

.Residential Flat Design Code

Tools for improving the design of residential flat buildings



Department of
Infrastructure, Planning and Natural Resources

To order an additional copy of the Residential Flat Design Code or to view an electronic version, visit the Planning NSW website:
www.planning.nsw.gov.au

For supporting case study examples of ideas and precedents to guide better design of residential flat development, visit the Residential Flat Pattern Book website:
www.patternbook.nsw.gov.au

© Crown copyright 2002
NSW Planning Department
Printed September 2002
ISBN 0-7347-0360-0
02/011

Disclaimer

While every reasonable effort has been made to ensure that this document is correct at the time of printing, the State of New South Wales, its agents and employees, disclaim any and all liability to any person in respect of anything or the consequences of anything done or omitted to be done in reliance or upon the whole or any part of this document.

Copyright Notice

In keeping with the NSW Planning Department's (also known as PlanningNSW) commitment to encourage the availability of information, you are welcome to reproduce the material that appears in this Design Code for personal, in-house or non-commercial use without formal permission or charge. All other rights are reserved. If you wish to reproduce, alter, store or transmit material appearing in this Design Code for any other purpose, request for formal permission should be directed to:

Director
Corporate Communications Branch
NSW Planning Department

You are required to acknowledge that the material is provided by the Department or the owner of the copyright as indicated in this Design Code and to include this copyright notice and disclaimer in any copy. You are also required to acknowledge the creator of the material as indicated in the Design Code.

.Residential Flat Design Code

Tools for improving the design of residential flat buildings



.Premier’s Foreword



In recent years Sydney has had its fair share of poorly designed, ugly apartment buildings. My own suburb of Maroubra has not been spared the crude, one profit-making storey stacked on top of the other.

But pointing out unattractive buildings is not hard. Doing something about it is the real challenge.

That is why I convened a residential flat forum in March 2000 to bring together 250 of our top planners, architects and developers to devise ways that the State government could help lift the quality of flat design.

Better design is about improving where we live, work and spend our time. It is a vital public issue. There is no reason why well-designed apartment buildings cannot help enhance our suburbs.

The statistics are interesting. Today there are 344,000 flats in Sydney. That is 24 percent of all dwellings. More than 650,000 people live in apartments: nearly two in every ten people living in Sydney. Over the past ten years about 80,000 new apartments have been built. That is equal to the number of detached houses.

More people want to live in apartments close to shops and transport. Young people are marrying and having children later in life. They prefer a balcony with a view in preference to a house with a garden to maintain.

By the way 62 percent of dwellings in Sydney are detached houses with front and back yards. In 15 years it will be 60 percent: only minimal change.

But with more people choosing to live in residential flats they will continue to be built. Over the past two years, what all the measures adopted by the State government have aimed to achieve are new ways to help designers, developers and planners achieve better quality more attractive and liveable flats.

After the March 2000 Forum the Urban Design Advisory Committee - ably chaired by Ken Maher from Hassell architects - called for public submissions and worked on the Forum conclusions.

In November 2000 the government responded to the recommendations from the Committee and announced the \$1.5M Design Quality Program. Key elements within the program were:

- a new State Environmental Planning Policy for residential flat development (SEPP 65) which means that only people with the right architectural design qualifications can design these buildings;
- the establishment of a number of design review panels to assist Councils improve the design quality of development proposals;
- a Residential Flat Design Pattern Book supported by a comprehensive website to help planners, developers and designers learn from some of the examples of better designed flat buildings in NSW.

Each of these is a clear and tangible way to help lift the quality of residential flat design. Now this document, the Residential Flat Design Code will arm Council planners, developers and architects with detailed guidance on how to improve those elements that go towards achieving better designed flat buildings.

The quality of new infrastructure in Sydney over recent years has been first class: new roads, train stations, parks and public squares which compare with the very best in the world. With the Olympic Games we showed - when given a challenge - just what this country can achieve. There is no reason why we cannot also rise to the challenge of creating residential flat buildings of which we can be proud and that enhance this great city.

This Code will help all those people whose job it is to rise to this challenge: our developers, planners, and architects. Better designed flats is a goal that must be achieved.



Bob Carr
Premier



.Preface

In July 2000, following a forum convened by the NSW Premier, the Urban Design Advisory Committee (UDAC) presented a report with a series of recommendations to improve the design quality of residential flat buildings in NSW. These recommendations subsequently formed the basis of PlanningNSW's Design Quality Program (DQP), which was launched by the Premier in November 2000 and received funding of \$1.5M over two years.

As its underlying approach, the Design Quality Program identifies three stages in the development process where design quality is critical:

- development proposal-the preparation and lodgement of residential flat development proposals
- development assessment-the principles and guidelines against which development proposals are assessed
- development consent-the process of decision making by elected representatives.

The DQP allows for the involvement of individuals with better design skills and experience at each of these stages. It has five key components: the new State Environmental Planning Policy 65 - Design Quality of Residential Flat Development (SEPP 65), Design Review Panels, Local Government Grants, the Residential Flat Design Pattern Book, and this Residential Flat Design Code.

The SEPP identifies ten design quality principles and explains how these principles will be applied in the preparation of instruments and plans and in determining development applications. It requires residential flat buildings to be designed by architects. Together with the establishment of design review panels, the SEPP addresses improved decision making. The Residential Flat Design Pattern Book supports good design by presenting a range of built and virtual examples of well designed residential flat buildings and by describing the positive contribution each makes to its urban context.

The Residential Flat Design Code sets broad parameters within which good design of residential flat buildings can occur by illustrating the use of development controls and consistent guidelines. It will be an important resource for council planners responsible for creating new plans relating to residential flats and for assessing residential flat development under SEPP 65. With the SEPP, it provides the 'how to' of designing better built outcomes.

Together with the other Design Quality Program initiatives, the Residential Flat Design Code will provide comprehensive guidance to improving the design quality of residential flat buildings.



.Contents

Premier's Foreword	i
Preface	iii
Introduction	01

.Part 01 .Local Context

Relating To The Local Context	07
Residential Flat Building Types	08
Amalgamation + Subdivision	18
Building Envelopes	22
Primary Development Controls	
Building Height	24
Building Depth	26
Building Separation	28
Street Setbacks	30
Side And Rear Setbacks	33
Floor Space Ratio	35

.Part 02 .Site Design

Site Analysis	39
Site Configuration	
Deep Soil Zones	44
Fences + Walls	45
Landscape Design	46
Open Space	48
Orientation	50
Planting on Structures	52
Stormwater Management	54
Site Amenity	
Safety	56
Visual Privacy	58
Site Access	
Building Entry	60
Parking	62
Pedestrian Access	64
Vehicle Access	65

.Part 03 .Building Design

Building Configuration	
Apartment Layout	67
Apartment Mix	70
Balconies	71
Ceiling Heights	73
Flexibility	75
Ground Floor Apartments	77
Internal Circulation	79
Mixed Use	80
Storage	82
Building Amenity	
Acoustic Privacy	83
Daylight Access	84
Natural Ventilation	86
Building Form	
Awnings + Signage	88
Facades	89
Roof Design	91
Building Performance	
Energy Efficiency	93
Maintenance	95
Waste Management	96
Water Conservation	97
Appendices	
Appendix 1: SEPP 65 Design Quality Principles	98
Appendix 2: Pre-Development Application Recommendations	100
Appendix 3: Development Application Recommendations	103
Appendix 4: Local Context Analysis	108
Glossary	117
References and Further Reading	120
Acknowledgments	122
Image Credits	123



.Introduction

This Residential Flat Design Code is a resource to improve the design of residential flat development. It is based on the principle that good quality buildings help improve the quality of life. It deals with the location, size and scale, appearance and amenity of the buildings in which many people live.

The design of new residential flat buildings is important at all scales - for our cities, towns, suburbs and neighbourhoods - to provide good quality and amenity to growing populations with changing needs. Quality design contributes to enjoyable places: buildings, streets, squares and parks. It is inextricably linked to site and locality.

The Design Code is a set of guidelines that provide benchmarks for better practice in the planning and design of residential flat buildings. The application of this code will help achieve:

- environmental sustainability benefits through design including improved energy efficiency (p.93) and narrow building depths for natural ventilation (p.86) and daylight (p.84)
- improved residential amenity such as greater ceiling heights (p. 73), better apartment layouts (p.67) and quality outdoor living spaces (pp. 46, 48)
- higher design quality to improve the presentation of the building to the street, for example by removing garage entries from main streets (p.65) and screening car parking behind other uses (p.62).

The Design Code encourages improvements to the development application process. It recommends more comprehensive site analysis and design documentation for the pre-development and development application stages. (see Site Analysis and Appendices 2 and 3)

This document supports the ten design quality principles identified in SEPP 65 (see Appendix 1) and gives greater detail in how to achieve these principles in development proposals.

Residential flat development

Residential flat development includes one or more residential flat buildings. It also includes communal and private open space and any shared facilities (such as laundry or car parking) and provisions (such as landscaping, open space).

This Design Code applies to residential flat development. It uses the definition of residential flat building in SEPP 65, that is a building comprising:

- (a) three or more storeys (not including levels below ground level provided for car parking or storage, or both, that do not protrude more than 1.2 metres above ground level)
- (b) four or more self-contained dwellings, but does not include a Class 1a building or a Class 1b building under the Building Code of Australia.

However many of its recommendations may be relevant to other types of residential development.

Relationship to SEPP 65

The State Environmental Planning Policy No 65 - Design Quality of Residential Flat Development is an environmental planning instrument under the Environmental Planning and Assessment Act 1979, gazetted 26 July 2002.

SEPP 65 establishes a consistent policy direction for residential flat development in New South Wales and provides a uniform state-wide framework for more detailed planning. It has a statutory effect on development and, as a consequence, may modify or supplement the provisions of a regional environmental plan (REP), local environmental plan (LEP) or development control plan (DCP).

All new environmental planning instruments, development control plans and master plans that relate to residential flat development must comply with the provisions of SEPP 65.

This Design Code provides additional detail and guidance for applying the design quality principles outlined in SEPP 65 to a specific locality. (See Appendix 1: SEPP 65 Design Quality Principles)

Who is this document for?

This document is primarily for planners in local and state government. It can also be a resource for development applicants, including developers and their architects.

Councils

This document contributes to the development of place-based plans that are oriented specifically to local issues. It reinforces the need for local government to have a clear vision, which reflects the community's needs and wants for the future of their area.

The design code gives direction for defining local development controls, which support and facilitate good residential flat design. It provides design guidelines, which assist in establishing consistent minimum standards across local government areas. It will also assist planners in assessing the design merit of proposed development.

Developers

This document stresses the importance of the relationship between a building, its site and the surrounding context. It is a tool to develop appropriate and supportable design concepts for a development, which can add value both to individual residential developments and to their wider setting. It will help in preparing a development proposal.

A place-based planning approach

The Design Code supports a place-based planning approach, exemplified in PlanFirst, by providing guidance in defining appropriate building types and developing place-specific building envelopes, development controls and guidelines. Under PlanFirst the Residential Design Code can be incorporated into that part of a locality plan which deals with residential flat development. In the absence of place-based planning instruments this Design Code is an important resource for testing development controls and assessing residential flat development applications. It may be integrated with development control plans as they are currently formulated and enacted.

Development Assessment

The Design Code supports, recommends and provides a resource for pre-development application discussions between potential applicants and the council. The emphasis of these meetings should be

on the local context in relation to the proposed development site, rather than on a proposed building design. The intent of the discussion is to agree to site and context issues that need to be addressed in the development application (DA) submission. The Pre-Development Application Recommendations in Appendix 2 provides a list of suggested documentation items required for a pre-DA discussion and explains the purpose of each item.

For the development application itself the Environmental Planning and Assessment Amendment Regulation 2002, which accompanies SEPP 65, lists additional submission recommendations for residential flat development applications. The Development Application Requirements in Appendix 3 elaborate on the SEPP documentation requirements and explain the purpose of each item.

Document structure and use

This document addresses residential flat development in relation to three different scales: the local context, the site, and the building. The information is presented in this document in three distinct sections.

Part 01 - Local context

This section outlines the importance of the local context in shaping residential flat design. Appendix 4: Local Context Analysis provides more detailed information on individual topics relating to local analysis and residential flat buildings.

This section also explains the concept of building types as a tool for testing development controls and illustrating the desired local character. It defines and demonstrates the application of primary development controls and shows how to coordinate these controls to deliver the desired outcomes.

Part 02 - Site Design

This section addresses the residential flat development site and its relationship to the adjacent context. It explains site analysis and illustrates the concept using a case study.

This section also provides design guidelines for improving site design, which focus on sustainable design, landscape design, residential amenity and the design response in relation to the adjacent context (immediately adjacent buildings, lots and streetscape).

