicative design achieves compliance with the above criteria.



Floor Plan (L4 - 16)

Objective 4D-2. Environmental performance of the apartment is maximised.

Design Criteria

- 1. Habitable room depths are limited to a maximum of 2.5 the ceiling height.
- 2. In open plan layouts (where the living, dining and kitchen are combined) the maximum habitable room depth is 8m from a window.

The indicative design achieves compliance with the above criteria.

Objective 4D-3. Apartment layouts are designed to accommodate a variety of household activities and needs.

Design Criteria

- 1. Master bedrooms have a minimum area of 10m2 and other bedrooms 9m2 (excluding wardrobe space).
- 2. Bedrooms have a minimum dimension of 3m (excluding wardrobe space).
- 3. Living rooms or combined living/dining rooms have a minimum width of: - 3.6m for studio and 1 bedroom apartments - 4m for 2 and 3 bedroom apartments
- 4. The width of cross-over or cross-through apartments are at least 4m internally to avoid deep narrow apartment layouts. The indicative design test layouts demonstrate more than adequate opportunity to meet this objective.

The indicative design achieves compliance with the above criteria.

Private open space and balconies

Objective 4E-1. Apartments provide appropriately sized private open space and balconies to enhance residential amenity.

Design Criteria

- 1. Apartments are required to have primary balconies as follows:

Dwelling type	Minimum area	Minimum depth
Studio	4m²	
1 Bedroom	8m²	2m
2 Bedroom	10m²	2m
3 Bedroom	12m²	2.4m

The proposed balconies comply with the minimum balcony area requirements at all levels. Refer to table 2.1

The indicative design achieves compliance with the above criteria.

Communal Open Space

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.
- 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 9am and 3pm on 21 June (mid winter).

The indicative design shows roof level communal space has an area equal to 30% the building footprint area and receives plenty of an excellent level of sunlight during winter. More than 50% of the communal area receives at least 2 hours of solar access on June 21 from 9:00 am to 3:00 pm.

The indicative design achieves compliance with the above criteria.

Common circulation and spaces

Objective 4F-1. Common circulation spaces achieve good amenity and properly service the number of apartments.

Design Criteria

- 1. The maximum number of apartments off a circulation core on a single level is eight.

While each level has 11 dwellings served by one core, the common corridors are provided with generous amenities to increase sense of community and quality of the space. The additional amenities include ample common space with view to the outside, generous widths, natural lights and possible access to natural air entering from 3 directions.

- 2. For buildings of 10 storeys and over, the maximum number of apartments sharing a single lift is 40.

The indicative design has two lifts which can be accessed from the Hume Street entrance. The speed and the capacity of the lifts will be designed to provide adequate levels of services. The lift lobbies at each level also have access to natural lights and views.

The indicative design achieves partial compliance with the above criteria.

Storage

Objective 4G-1. Adequate, well designed storage is provided in each apartment.

Design Criteria

- 1. In addition to storage in kitchens, bathrooms and bedrooms, the following storage is provided:

Dwelling type	Storage size volume
Studio apartments	4m3
1 bedroom apartments	6m3
2 bedroom apartments	8m3
3+ bedroom apartments	10m3

At least 50% of the required storage is to be located within the apartment. There is also very convenient access to further resident storage on each level, mainly on level 06/07/08, capable of providing up to 50% of the storage requirement.

Sufficient storage spaces are provided in the indicative scheme both within the apartment as well as storage spaces in car park area.

The indicative design achieves compliance with the above criteria.

I.3 ADG Analysis

I.3.1 Solar Access | Massing Assessment

Objective 4A-1.

The proposed design should optimise the number of apartments receiving sunlight to habitable rooms, primary windows and private open spaces, as per 4A Solar and daylight access

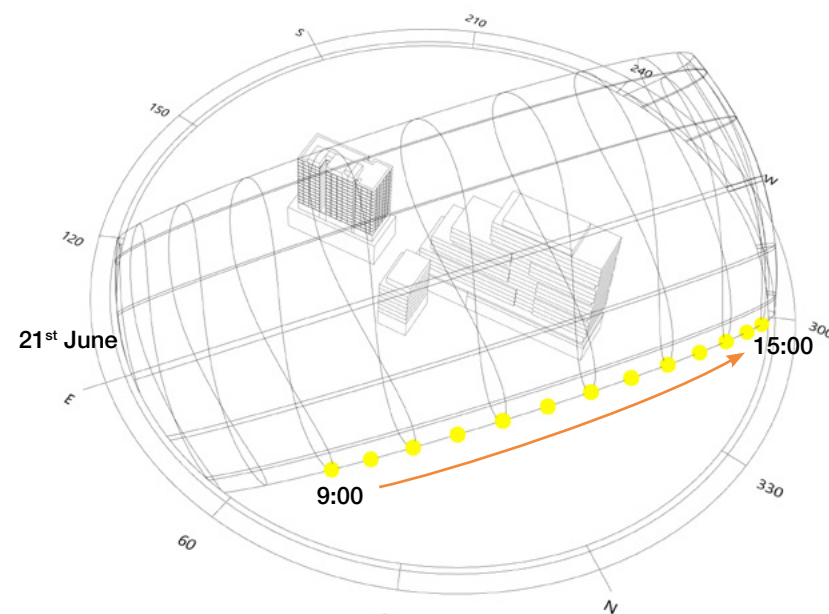
4A-1.1 Living rooms and private open spaces of at least 70% of apartments receive minimum 2 hours direct sunlight between 9 am and 3 pm on 21 June;

Complies, 73% of apartments receive more than 2 hours of sunlight.