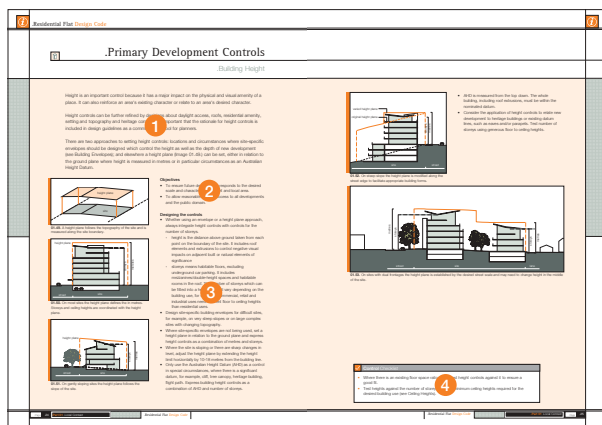
Part 03 - Building Design

This section addresses the residential flat development building. It provides design guidelines for improving building design. The guidelines focus on building performance/functionality, form, layout, sustainability and residential amenity.

The Design Code includes best practice benchmarks for sustainable design in parts 2 and 3. Planning NSW will be releasing the Building Sustainability Index (BASIX) in late 2002, which will provide more detailed technical information on these topics.

Information Sheets

Within each section, information sheets outline specific topics and elaborate on how the topic improves the design quality of residential flat development.



1. **descriptive text** defines the topic and explains why it is important
2. **objectives** state what the resulting outcome should achieve
3. **directive text** explains how to **design the appropriate controls** for your area
4. **control checklist** outlines key tasks to ensure controls are tested.



1. **descriptive text** defines the topic and explains why it is important
2. **objectives** state what the resulting outcome should achieve
3. **directive text** outlines **better design practice guidelines** and provides some **possible design solutions** for achieving the guidelines. The guidelines also provide support in assessing variations of the recommended standards
4. **rules of thumb** recommend minimum standards as a guide for local decision making. Minimum standards may vary depending on local context issues and/or if development applicants are able to demonstrate that they have addressed the better design practice guidelines and achieved the stated objectives.

.Part 01
Local Context

Tools for improving the design of residential flat buildings

.Residential Flat Design Code

.Part 01



.Relating to the Local Context

Good design responds and contributes to its context. Context is everything that has an impact on an area: its key natural and built features. Context includes social, economic and environmental factors as well as the physical form of the area and its surrounds. Understanding context means understanding how the interrelationships between all these factors, and between the local area and the region, will have an impact on the area in the future. Responding to the local context involves identifying the desirable elements of current character or the key aspects of character that are important to its future.

Understanding the local context is a key step in the process of establishing a robust urban structure which can support change and help to identify the appropriate building types and development controls for a particular situation.

Residential flat development is an important component of urban form. Decisions about the location, size and type of residential flat development will be informed by:

- Regional context and urban centres
- Neighbourhood and precinct areas
- Open space
- Views
- Topography
- Street layout
- Streetscape
- Blocks
- Lots
- Heritage buildings and significant elements
- Existing uses.

See Appendix 4: Local Context Analysis for more detailed information.



.Residential Flat Building Types

.Understanding Residential Building Types

What is a building type?

For the purpose of this Design Code, a building type is a generic building form used to describe buildings with common three-dimensional form and characteristics. Building types are not buildings. The translation from a generic building type to a specific building allows for a site-specific architectural quality and response.

Building types can be adapted to fit specific urban contexts. A particular site configuration may accommodate a range of building types. A building may be a hybrid building type - a combination of more than one type - and in larger developments an assemblage of building types may be applicable.



01.01. A figure ground drawing illustrates the relationship between building to open space and can help to identify different building types (houses, courtyard apartments, shopping centres, main street shops).

Multiple building types may apply to one site and provide more design choice.

When used with building envelopes, building types are a tool for testing the dimensions of envelope controls to ensure it is practical and suited to a particular use or site configuration. This can alleviate the problem of, for example, specifying a building envelope for a residential flat building that is too deep and cannot achieve natural ventilation or adequate daylight access.

When used with built form controls, illustrating building types can be useful for communicating the desired built form character of an area and for testing the proposed development controls in relation to a particular site shape and size.

Residential building types common to NSW

Higher density housing includes a range of building types which can have a significant impact on the character of an area because of their bulk and scale. This document discusses residential flat buildings; however any development, particularly on large sites, may include one or a range of the following types to suit a particular situation:

- Single Detached Dwelling
- Blocks
- Duplex or Maisonette
- Terrace
- Townhouse
- Shop Top Housing
- Residential Flat Buildings.

Residential Flat Buildings

The term residential flat building represents a group of particular residential building types:

- big house apartments
- row apartments
- courtyard apartments
- stepped apartments
- slab (block) apartments
- tower apartments.

This document defines and illustrates each of the residential flat building types and describes when best to use them to assist in the selection of building types appropriate in scale and massing to a local area context. Hybrid building types and grouping types on one site are also addressed. While the guidelines and provisions in this document primarily support the SEPP definition of a residential flat building, some of the residential flat building types described can be less than three storeys high and less than four units.

.Big House Apartment

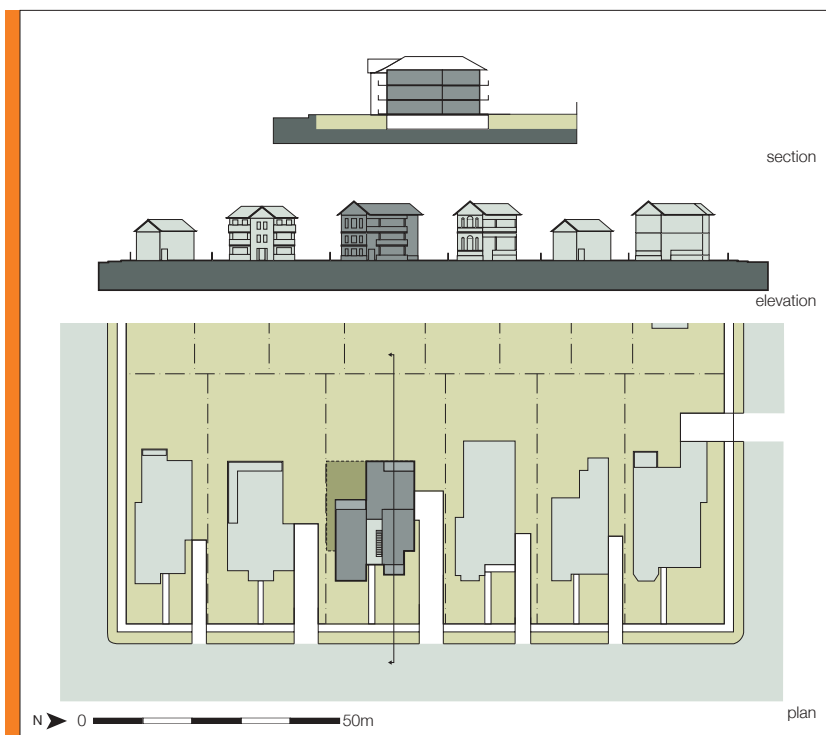


01.02. A big house apartment has the proportion and scale of a large house.

A big house apartment is a residential flat building, which has the proportion and scale of a large detached dwelling. It is a freestanding building in a landscape setting. The big house can range in size from one to three dwelling units per floor and is typically two or three storeys high. The big house can also be an existing large house, internally subdivided into separate apartments.

This building type is best used when:

- the context is detached dwellings or similar architectural forms, which are likely to remain
- the character of the street, in terms of consistent building form and front gardens, needs to be maintained
- rear landscape areas and mature tree plantings are desired
- there are existing large heritage houses on the street
- large houses, often heritage listed, are available to be internally subdivided.



01.03.

- | | | |
|------------------------|--------------------|-----------------------|
| Deep Soil Zone | Apartment Interior | Commercial/Retail Use |
| Landscape on Structure | Balcony | Line of Carpark Below |

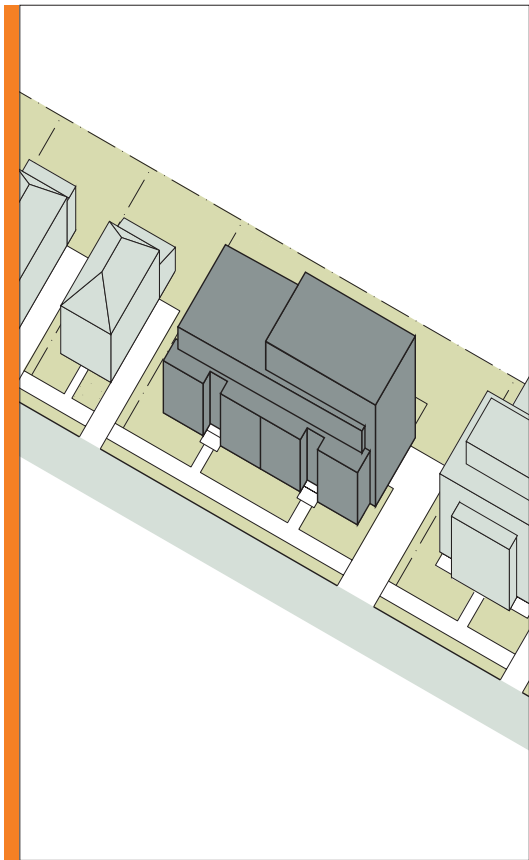


01.04.



01.05.

.Row Apartment

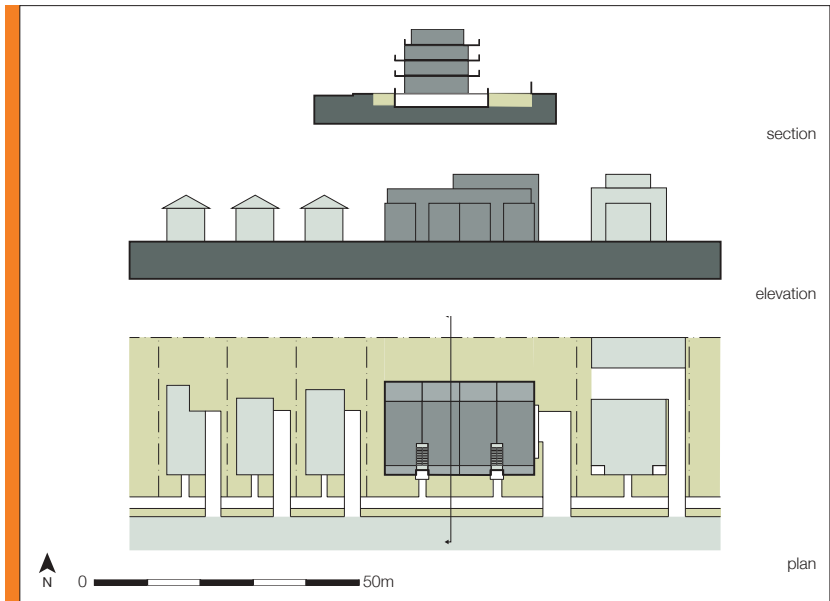


01.06. In a suburban context a row apartment can have a front setback and rear garden.

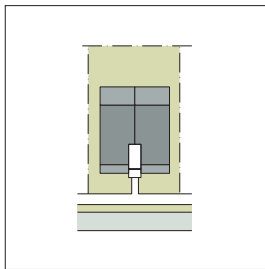
Row apartments are suited to a range of lot sizes because they can be limited to four units around a central stair or can be extruded along a street to allow multiple collective entries and longer street-edge development. Row apartments can be limited in height as a walk-up or can be up to six storeys high. They can also be street-edge aligned or set back within a landscape.

This building type is best used when:

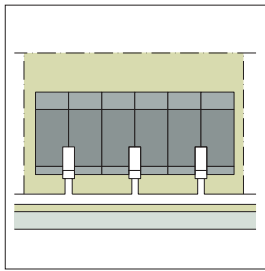
- limiting building height is a consideration
- smaller flat building footprints are desirable
- street-edge infill sites are being redeveloped
- a larger development site requires a long block edge building
- rear landscape areas and mature tree plantings are desired
- a perimeter block is intended; row apartments can be a component of a perimeter block
- a vertical rhythm is desired to reinforce an existing subdivision pattern or building pattern
- mixed use is desired; row apartments can be street-edge aligned and made suitable for commercial/retail uses on the ground floor level or live/work apartment layouts.



01.07.



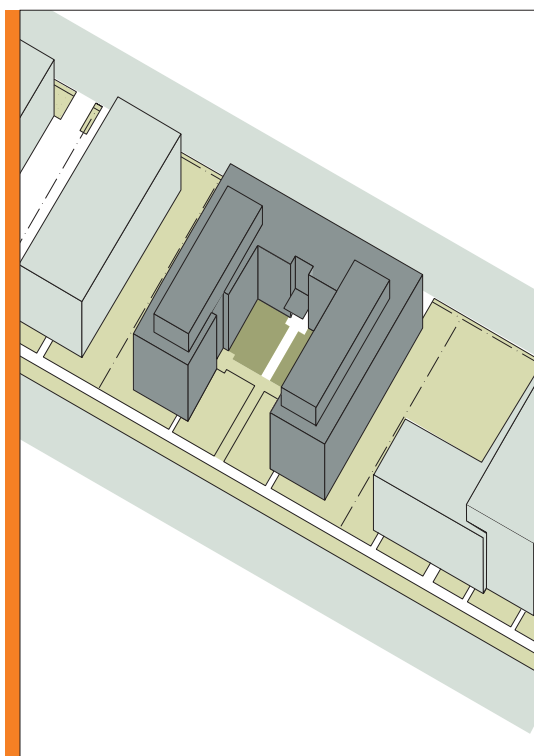
01.08. Single module.



01.09. Triple module.

- | | | |
|------------------------|--------------------|-----------------------|
| Deep Soil Zone | Apartment Interior | Commercial/Retail Use |
| Landscape on Structure | Balcony | Line of Carpark Below |

.Courtyard Apartment

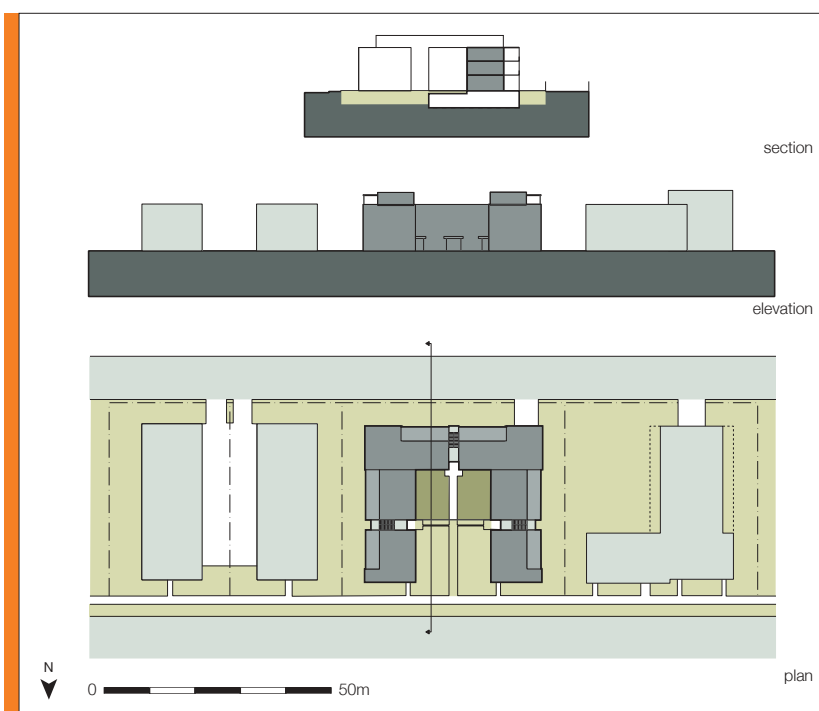


01.10. Courtyard apartments enclose communal open space.

A courtyard apartment is a residential flat building, which wraps around and defines an open space (courtyard) or multiple open spaces on a site. The open spaces are generally communal and provide a high quality landscaped environment and outlook. Courtyard buildings are often limited in height to four storeys to ensure adequate daylight access to the open space and apartments.

This building type is best used when:

- limiting building height is a consideration
- the context is other residential flat buildings
- corner sites, wide shallow sites, or sites with two or more frontages are being developed
- a landscape refuge is desired
- sufficient building separation between adjacent lots can be achieved
- a building/open space/building rhythm is desired along a street
- a perimeter block is intended; L-shaped courtyard buildings can be a component of a perimeter block.

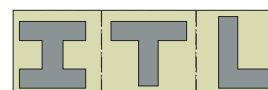


01.11.

- | | | |
|------------------------|--------------------|-----------------------|
| Deep Soil Zone | Apartment Interior | Commercial/Retail Use |
| Landscape on Structure | Balcony | Line of Carpark Below |



01.12.



01.13.



01.14. Lyndhurst Gardens courtyard

.Stepped Apartment



01.15. At Newington stepped apartments follow the topography and provide outlook to a regional park.

A stepped apartment is a residential flat building characterised by a built form which steps down the lot in relation to the natural ground slope. Stepped apartments often provide large outdoor terraces, which can contribute to the landscape setting of the site. They are most successful when they become stepped courtyard apartments (as illustrated below). Stepped buildings are often limited to four storeys in height.

This building type is best used when:

- the site is sloping
- the slope is facing a significant public, green open space
- visual integration with the natural context and landscape is necessary
- large terraces/balconies are desired
- a predominant view or outlook is desired.



01.16 .

- | | | |
|------------------------|--------------------|-----------------------|
| Deep Soil Zone | Apartment Interior | Commercial/Retail Use |
| Landscape on Structure | Balcony | Line of Carpark Below |



01.17.



01.18.



01.19.

.Slab (Block) Apartment



01.20. Wylde Street apartments are proportionately long and tall with a narrow building depth.

A slab or block apartment is a residential flat building with an elongated plan and a controlled building depth. Units are usually arranged along a corridor with a single or multiple cores depending on the building length. Slab buildings are often greater than six storeys in height.

This type of building is best used when:

- higher density is desired
- the existing context is of large buildings or abutting building forms
- a strong urban form is desired, for example, reinforcing the edge of an important precinct
- large development sites are available
- a perimeter block is intended; slab buildings can be a component of a perimeter block
- dwelling units with dual aspect and natural ventilation are desired, such as cross-over units
- mixed use is desired; slab buildings can be street-edge aligned and made suitable for commercial/retail uses on the lower levels.

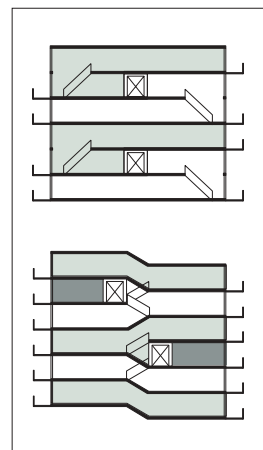


01.21.

- | | | |
|------------------------|--------------------|-----------------------|
| Deep Soil Zone | Apartment Interior | Commercial/Retail Use |
| Landscape on Structure | Balcony | Line of Carpark Below |

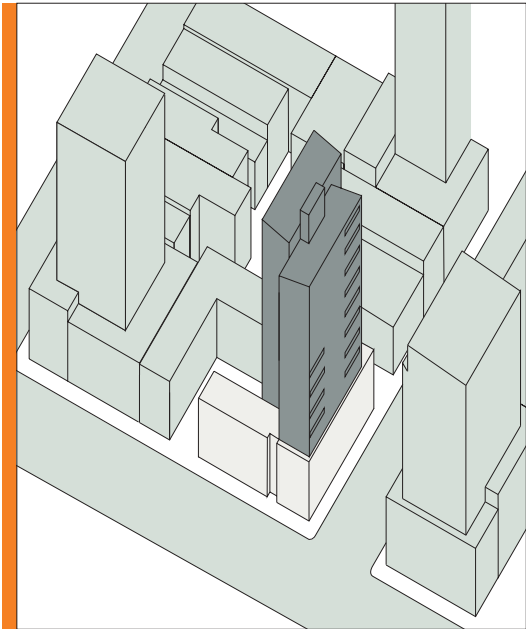


01.22.



01.23. Sample sections of cross-over units.

.Tower Apartment

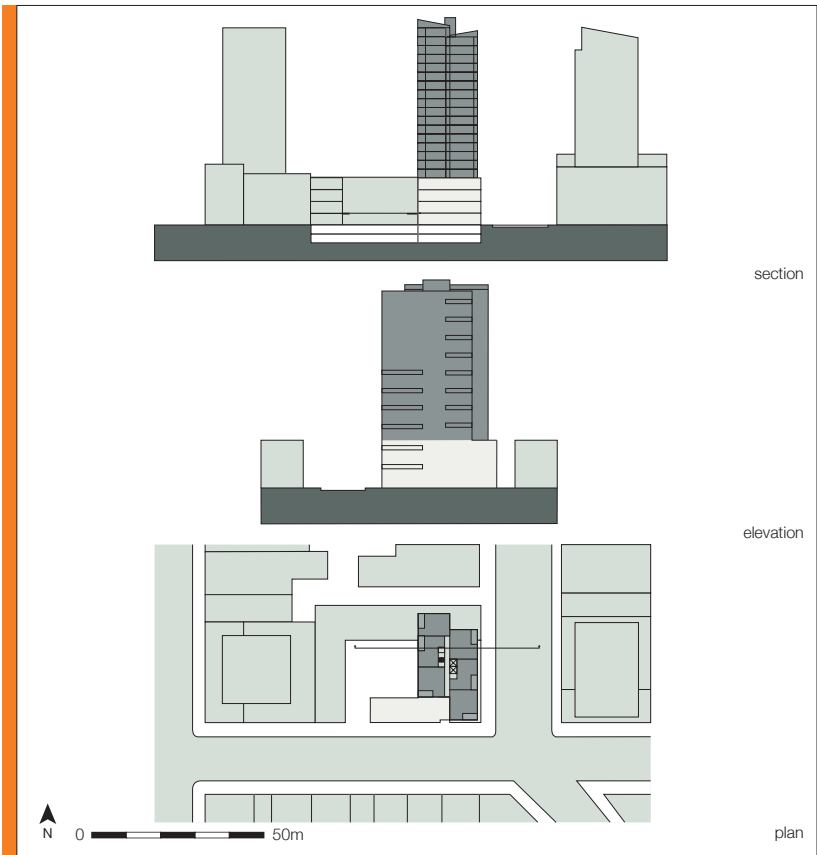


01.24. Towers are vertically proportioned and organised around a central core.

A tower apartment is a residential flat building, which is vertically proportioned and has a limited number of dwelling units arranged around a central core. The floor plates are typically repetitive and the tower is free standing except for the base, which may have a podium. Where podiums are provided their roof can be used for communal open space with landscape treatment.

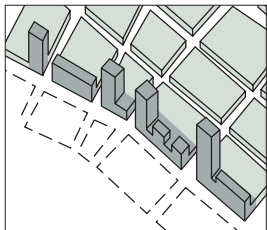
This building type is best used when:

- the existing context is an urban area
- higher density housing is desired
- the existing context has towers, such as a central business district or a town centre. Use of towers should reinforce a regional urban form strategy
- a strong urban form is desired, for example, reinforcing an important precinct, or defining an edge
- mixed use is desired; lower levels are generally suited to retail, commercial or community uses.

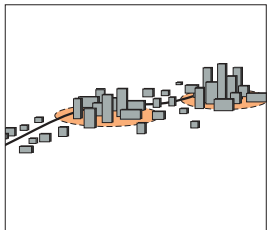


01.25.