4A-1.2 Not applicable to this location;

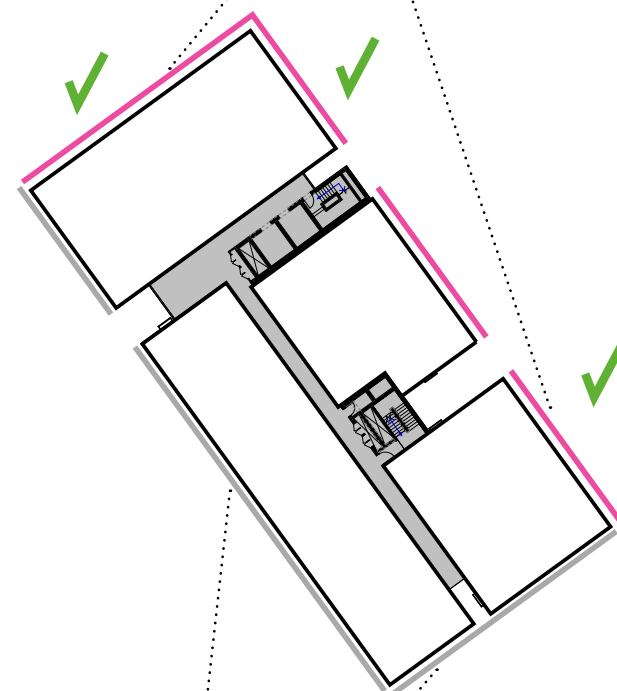
4A-1.3 A maximum of 15% of apartments in a building receive no direct sunlight between 9 am and 3 pm on 21 June.

Complies, 13% of the apartments receive no sunlight.



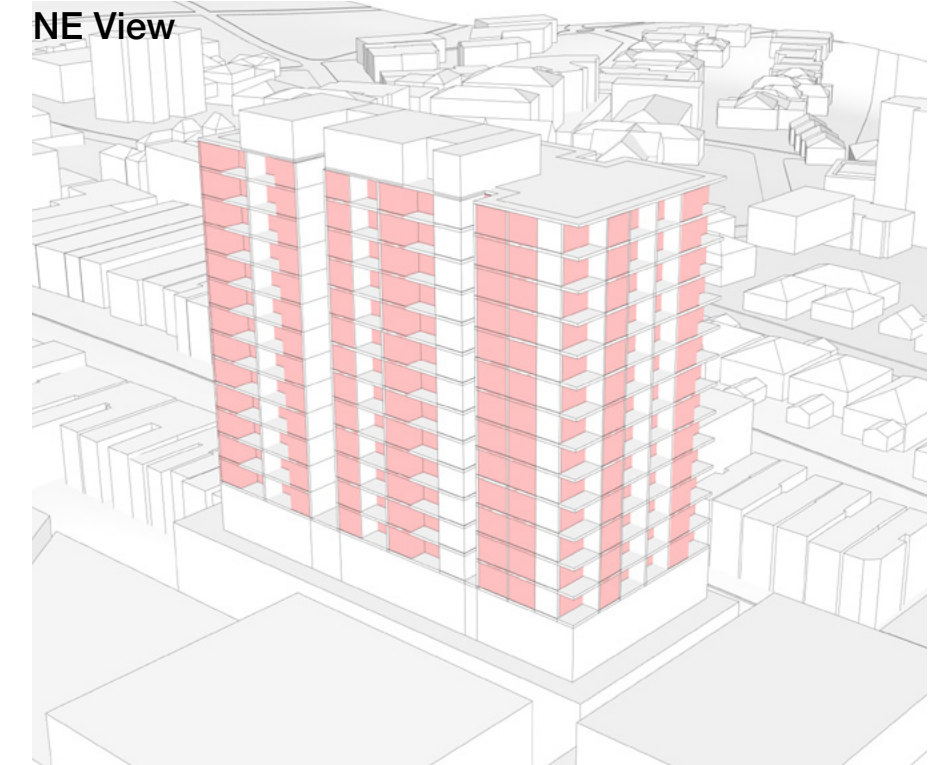
Source: NSW Department of Planning & Environment
Apartment Design Guide 2015.

Plan View

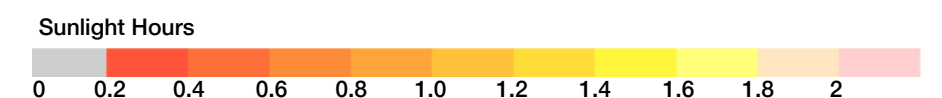
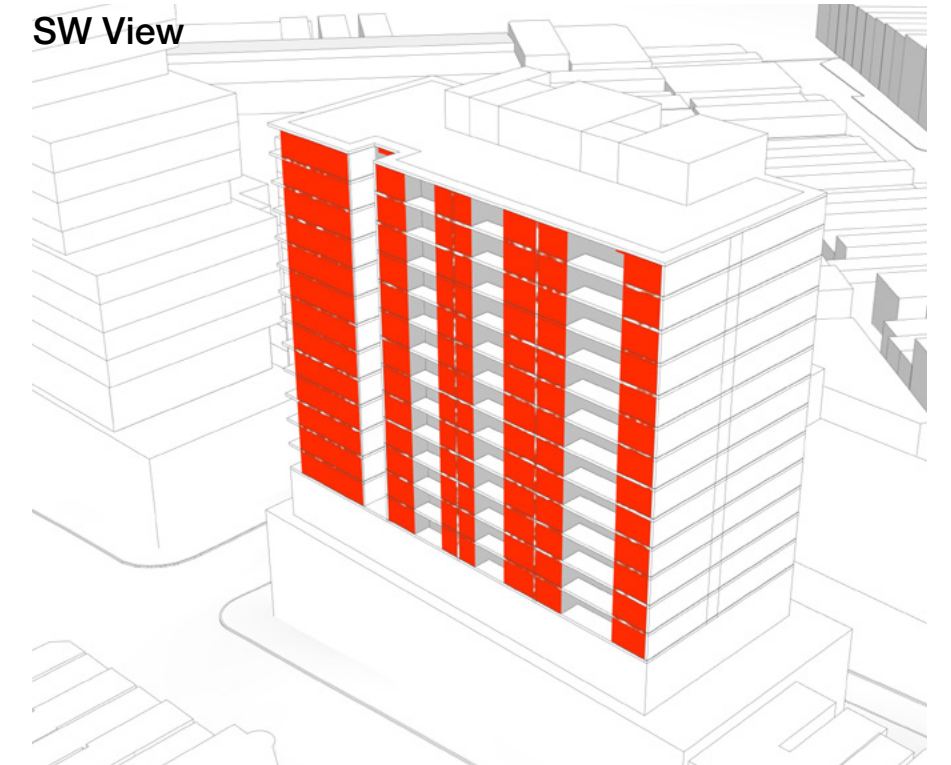


South western and south-eastern façades receive no direct sunlight due to the orientation and the balconies

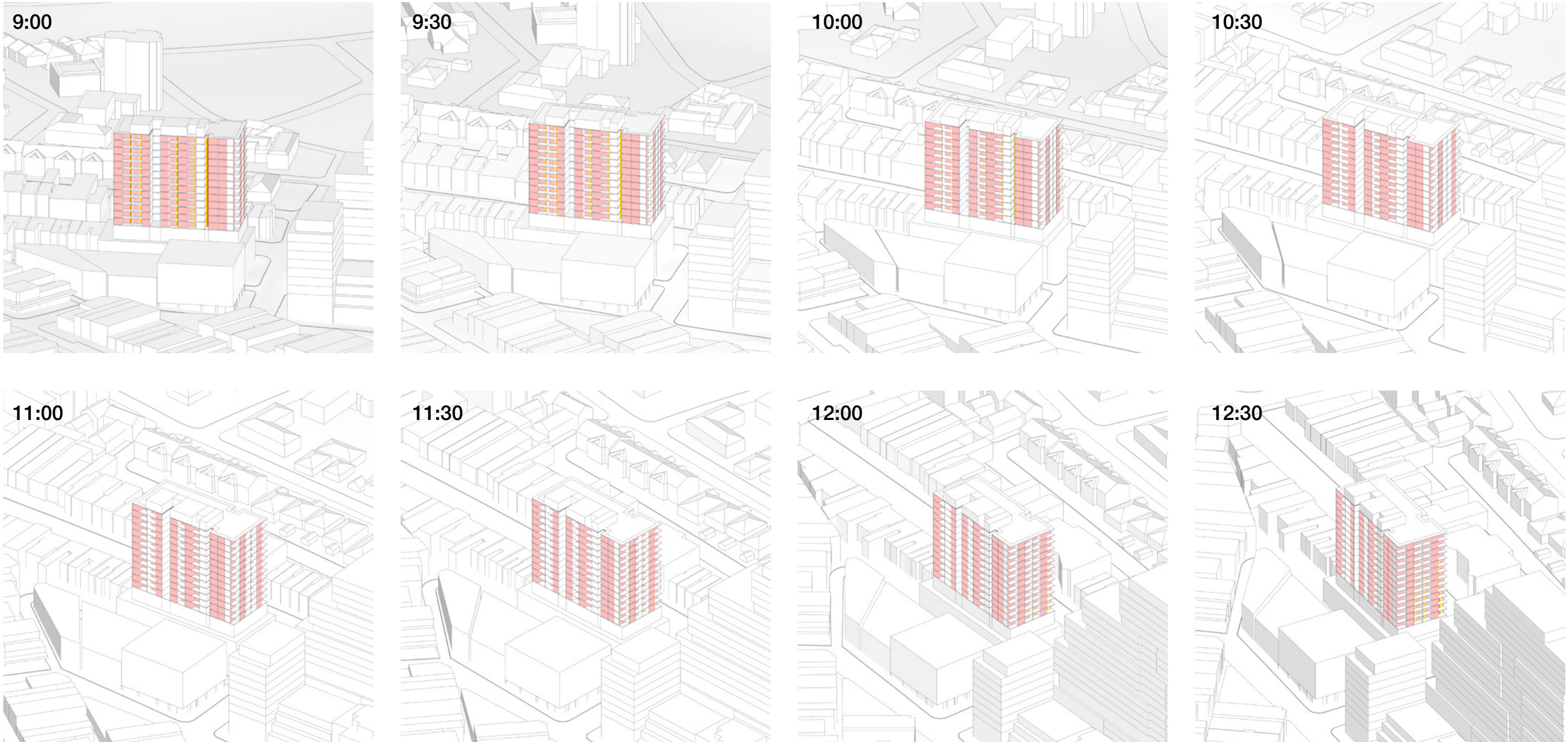
NE View

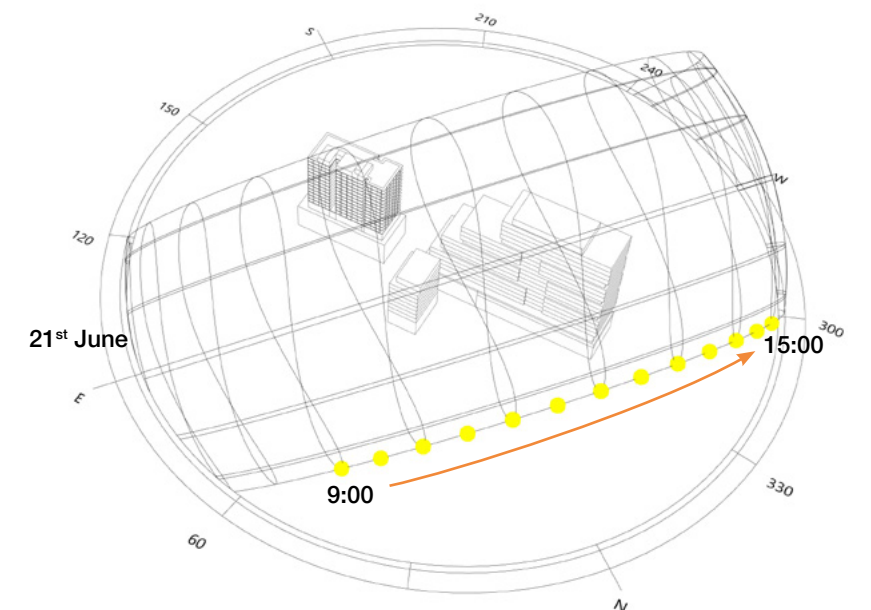