- | | | |
|------------------------|--------------------|-----------------------|
| Deep Soil Zone | Apartment Interior | Commercial/Retail Use |
| Landscape on Structure | Balcony | Line of Carpark Below |



01.26. Towers can define the edge of a precinct.

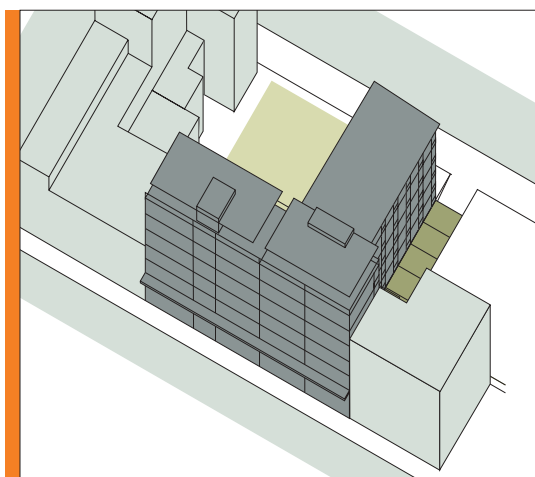


01.27. Towers should reinforce urban centres.



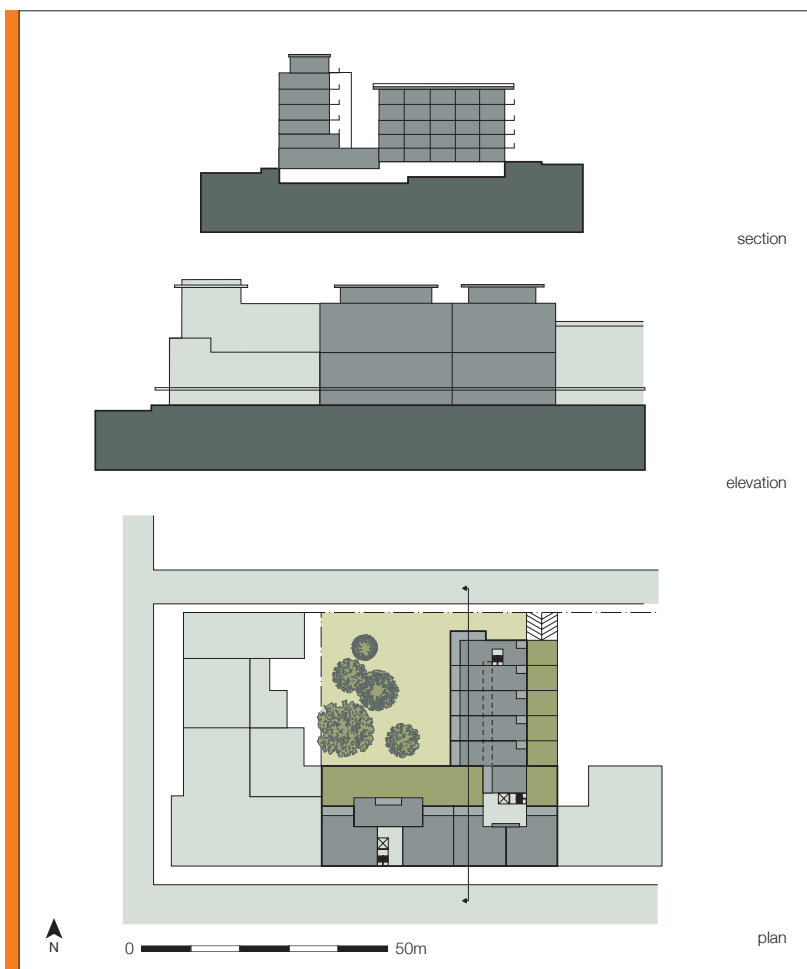
01.28.

.Hybrid Building



01.29. This building type is a hybrid of a street wall row apartment and a courtyard apartment.

Hybrid buildings and groups are a result of a specific site configuration, combination of uses, and/or adjacent context responses. Residential hybrid building types are a combination of two or more building types. For example, the T-shaped street wall building illustrated is a combination of row and courtyard apartment types. The illustrated example exhibits the properties of a row apartment type because it is a street-edge aligned infill and has commercial/retail uses on the first two levels. It exhibits the properties of a courtyard building because it defines a courtyard at the side/rear of the lot as a landscape outlook and refuge from the street edge activity.



01.30.

- | | | |
|------------------------|--------------------|-----------------------|
| Deep Soil Zone | Apartment Interior | Commercial/Retail Use |
| Landscape on Structure | Balcony | Line of Carpark Below |

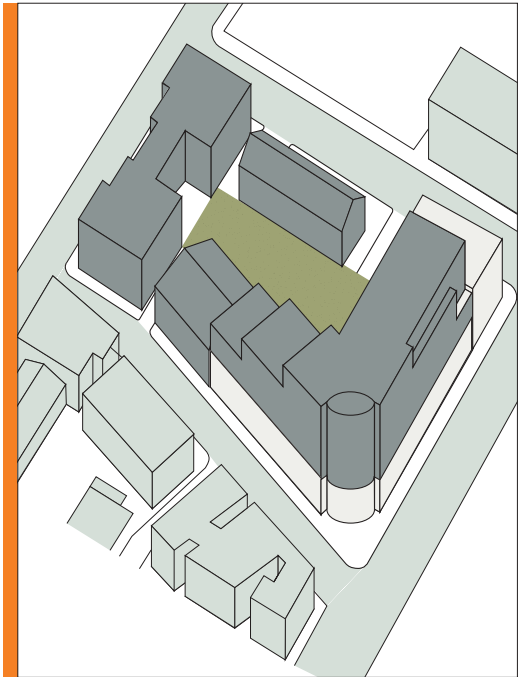


01.31.



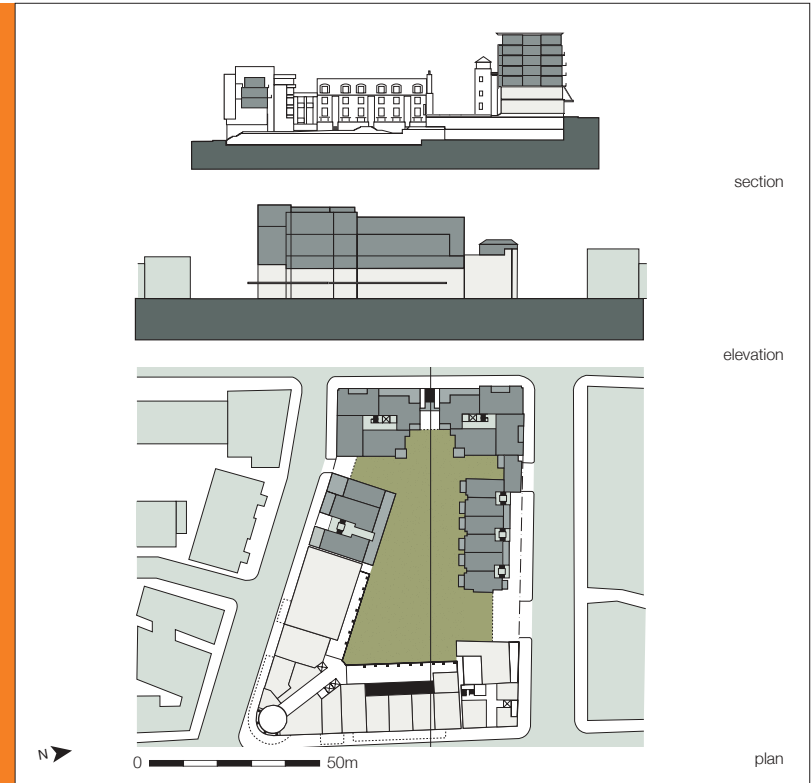
01.32.

.Hybrid Groups



01.33. Crown Street Housing combine a range of apartment types around a central courtyard.

The assemblage of different building types on one site can also result in a hybrid group, characterised by the alteration to the properties of each individual building type. For example, Crown Street Housing assembles row apartments and L-shaped courtyard apartments into a perimeter block, which defines a central communal space. It also incorporates a mix of uses and existing heritage buildings.



01.34.

- | | | |
|------------------------|--------------------|-----------------------|
| Deep Soil Zone | Apartment Interior | Commercial/Retail Use |
| Landscape on Structure | Balcony | Line of Carpark Below |



01.35.



01.36.



.Amalgamation + Subdivision

Amalgamation is the combination of two or more lots; subdivision is the division of large land holdings into blocks and/or lots for the purpose of redevelopment. Amalgamation and subdivision are important planning and redevelopment tools for restructuring an area undergoing change.

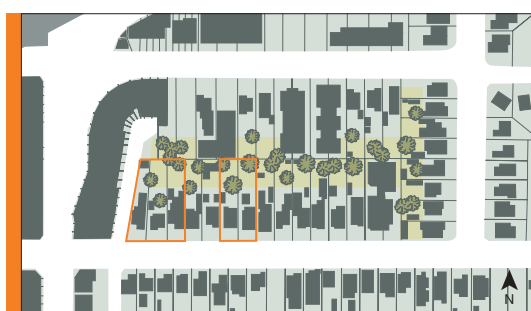
Blocks and lots determine the possible building types and capacities that fit into an area. When areas change from one use to another - for example, from single family detached houses or from industrial estates into residential flats - the size and shape of lots need to be considered, and street layout and block sizes may need to change.

Topography and significant natural features also impact on block, lot and street layouts. Existing block shapes (and lots) are often irregular because of a street layout that responds to the contours of the land or other requirements. New subdivision may similarly need to respond to landform.

Change in land ownership patterns through amalgamation or subdivision of lots may be necessary to facilitate a desired change in an area. Ownership patterns should be considered as part of future street and block patterns - for example, locating a new road on an existing lot line minimises impact on both landowners.

Site amalgamation and subdivision can have a significant effect on a streetscape by changing the characteristic rhythm or pattern of typical lots and buildings along a street and in a block. When changing the subdivision pattern of an area, new public domain elements - streets, pedestrian walkways and open space - rather than private elements - share driveways - need to be considered in relation to the proposed development type and scale, the desired street layout and the desired public open space network. The following two examples illustrate these concepts:

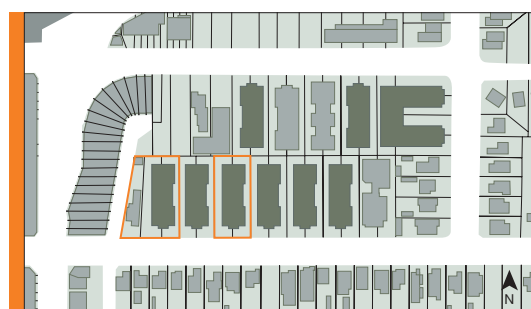
- the first illustrates how a suburban context, comprising single family houses, can be restructured to support residential flat development
- the second illustrates how a redundant industrial area can be restructured to provide a range of development sites suitable for residential flat development.



01.37. Existing context

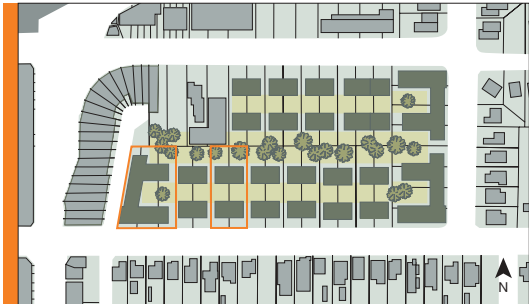
Amalgamation Example

The desire to promote housing choice and increased densities adjacent to the town centre required a study of the existing lot patterns and their capacity to support a change in housing type. The existing lot sizes are 55 metres deep and accommodate detached, single-family houses.



01.38. Conventional practice

The development pattern emerging from the study illustrates that the existing development controls do not relate to the lot sizes and shapes. This has resulted in large footprint residential flat buildings, which cover the centre of two lots. When multiplied across the block, as shown in the diagram, this building type results in poor residential amenity and open space provisions.



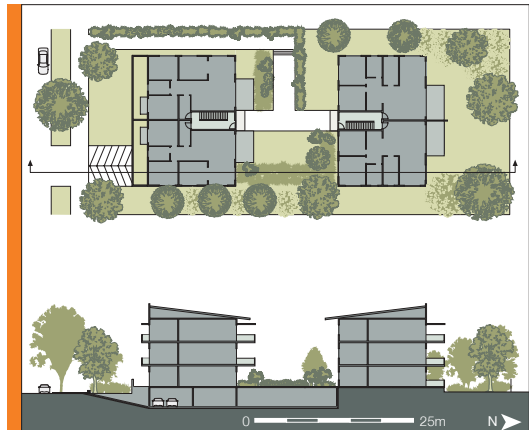
01.39. Better practice

New building types were needed to improve the quality of residential flat and site design. Building types were designed to test the building footprint against the lot size and shape and to determine the minimum site frontages necessary for each type. The frontage compared to the lot size demonstrates if amalgamation is required.



01.40. Corner site

Corner sites can accommodate higher densities than the mid-block sites. A three storey courtyard building type was proposed to accentuate the corner and reinforce the street hierarchy. Increased setbacks enabled vehicular access from the widened laneway. This example amalgamates three lots. At the other end of the block, a courtyard building type was also proposed. In this example, the shallower lots required four lots to be amalgamated.



01.41. Mid-block site

Mid-block sites can accommodate three storey row apartments, which are divided into two buildings, one addressing the street and one addressing the mid-lot landscaped area. In contrast to the existing development pattern, this building type improves residential amenity and maintains the rear gardens common to this area.



01.42. Existing site

Subdivision Example

The transformation from a redundant industrial suburb to a vibrant new residential neighbourhood was the motivation for a subdivision and building envelope study. The existing block pattern of large industrial sites needed to be transformed to a smaller pattern to accommodate a change in use to residential and commercial.



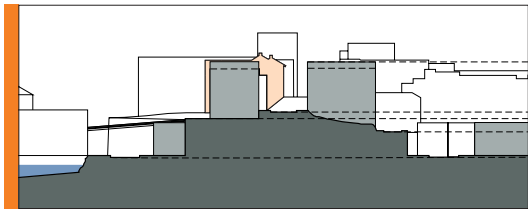
01.43. New subdivision + street pattern

A number of factors influenced the subdivision. A new public park was identified at the tip of the peninsula. New streets and view corridors (shown dotted) were established to create smaller development sites and to define a finer urban grain more suitable for residential and commercial uses.



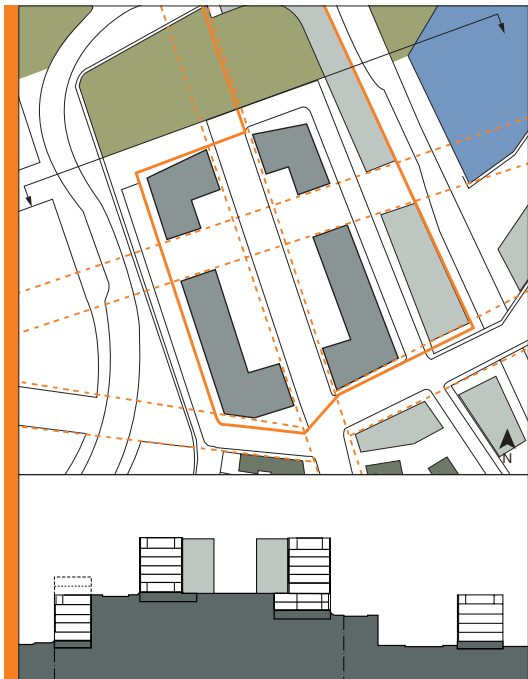
01.44. Proposed development sites

Development sites were identified and tested to ensure that the sizes and shapes of the sites would support the intended uses and floor space ratios. Building envelopes were prepared for each site to determine the appropriate height, depth, floor space and site coverage for residential development.



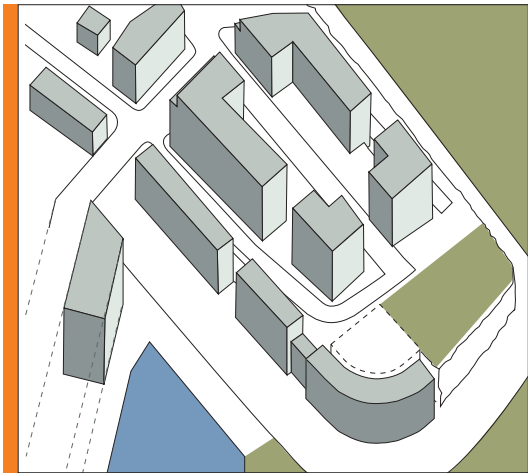
01.45. Site section

The building envelope study began with site sections. These were used to study the relationship of potential built form to the site's topography and adjacent heritage buildings.



01.46. Building footprints + section

Building footprints and more detailed building sections were drawn to determine appropriate building depths, site coverage and open spaces for residential flat development. The envelopes reinforce the subdivision plan by responding to the desired street pattern, view corridors and open space layout.



01.47. Building envelopes

A three-dimensional envelope sketch was used to verify the overall built form and to illustrate the desired outcomes. The resulting envelopes facilitate residential courtyard buildings, which contribute to the overall vision for the area and support quality residential amenity and design.



.Building Envelopes

.Building Envelopes

A building envelope is not a building, but a three dimensional zone that limits the extent of a building in any direction. It defines the extent of the overall building zone in plan and section within which a future building can be located. (see image 01.49.) The length, depth and height of building envelopes are defined in metres. Building envelopes should be at least 20-25 percent greater than their achievable floor area to allow for building articulation (see Floor Space Ratio).

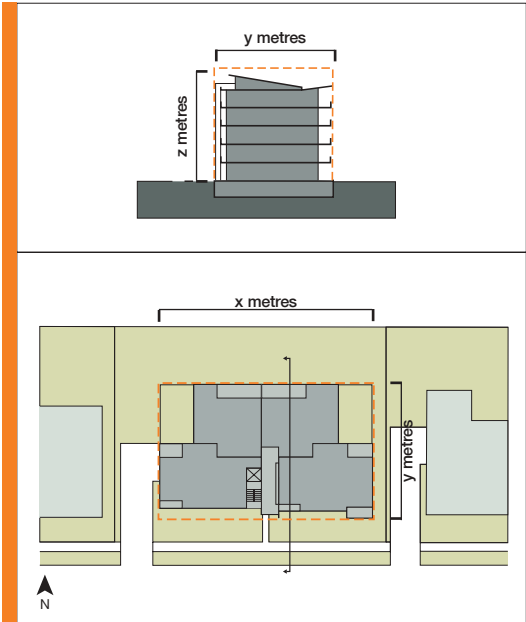
Building envelopes set the appropriate scale of future development in terms of bulk and height in relation to the street layout and block and lot sizes in a particular location. They are appropriate for determining and controlling the desired urban form in town centres, brownfield sites, master plan sites and special sites - such as areas with extreme topography.

Building envelopes can help:

- design the three dimensional form of an area
- inform decisions about appropriate density for a site and its context
- test that the primary controls are coordinated and produce the desired outcome
- communicate and illustrate the future bulk and distribution of new development to planners, councillors and development applicants.



01.48. Building envelopes can help visualise the future urban form of an area. They are also a useful tool during community consultation.



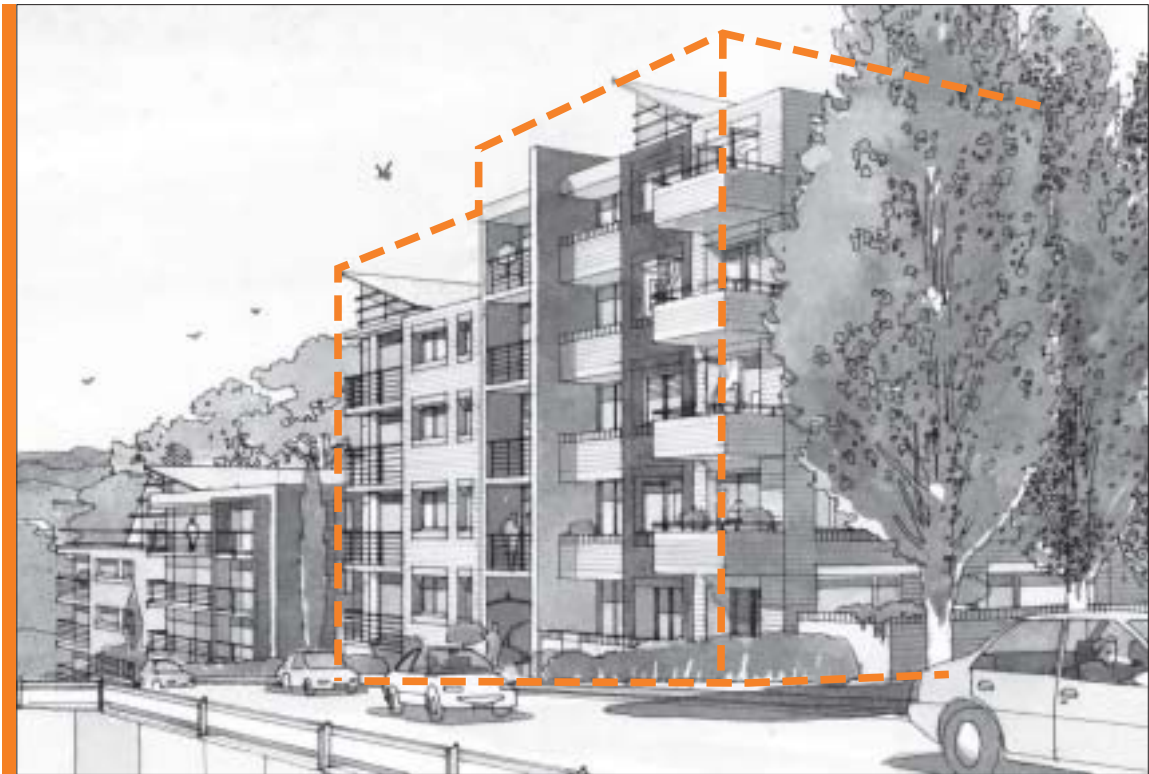
01.49. The building envelope (outlined in orange) defines the area in plan and section within which a residential flat building is designed.

Determining the Primary Controls

When building envelopes are used, the primary development controls describe and support them. In the absence of building envelopes, development controls establish the allowable bulk, height and location of development on a site. These controls are expressed through a combination of drawings and text. The primary controls must be carefully tested to ensure that the desired built form outcome is achievable. For example, that the desired FSR can be accommodated within the height and setback controls and still achieve the desired massing.

Primary development controls include:

- building height
- building depth
- building separation
- street setbacks
- side and rear setbacks
- floor space.



01.50. A building envelope is not a building. It defines a generous three-dimensional space within which quality residential design can occur.



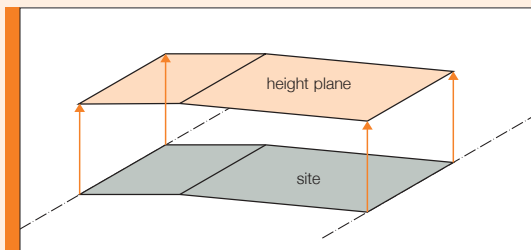
.Primary Development Controls

.Building Height

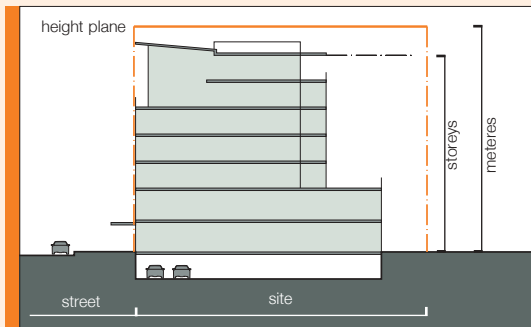
Height is an important control because it has a major impact on the physical and visual amenity of a place. It can also reinforce an area's existing character or relate to an area's desired character.

Height controls can be further refined by decisions about daylight access, roofs, residential amenity, setting and topography and heritage context. It is important that the rationale for height controls is included in design guidelines as a communication tool for planners.

There are two approaches to setting height controls: locations and circumstances where site-specific envelopes should be designed which control the height as well as the depth of new development (see Building Envelopes); and elsewhere a height plane (Image 01.51.) can be set, either in relation to the ground plane where height is measured in metres or in particular circumstances as an Australian Height Datum.



01.51. A height plane follows the topography of the site and is measured along the site boundary.



01.52. On most sites the height plane is defined in metres. Storeys and ceiling heights are coordinated with the height plane.



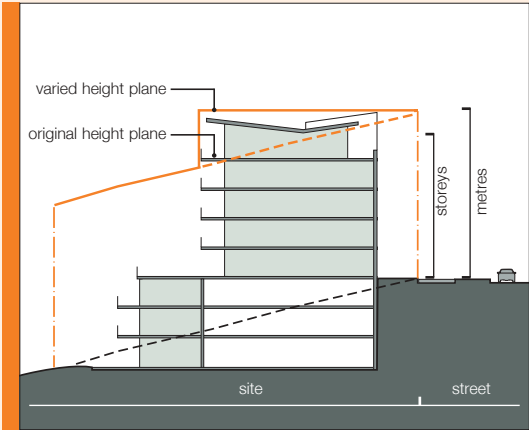
01.53. On gently sloping sites the height plane follows the slope of the site.

Objectives

- To ensure future development responds to the desired scale and character of the street and local area.
- To allow reasonable daylight access to all developments and the public domain.

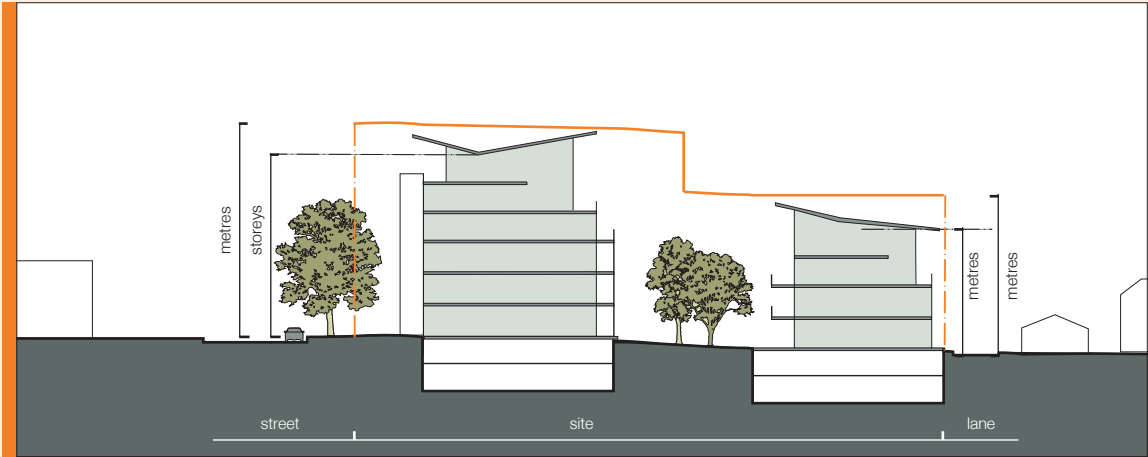
Designing the controls

- Whether using an envelope or a height plane approach, always integrate height controls with controls for the number of storeys.
 - height is the distance above ground taken from each point on the boundary of the site. It includes roof elements and extrusions to control negative visual impacts on adjacent built or natural elements of significance
 - storeys means habitable floors, excluding underground car parking. It includes mezzanines/double-height spaces and habitable rooms in the roof. The number of storeys which can be fitted into a height limit will vary depending on the building use, for example, commercial, retail and industrial uses need different floor to ceiling heights than residential uses.
- Design site-specific building envelopes for difficult sites, for example, on very steep slopes or on large complex sites with changing topography.
- Where site-specific envelopes are not being used, set a height plane in relation to the ground plane and express height controls as a combination of metres and storeys.
- Where the site is sloping or there are sharp changes in level, adjust the height plane by extending the height limit horizontally by 10-18 metres from the building line.
- Only use the Australian Height Datum (AHD) as a control in special circumstances, where there is a significant datum, for example, cliff, tree canopy, heritage building, flight path. Express building height controls as a combination of AHD and number of storeys.