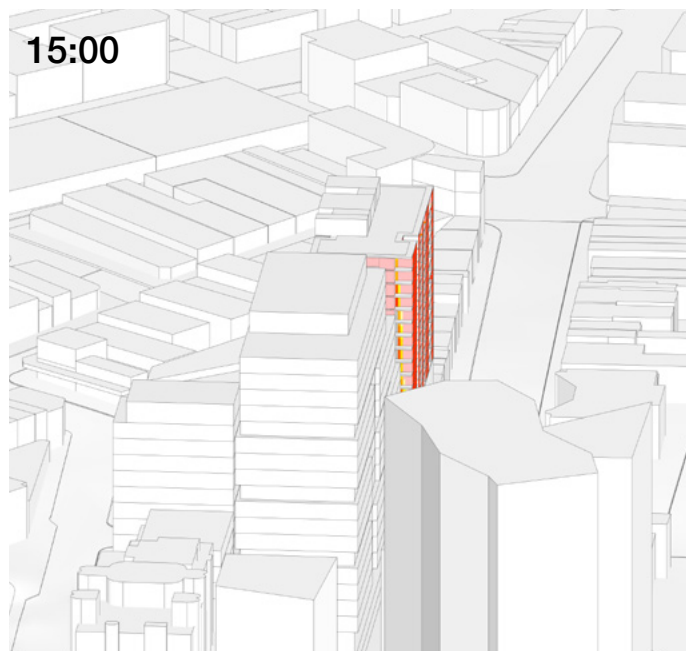
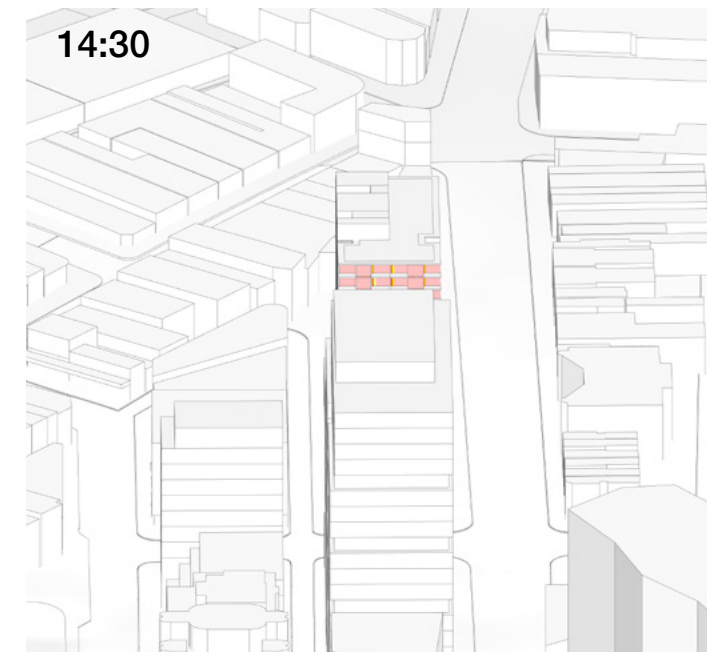
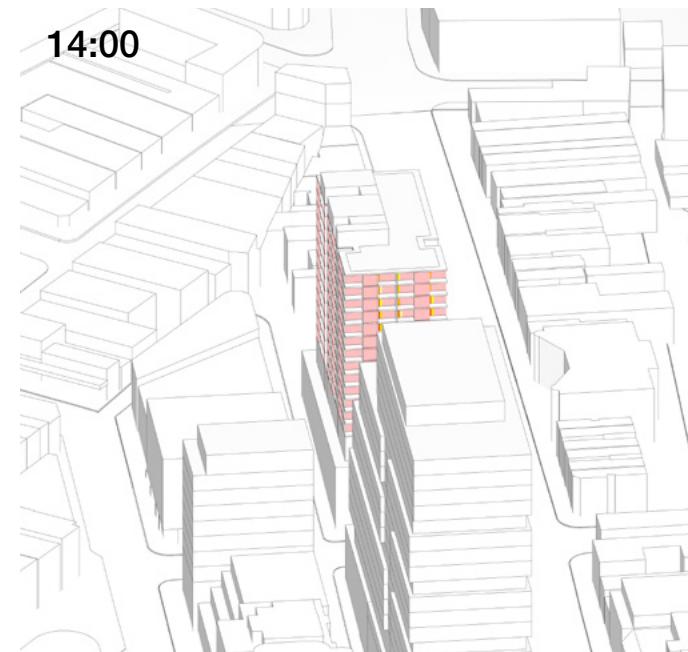
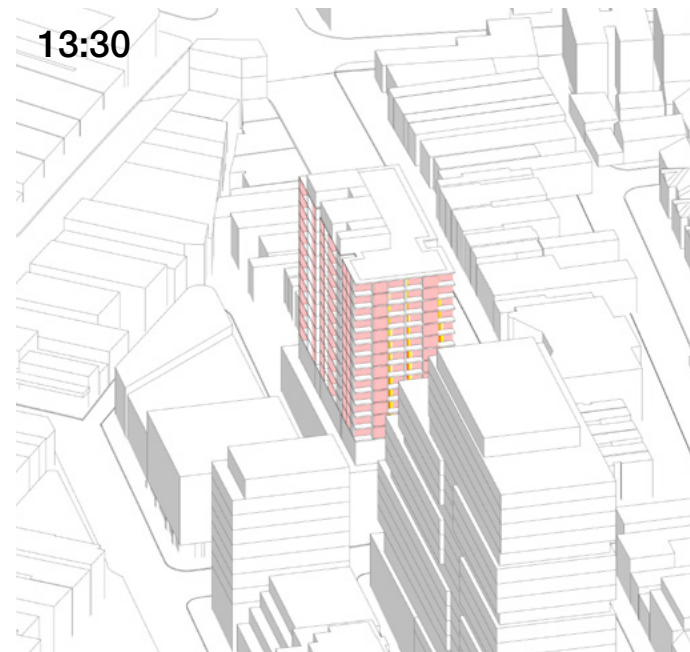
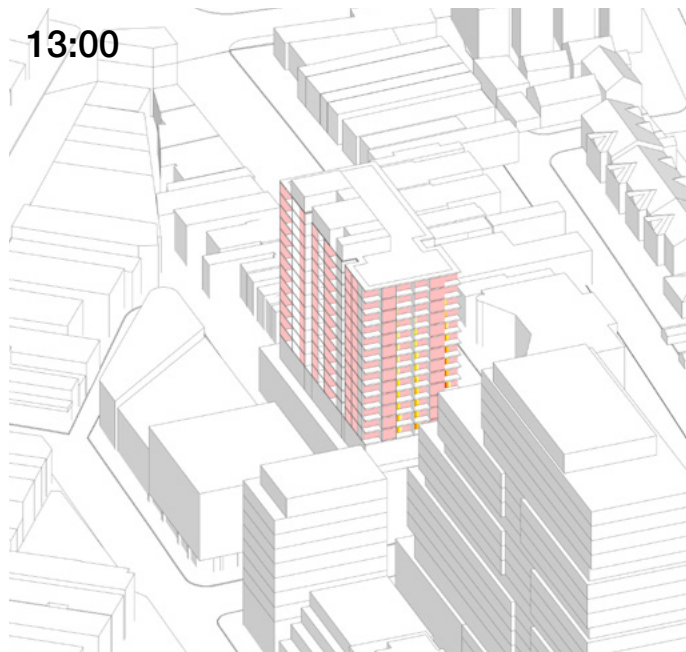