01.54. On steep slopes the height plane is modified along the street edge to facilitate appropriate building forms.

- AHD is measured from the top down. The whole building, including roof extrusions, must be within the nominated datum.
- Consider the application of height controls to relate new development to heritage buildings or existing datum lines, such as eaves and/or parapets. Test number of storeys using generous floor to ceiling heights.



01.55. On sites with dual frontages the height plane is established by the desired street scale and may need to change height in the middle of the site.

Control Checklist

- Where there is an existing floor space ratio (FSR), test height controls against it to ensure a good fit.
- Test heights against the number of storeys and the minimum ceiling heights required for the desired building use (see Ceiling Heights).



.Primary Development Controls

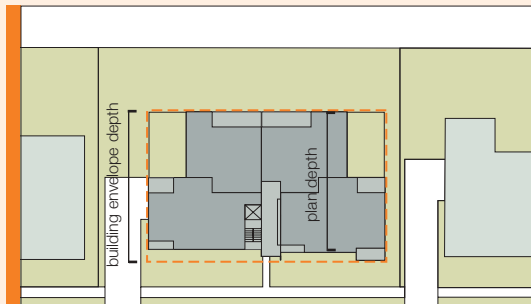
.Building Depth

Building depth is the horizontal cross section dimension of a building (building plan depth + articulation zone = building envelope depth). It generally refers to the dimension measured from front to back (from the street to the inside of the block). Where buildings are oriented differently, the depth will be the dimension of the shorter axis.

Control over building depth is important as the depth of a building will have a significant impact on residential amenity for the building occupants. In general, narrow cross-section buildings have the potential for dual aspect apartments with natural ventilation and optimal daylight access to internal spaces.

In setting controls it is important to recognise that building depth is related to building use. Mixed use buildings may have wider commercial/retail floors combined with narrower residential floors.

Different site conditions will require different design solutions for building depth. For example, buildings on infill sites in urban areas may need to be more slender than residential flat buildings in more open settings. Shallow sites may also require slender buildings to protect the amenity of neighbouring uses.



01.56. The internal plan depth is measured from glass line to glass line.



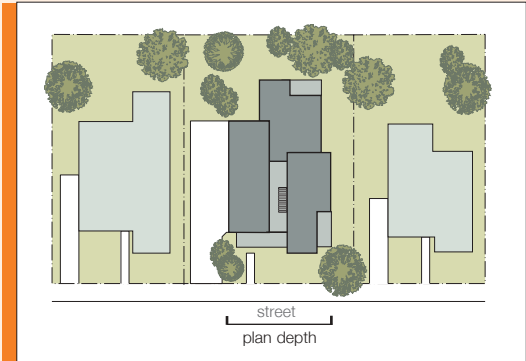
01.57. In mixed use buildings the section above commercial uses may need to change to accommodate the necessary plan depth of residential uses.

Objectives

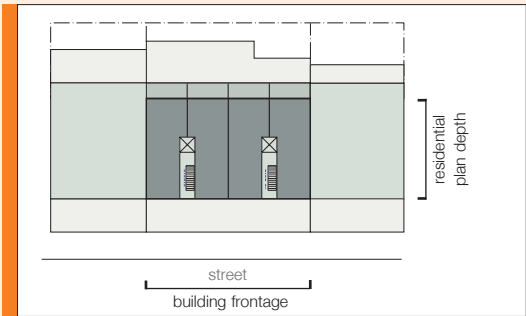
- To ensure that the bulk of the development is in scale with the existing or desired future context.
- To provide adequate amenity for building occupants in terms of sun access and natural ventilation.
- To provide for dual aspect apartments.

Designing the controls

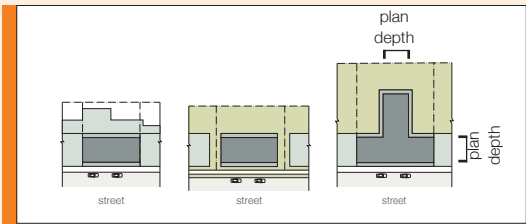
- When a building envelope is being used, set depth controls in metres. The envelope includes the articulation zone (balconies, bay windows, shading devices)
 - exceptions may be made but for bay windows and balconies, which project beyond the building and are an appropriate minimum distance above the finished ground level.
- Whether there is a building envelope or not, the maximum internal plan depth of a building should be 18 metres from glass line to glass line.
- The 18 metre guideline generally applies to street wall buildings, buildings with dual and opposite aspect and buildings with minimal side setbacks.
- Freestanding buildings (the big house or tower building types) may have greater depth than 18 metres only if they still achieve satisfactory daylight and natural ventilation. Use building depth in combination with other controls to ensure adequate amenity for building occupants. For example, a deeper plan may be acceptable where higher floor to ceiling heights allow sun access or where apartments have a wider frontage



01.58. Where freestanding buildings with multiple aspects achieve satisfactory amenity, the plan depth is measured along the shortest axis.



01.59. Where street wall buildings have limited aspect, the plan depth is measured from the front (street) to the back (inside of block).



01.60. Street wall buildings can have a variety of settings and forms (party wall infill, detached infill with small side setbacks, t-shaped infill).

- see Apartment Layout for optimum apartment width in relation to depth and for additional information about varying the apartment depth.
- Slim buildings facilitate dual aspect apartments, daylight access and natural ventilation
- see Natural Ventilation and Daylight Access for amenity issues.
- In conjunction with height controls, consider the application of upper level setbacks to limit the depth of residential floors above deeper commercial or retail levels.

Control Checklist

- Resolve building depth controls in plan, section and elevation.
- In general, an apartment building depth of 10-18 metres is appropriate. Developments that propose wider than 18 metres must demonstrate how satisfactory daylighting and natural ventilation are to be achieved.

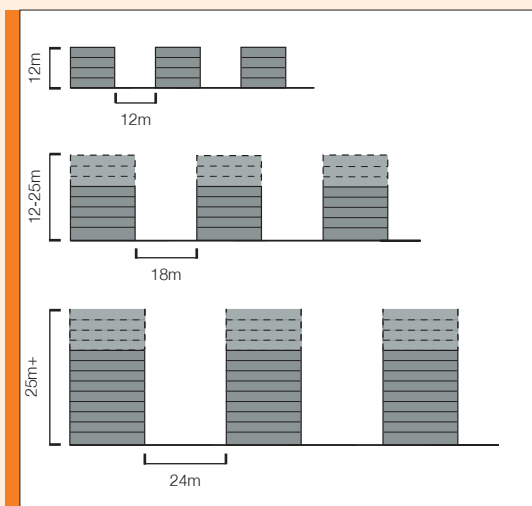


.Primary Development Controls

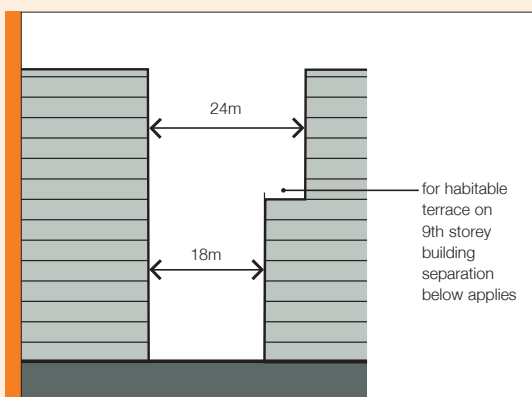
.Building Separation

The spatial relationship of buildings is an important determinant of urban form. Building separation relates to urban form because it has to do with the legible scale of an area. Buildings which are too close together also create amenity problems inside the building, for the space between and for neighbouring buildings. These problems include lack of visual and acoustic privacy, loss of daylight access to apartments and to private and shared open spaces

Building separation controls should be set in conjunction with height controls and with controls for private/communal open space and deep soil zones. They are measured in metres, balcony to balcony or external wall to external wall.



01.61. Building separation is proportionate to building height to facilitate better urban form and improved residential amenity.



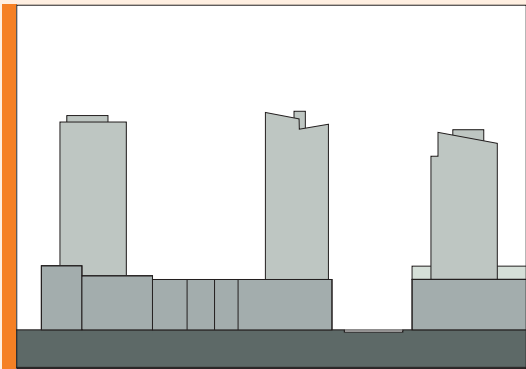
01.62. Where buildings step back in response to minimum building separations, the building separation for the floor below applies to encourage habitable outdoor terraces.

Objectives

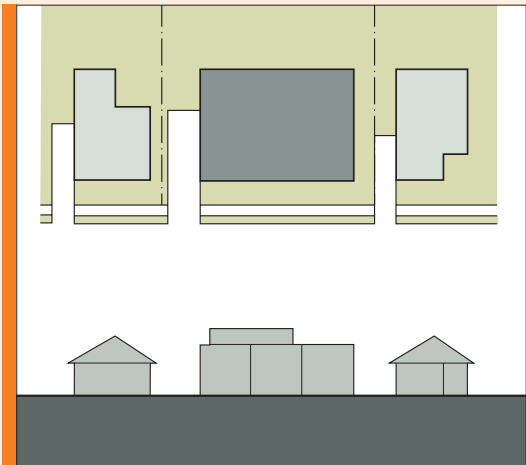
- To ensure that new development is scaled to support the desired area character with appropriate massing and spaces between buildings.
- To provide visual and acoustic privacy for existing and new residents.
- To control overshadowing of adjacent properties and private or shared open space.
- To allow for the provision of open space with appropriate size and proportion for recreational activities for building occupants.
- To provide deep soil zones for stormwater management and tree planting, where contextual and site conditions allow.

Designing the controls

- For buildings over three storeys, it is recommended that building separation increase in proportion to building height to ensure appropriate urban form, adequate amenity and privacy for building occupants. Suggested dimensions within a development, for internal courtyards and between adjoining sites are:
 - up to four storeys/12 metres
 - 12 metres between habitable rooms/balconies
 - 9 metres between habitable/balconies and non-habitable rooms
 - 6 metres between non-habitable rooms
 - five to eight storeys/up to 25 metres
 - 18 metres between habitable rooms/balconies
 - 13 metres between habitable rooms/balconies and non-habitable rooms
 - 9 metres between non-habitable rooms
 - nine storeys and above/ over 25 metres
 - 24 metres between habitable rooms/balconies
 - 18 metres between habitable rooms/balconies and non-habitable rooms
 - 12 metres between non-habitable rooms
- Allow zero building separation in appropriate contexts, such as in urban areas between street wall building types (party walls).



01.63. In urban areas with tower building types, building separation is an important element for defining better urban form and improving residential amenity.



01.64. In suburban areas with small infill sites, minimum building separations may not be possible. Apartment layout and building orientation need to respond to the site constraints. (see Side and Rear Setbacks)

- Where a building step back creates a terrace, the building separation distance for the floor below applies. (see image)
- Coordinate building separation controls with side and rear setback controls. For example in a suburban area where a strong rhythm has been established between buildings, smaller building separations may be appropriate. (see side + rear setbacks)
- Coordinate building separation controls with controls for daylight access, visual privacy, and acoustic privacy.
- Protect the privacy of neighbours who share a building entry and whose apartments face each other by designing internal courtyards with greater building separation.

Control Checklist

- Design and test building separation controls in plan and section.
- Test building separation controls for daylight access to buildings and open spaces.
- Building separation controls may be varied in response to site and context constraints.
- Developments that propose less than the recommended distances apart must demonstrate that daylight access, urban form and visual and acoustic privacy has been satisfactorily achieved (see Daylight Access, Visual Privacy and Acoustic Privacy).