SW View

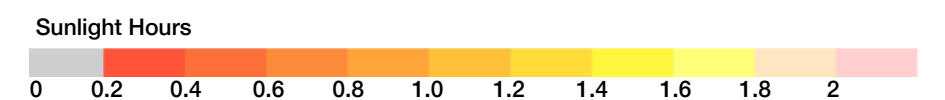


I.3.2 Solar Access | Sun Views

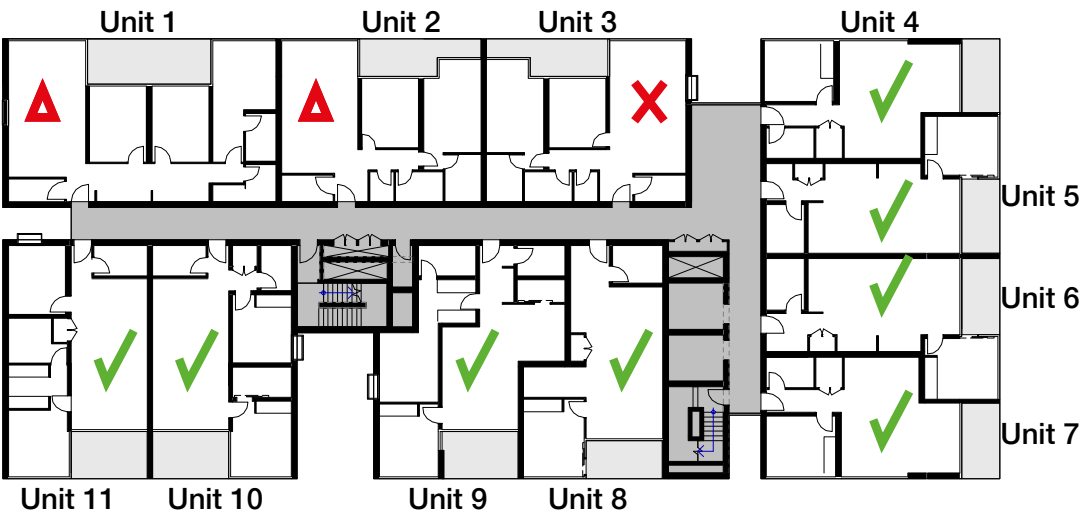




Source: NSW Department of Planning & Environment
Apartment Design Guide 2015.



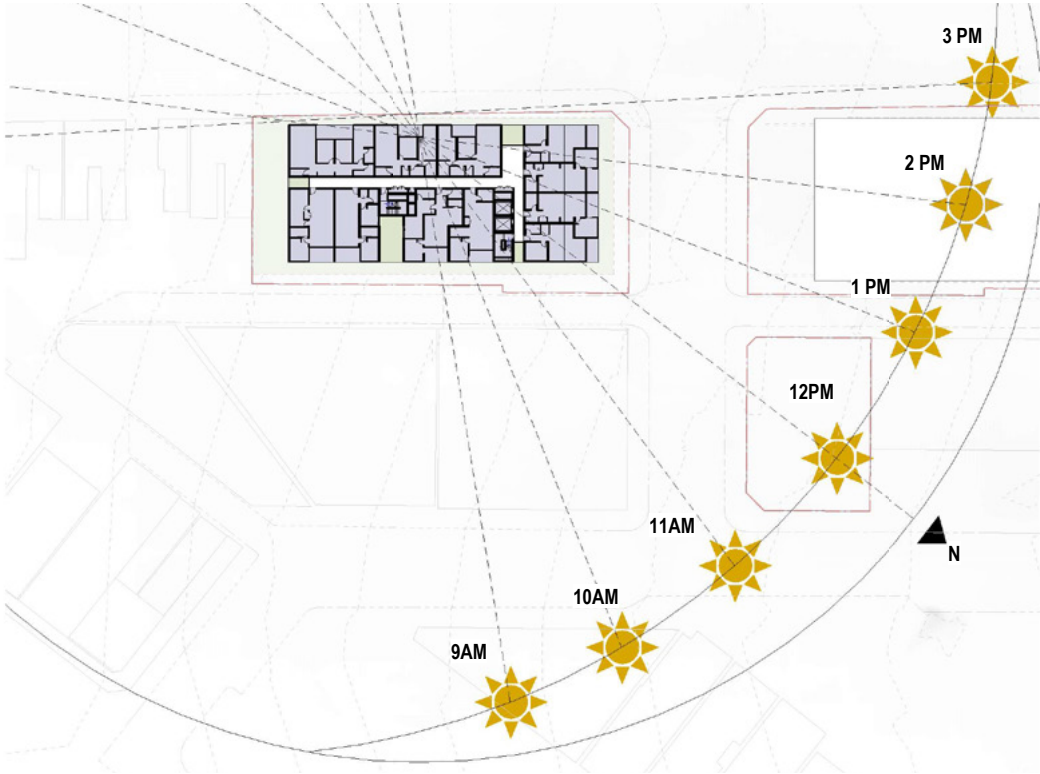
I.3.3 Solar Access | Plan Diagram Indicative Design



Floor Plan Level 4 - 16

Solar Access Summary

	no. Apartments	Percentage (%)
✓ receiving more than 2h solar access	104	73%
⚠ receiving less than 2h solar access	26	18%
✗ receiving less than 15m solar access at 1m height	13	9%
Total	143	100%



Sun Path Diagram

I.3.4 Solar Access | Detailed Solar Access Analysis Indicative Design



Floor Plan Level 4



Floor Plan Level 8



Floor Plan Level 10

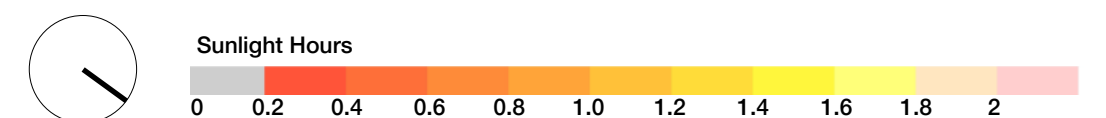


Floor Plan Level 16

The Apartment Design Guide 2015, Part 4A-1, stipulates the minimum amount of sunlight that should be received in habitable rooms and private open space. In order to verify a high level of compliance with the standard and inform the detailed design, a detailed solar access study was performed with specialist software.

This analysis was carried out for June 21 from 9:00 am to 3:00 pm. The model includes the surrounding context with the correct orientation and geolocation. The analysis was carried out on a grid of 0.5m at each floor level at 15min interval.

The results indicate that all apartments with windows oriented NE and NW will receive a good level of sunlight in excess of that required by the ADG. Most of the apartments oriented SE will receive less than 2 hours of solar access, however from level 4 to 16, the unit 3 receives less than 15 minutes of solar access.



I.3.5 Solar Access | Communal Open Space Indicative Design

Indicative Communal Roof Area



Objective 3D-1.

An adequate area of communal open space is provided to enhance residential amenity and to provide opportunities for landscaping

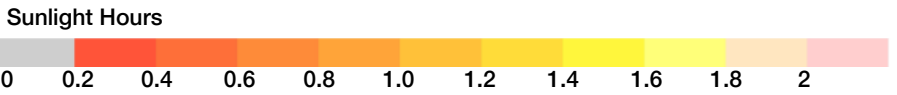
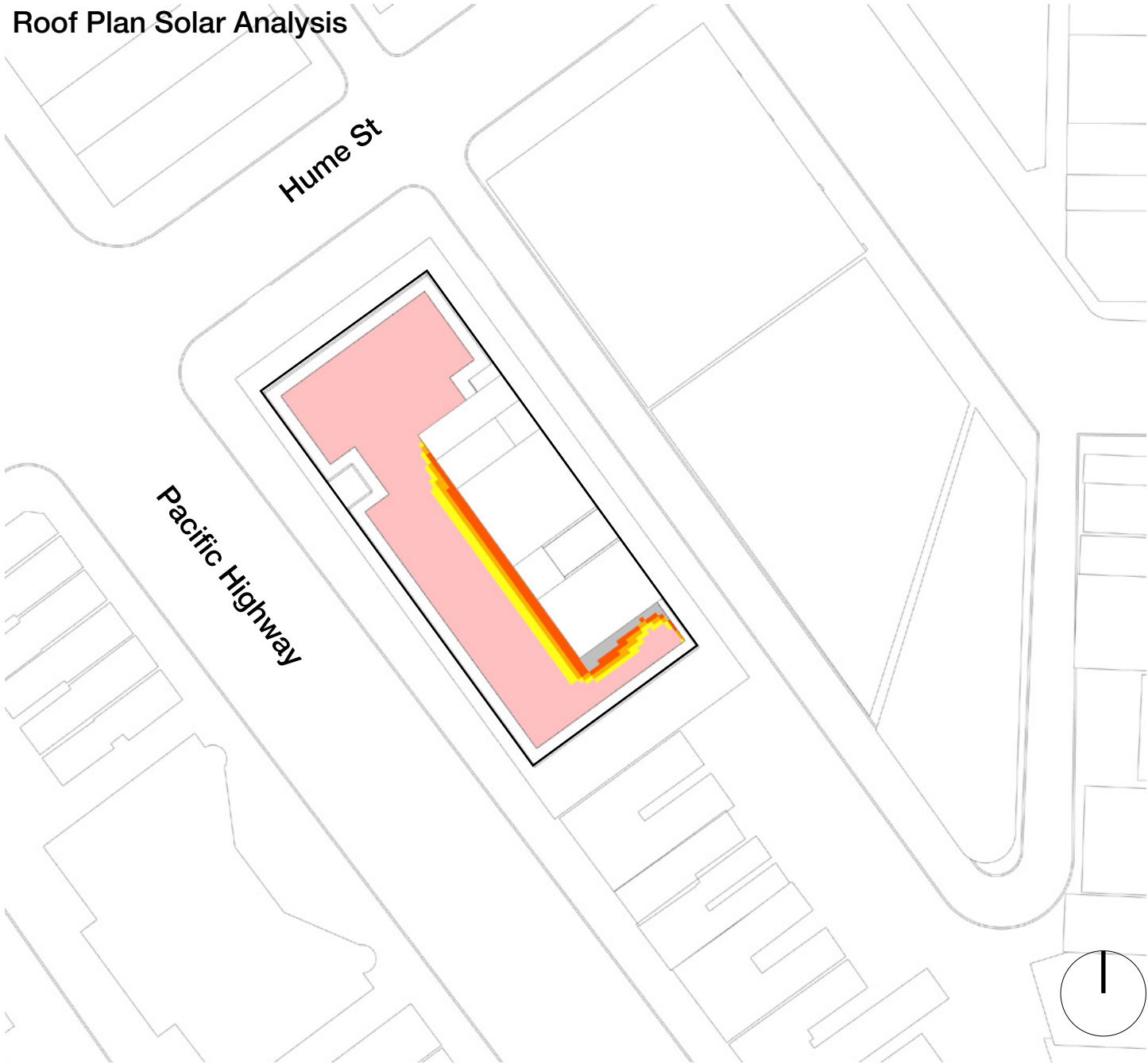
- 1. Communal open space has a minimum area equal to 25% of the site