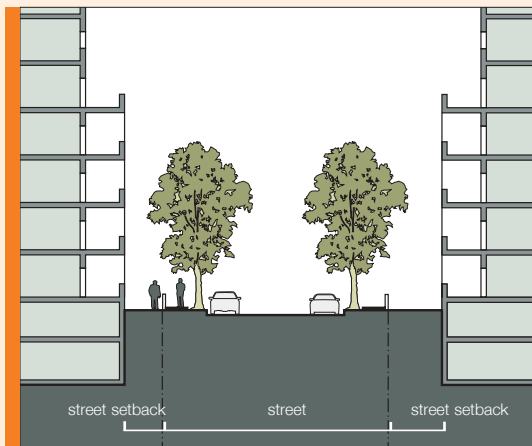


.Primary Development Controls

.Street Setbacks

Street setbacks establish the front building line. Controls over street setbacks create the proportions of the street and can contribute to the public domain by enhancing streetscape character and the continuity of street facades. Street setbacks can also be used to enhance the setting for the building. They provide for landscape areas, entries to ground floor apartments and deep soil zones.

Street setbacks are measured from the street boundary to the outside edge of the building. Controls can be expressed as a minimum distance, as a range (in metres), or as a 'build to' line.



01.65. Streetscapes are defined by a combination of public elements (the street, verges, and footpaths) and private elements (street setbacks, fences and building facades).

Objectives

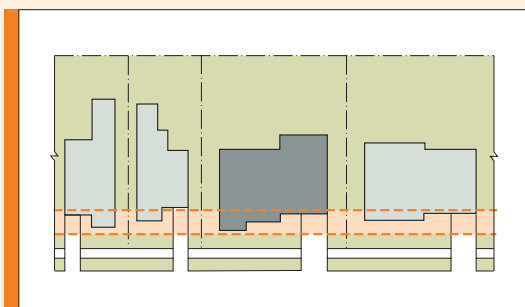
- To establish the desired spatial proportions of the street and define the street edge.
- To create a clear threshold by providing a transition between public and private space.
- To assist in achieving visual privacy to apartments from the street.
- To create good quality entry spaces to lobbies, foyers or individual dwelling entrances.
- To allow an outlook to and surveillance of the street.
- To allow for street landscape character.

Designing the controls

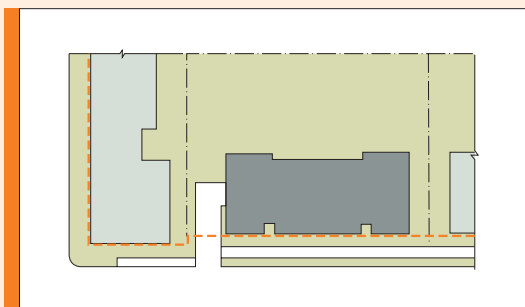
- Use different setback controls to differentiate between urban and suburban character areas. Setbacks typically vary from none in city centres to 10 metres on suburban streets
 - establish a dimension to match existing development or step back from special buildings or to retain significant trees
 - use a 'build to' line in urban areas where a consistent street edge needs to be reinforced. A 'build to' line includes the articulation zone
 - use a range where the desired character is for variation within overall consistency; a 5 to 9 metre range is typical of suburban areas.
- Nominate an appropriate percentage of future development to be built to the 'build to' line, where one is set. (see image 01.67.) A 'build to' line does not necessarily imply an unrelieved and unmodulated frontage along the whole length of the building.
- Minimise overshadowing of the street and/or other buildings.
- In conjunction with height controls, consider secondary upper level setbacks to reinforce the desired scale of the buildings on the street.



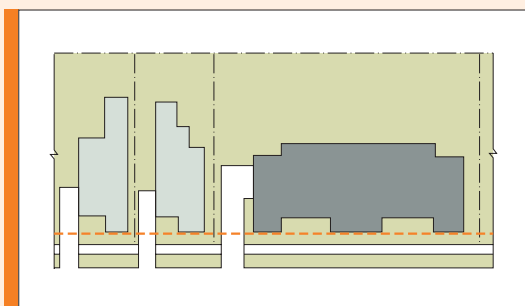
01.66. Street setbacks can be defined with a minimum setback and a facade angle in areas where angled lots exists and a response to the existing street pattern is desired.



01.67. Street setbacks can be defined as a range in which buildings sit.



01.68. Street setbacks can be defined as a build to line in areas where street edge aligned buildings are desired.



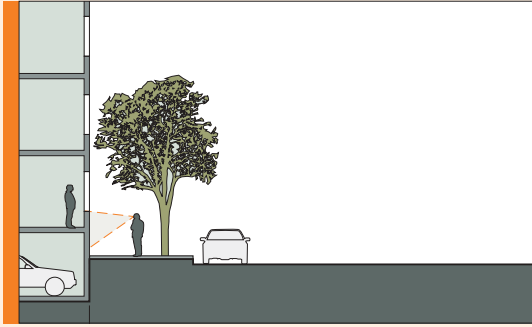
01.69. Street setbacks can be defined as a percentage of a build to line (50% in this example) to encourage the modulation of long building facades.

- In general, no part of a building or above ground structure may encroach into a setback zone. Exceptions are:
 - underground parking structures no more than 1.2 metres above ground, where this is consistent with the desired streetscape (see Ground Floor Apartments)
 - awnings
 - balconies and bay windows.

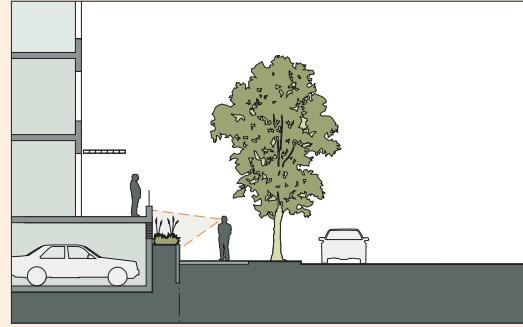


.Primary Development Controls

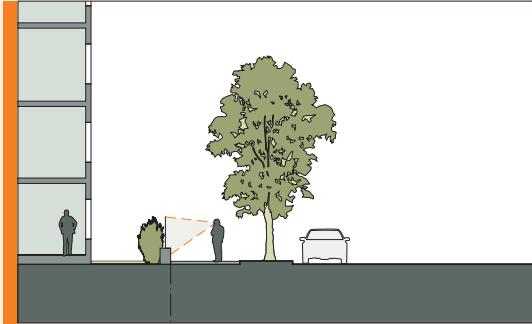
.Street Setbacks



01.70. In urban areas where no street setbacks occur, a change in level from the footpath to ground floor apartment optimises privacy.



01.72. Where private terraces are elevated above the footpath level, a balance between privacy for the terrace and a pleasant streetscape is needed.



01.71. Where small setbacks occur, fencing and planting selection provides a separation between the public and private realms.



01.73. In suburban areas with large setbacks, trees and plantings contribute to the streetscape and ensure privacy.

✓ Control Checklist

- Identify the desired streetscape character, the common setback of buildings in the street, the accommodation of street tree planting and the height of buildings and daylight access controls.
- Relate setbacks to the area's street hierarchy.
- Identify the quality, type and use of gardens and landscaped areas facing the street.
- Test street setbacks with building envelopes and street sections.
- Test controls for their impact on the scale, proportion and shape of building facades.

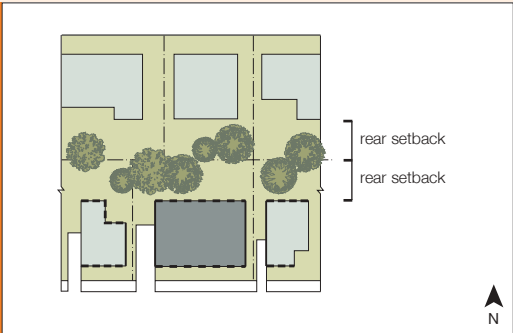


.Primary Development Controls

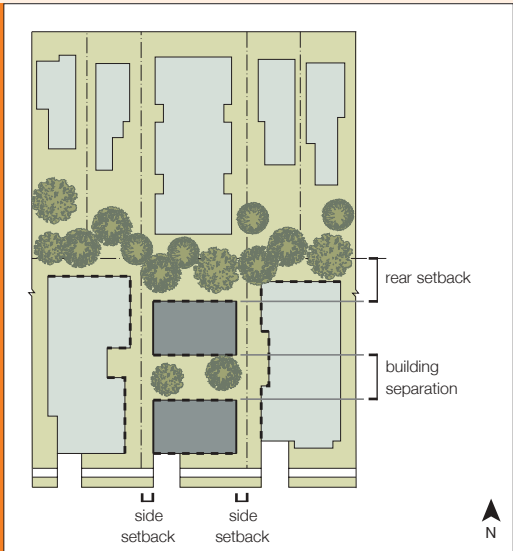
.Side + Rear Setbacks

Side and rear setbacks are important tools to ensure that the building height and distance of the building from its boundaries maintain the amenity of neighbouring sites and within the new development. Setbacks vary according to the building context and type, and will apply more to suburban than urban contexts.

Side and rear setbacks can be used to create useable land, which contributes to the amenity of the side and rear of the buildings through landscape design.



01.74. On small suburban infill sites, following the existing open space patterns, limiting side setbacks, and locating habitable rooms to face the street and rear optimises amenity and privacy for all.



01.75. On narrow infill sites, changing building types and the orientation of habitable rooms optimises limited building separations and side setbacks.



Objectives

Side Setbacks:

- To minimise the impact of development on light, air, sun, privacy, views and outlook for neighbouring properties, including future buildings.
- To retain or create a rhythm or pattern of development that positively defines the streetscape so that space is not just what is left over around the building form.

Rear setbacks:

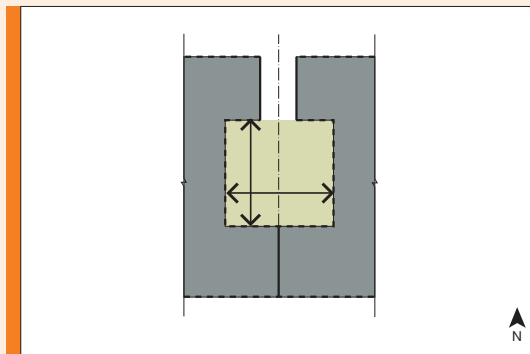
- To maintain deep soil zones to maximise natural site drainage and protect the water table.
- To maximise the opportunity to retain and reinforce mature vegetation.
- To optimise the use of land at the rear and surveillance of the street at the front.
- To maximise building separation to provide visual and acoustic privacy.

Designing the controls

- Establish primary and secondary setback lines. For example, an L-shaped building that has two external walls at the rear and two to one side. These different conditions need to be considered.
- Design side and rear setbacks in conjunction with building separation, open space and deep soil zone controls.
- Where the desired character is for a continuous street frontage, zero side setbacks are appropriate.
- Where setbacks are limited by lot size and adjacent buildings, 'step in' the plan on deep building to provide internal courtyards and to the limit the length of walls facing boundaries.
- In general, no part of a building or above ground structure may encroach into a setback zone. Exceptions are:
 - underground parking structures no more than 1.2 metres above ground and where the roof of the parking structure is a private or communal open space
 - balconies and bay windows.



01.76. Side and rear setbacks can be defined with percentage of a build to line (40% in this example) to encourage courtyard building types and better building orientation.



01.77. Where limited setbacks and deep buildings are unavoidable, 'step in' the plan to create useful internal courtyards and to optimise building separations.

✓ Control Checklist

- Relate side setbacks to existing streetscape patterns.
- Test side and rear setback with building separation, open space and deep soil zone requirements (see Building Separation, Open Space and Deep Soil Zones).
- Test side and rear setbacks for overshadowing of other parts of the development and/or adjoining properties, and of private open space.

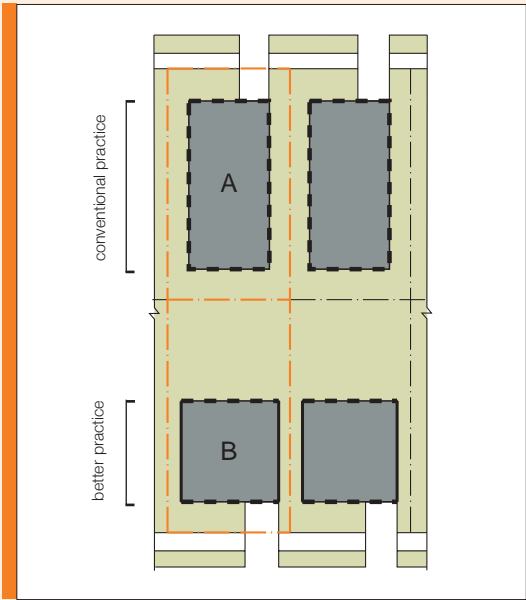


Primary Development Controls

.Floor Space Ratio

Floor space ratio (FSR) controls provide a guide for developers, council staff and the community as to the allowable densities for an area. The FSR is the maximum capacity of a building and the accepted currency for development. A key benefit of FSR is its usefulness in determining and controlling the maximum amount of floor space yield. However, FSR should not be the sole determinant of future built form; it should be linked with all other building envelope controls to support the desired urban outcome. Once established, FSR is an absolute maximum, which may not be wholly achievable on all sites due to urban design considerations.