Complies

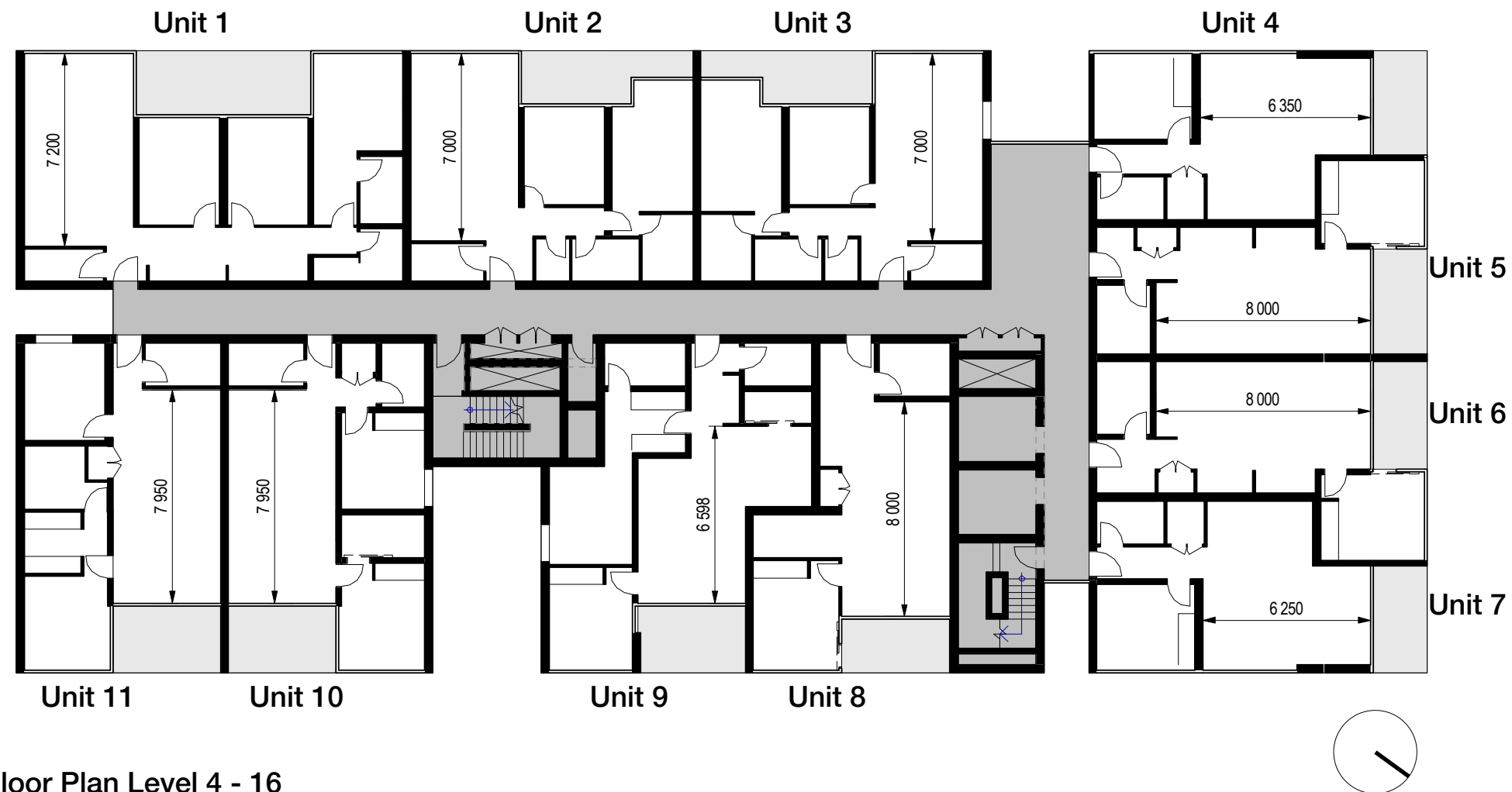
- 2. Developments achieve a minimum of 50% direct sunlight to the principal usable part of the communal open space for a minimum of 2 hours between 9 am and 3 pm on 21 June (mid winter).

Complies

Roof Plan Solar Analysis



I.3.6 Environmental Performance | Room Depth Indicative Design



Floor Plan Level 4 - 16

Objective 4D-2

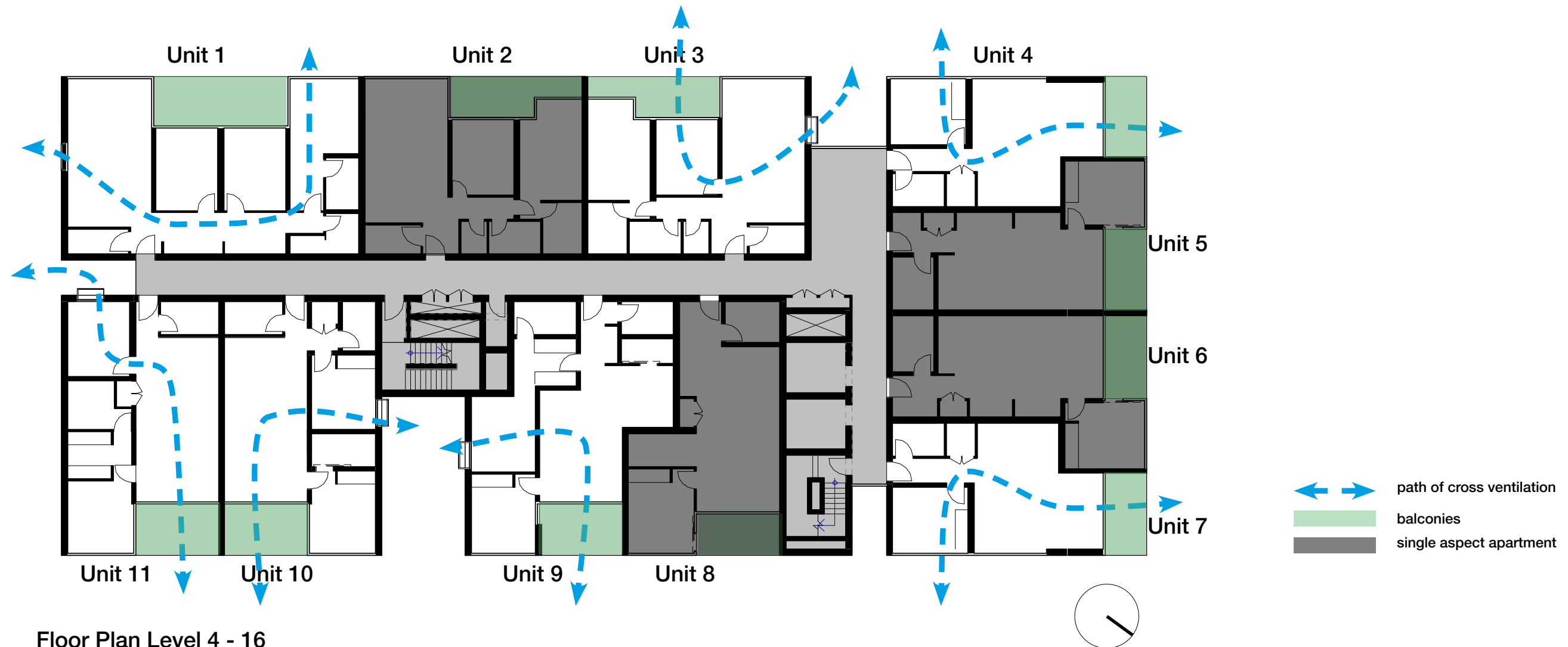
1. Habitable rooms depths are limited to a maximum of 2.5 x the ceiling height.

Complies, the maximum room depth is within the above threshold.

2 In open plan layouts (where the living, dining and kitchen are combined) the maximum habitable room depth is 8 m from a window.

Complies, the maximum room depth for open plan apartments is less than 8 m.

I.3.7 Natural Ventilation Analysis Indicative Design



Floor Plan Level 4 - 16

Objective 4B-3 The number of apartments with natural cross ventilation is maximised to create a comfortable indoor environment for residents.

1a. At least 60% of apartments are naturally cross ventilated in the first nine storeys of the building.

64 percent of apartments are naturally cross ventilated

1b. Apartments at ten storeys or greater are deemed to be crossed ventilated only if any enclosure of the balconies at these levels allows adequate natural ventilation and cannot be fully enclosed.

All apartments have balconies which allow adequate natural ventilation.

I.3.8 Shadow Analysis - Summary

Overshadowing of Residential Properties

Objective 3B-2

Overshadowing of neighbouring properties is minimised during mid winter.

3B-2.A Living areas, private open space and communal open space should receive solar access in accordance with sections 3D Communal and public open space and 4A Solar and daylight access

3D-1 ≥50% direct sunlight to the principal usable part of the communal open space for 2 hours between 9 am and 3 pm on 21 June

4A Solar and daylight access:

4A-1.1 Living rooms and private open spaces of at least ≥70% of apartments receive ≥2 hours direct sunlight between 9 am and 3 pm on 21 June;

4A-1.3 A maximum of 15% of apartments in a building receive no direct sunlight between 9 am and 3 pm on 21 June.

3B-2.B Where an adjoining property does not currently receive the required hours of solar access, the proposed building ensures solar access is not reduced ≥20%.

Result

The proposed developments creates some additional shadows in mid-winter in the early hours of the day to residential properties on west side of Pacific Highway.

With exception of 400 Pacific highway, the communal open spaces and living rooms of affected residential properties still receives adequate amount of direct sunlight.

At 400 Pacific highway, direct sunlight access is reduced to below 2 hours on the NE facade and roof amenity, due to overshadowing caused by the proposed development.

Some additional shading of the southern end of Willoughby Road occurs after 15:00hrs, however this is minimal, and the majority of the shadow on the road on this time is cast by the existing buildings.

The details of shadow analysis are provided in Appendix J and Appendix I