In a new urban area or where an existing area is undergoing change, FSR controls should be set after designing and testing building envelopes, not before.



01.78. A sample floor space area comparison shows conventional practice with development along the length of the site and better practice showing narrow building along the street. The better practice option increases the height by a storey, but improves residential amenity and open space.

	Building Envelope Footprint
	Site
	Habitable Room Edges

Site Area	760 m ²
Building Envelope Footprint Area	360 m ²
Height	3 storeys
Total Envelope Area	1,080 m ²
Less 80% of Total Envelope Area	864 m ²
FSR	1.1:1

Site A. Conventional practice

Site Area	760 m ²
Building Envelope Footprint Area	270 m ²
Height	4 storeys
Total Floor Area	1,080 m ²
Less 80% of Total Envelope Area	864 m ²
FSR	1.1:1

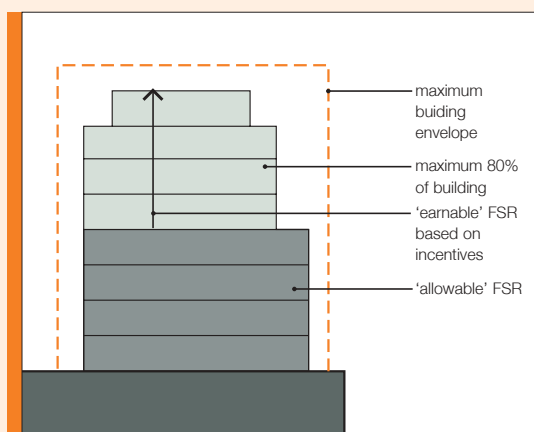
Site B. Better practice

Objectives

- To ensure that development is in keeping with the optimum capacity of the site and the local area.
- To define allowable development density for generic building types.
- To provide opportunities for modulation and depth of external walls within the allowable FSR.
- To promote thin cross-section buildings, which maximise daylight access and natural ventilation.
- To allow generous habitable balconies.

Designing the controls

- When envelopes are being used, the FSR should not fill them. Determine FSR by calculating it at 80 percent of the building envelope in denser urban areas and at 75 percent in suburban areas.
- Where there are no site-specific envelopes, ensure that the controls are coordinated so that height, setbacks and FSR are consistent with each other and with the desired built form outcome.
- Floor space should be measured from the inside face of external walls and 1400mm above the slab. It includes:
 - habitable space below ground (auditoria, cinemas, supermarkets)
 - retail space (cafés) associated with main entrance and/or lobby.
- It excludes:
 - main building entrances and associated foyers and lobbies
 - common vertical circulation (stairs and lifts)
 - underground:
 - storage
 - vehicular access, loading areas, garbage and services
 - car parking
 - plant rooms and vertical mechanical services and ducting
 - communal recreational areas in residential buildings up to 5% of the total floor area of the building



01.79. When determining floor space controls, design maximum building envelopes which include incentives and bonuses up front.

- balconies, including those enclosed by operable screening devices
- the void space above double height spaces.
- Relate FSR to minimum site frontage or range of site depths in areas with small lots or a variety of lot sizes and shapes. Different sites, for example, corner, mid-block and wide shallow sites, have different floor space capacities and blanket controls may result in undesirable built form.
- Consider varying floor space ratio to provide incentives for housing, sustainability and public benefits including:
 - affordable housing
 - street widening
 - open space and parkland dedication
 - colonnades, walkways and arcades
 - public parking.
- Determine any incentives/bonuses up front, working back from 80 percent and testing FSR yield for economic viability. The maximum FSR should include all incentives/bonuses. Consider dividing FSR into allowable FSR and earnable FSR. Allowable means the base line FSR and earnable is the difference between the base line and the maximum FSR. Ensure the amount of earnable FSR is quantified against each incentive/bonus up front in the planning process.
- Track and monitor the transfer of floor space from heritage areas.

✓ Control Checklist

- Test the desired built form outcome against proposed floor space ratio to ensure consistency with:
 - building height
 - building footprint
 - the three dimensional building envelope
 - open space requirements.
- Test a variety of typical lot sizes and shapes in your area before establishing a blanket FSR control.

.Part 02

Site Design

Tools for improving the design of residential flat buildings

.Residential Flat Design Code

.Part 02



.Site Analysis

Site analysis is an important part of the design process. Development proposals need to illustrate design decisions, which are based on careful analysis of the site conditions and their relationship to the surrounding context. By describing the physical elements of the locality and the conditions impacting on the site, opportunities and constraints for future residential flat development can be understood and addressed in the design.

Site analysis should include plan and section drawings of the existing features of the site, at the same scale as the site and landscape plan, together with appropriate written material. Information may include but is not limited to: (see Table A: Pre-Development Application Requirements for additional information on local context requirements)

- site dimensions, site areas, north point
- location of site in relation to shops, community facilities and transport
- form and character of adjacent and opposite buildings in the streetscape, including both sides of any street that the development fronts
- location and use of any existing buildings or built features on the site
- location and important characteristics of adjacent public, communal and private open spaces
- location, use, overall height (storeys, metres) and important parapet/datum lines of adjacent buildings
- location and height of existing windows and balconies on adjacent properties facing the site
- location, height and characteristics of adjacent walls and fences
- location of major trees on site, on adjacent properties and street trees, identified by size and botanical or common names
- topography, showing spot levels and contours 0.5 metre intervals for the site, adjoining streets and land adjoining the site
- views to and from the site
- prevailing winds
- orientation and overshadowing of the site and adjoining properties by neighbouring structures and trees
- geotechnical characteristics of the site and suitability of development
- pedestrian and vehicular access points (existing and proposed)
- location of utility services, including electricity poles, stormwater drainage lines, natural drainage, kerb crossings and easements
- location of any infrastructure easements or rights of way
- significant noise sources on and in the vicinity of the site, particularly vehicular traffic, train, aircraft and industrial operations noise
- assessment of site contamination, proposed remediation strategy and a statement from a recognised expert that the site can be remediated and made suitable for the proposed uses.

A written statement explaining how the design of the proposed development has responded to the site analysis must accompany the development application. (see Table B: Development Application Recommendations in the Appendices)

.Sample Site Analysis

This example illustrates a selection of sketches that could be produced as part of a site analysis. It is a sample only. Because each site is different, the sketches required to describe a particular site, its opportunities and its constraints will vary. An appropriate site analysis should consider the list of items on the previous page, the information sheets in the Design Code and the Pre-DA and DA recommendations listed in Appendix 2 and 3.

- This example is divided into two parts:
- 1- the contextual documentation illustrates and describes the basic topics which will inform the design process
 - 2- the analysis diagrams illustrate and notate major design decisions in relation to the site layout and the adjacent context. These decisions inform the site and building design process.

The example site is a small infill site in a suburban area adjacent to a main shopping street. The development proposal amalgamates three smaller sites and demolishes three detached buildings and their associated outbuildings.



02.01.

Building Use

The context includes a main shopping street with retail uses on the ground floor (shops, cafes) and generally commercial uses or retail support on the second storey. Occasionally the second storey is used for shop top housing. The remaining building uses are housing. Although the context is predominantly single family detached dwellings, a residential flat building is located across the street from the site.

- light grey square: retail/commercial
- dark grey square: single family houses
- orange square: residential flats



02.02.

Building Height

The context is a low scale residential neighbourhood adjacent a traditional two to three storey shopping street.

- light grey square: one storey
- dark grey square: two storey
- light orange square: three storey
- orange square: four storey



02.03.

Circulation

The street hierarchy includes a main north-south shopping street, local residential streets and laneways. The site is located on an east-west local residential street. Across from the site, a north-south residential street intersects with the site street. Laneways provide rear access shops and cafes along the shopping street as well as to the site.

- vehicular circulation
- pedestrian circulation
- service access

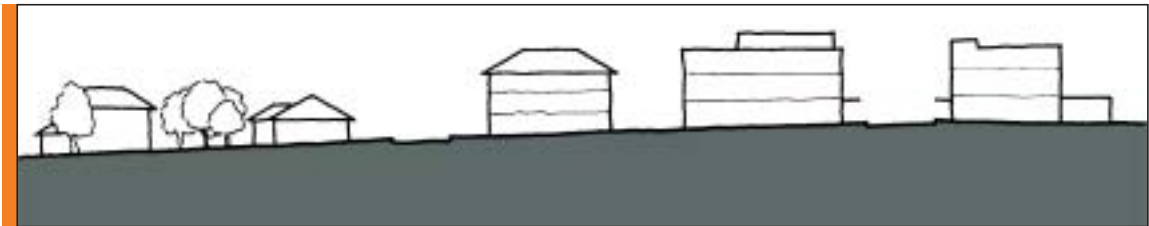


02.04.

Open Space, Landform + Views

The context slopes from the north-east to the south-west providing high level views from the site to the valley beyond. A view corridor from the street to the north terminates at the site. Prevailing breezes originate from the north east. Front landscape setback and rear gardens with mature trees characterise the open space.

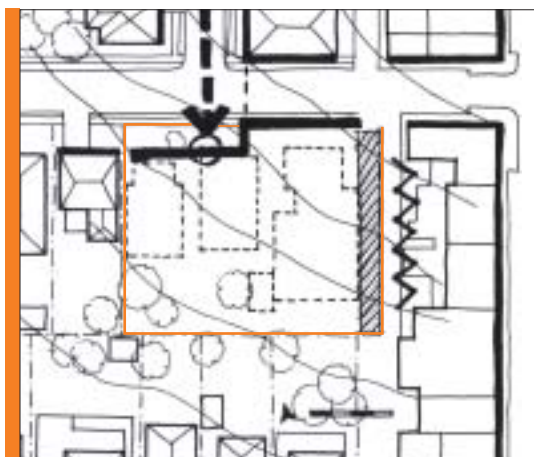
- open small spaces + mature trees
- views
- prevailing breezes



02.05. South Elevation of Street. A laneway separates the street edge aligned buildings along the shopping street and the smaller detached building to the west.



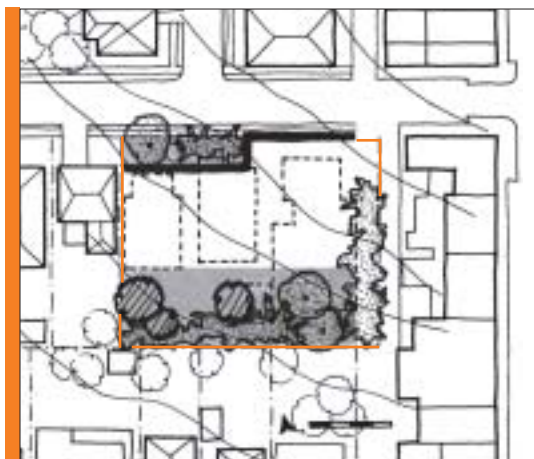
02.06. North Elevation of Street. The building heights step down the slope from east to west.



02.07.

Building Edges

The analysis proposes to match the street edge alignment of the shopping street and the residential flat building across the street. A front setback is then introduced to correspond to existing setbacks along the residential street. The view corridor is noted as a potential elevation response. A buffer is proposed along the laneway to protect the residential amenity of the development.



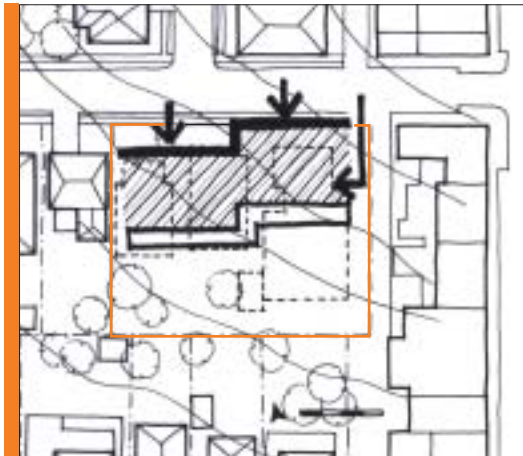
02.08.

Landscape Response

The analysis proposes to maintain the rear landscape areas and existing trees. Additional trees and planting are incorporated into the design. New planting is proposed along the laneway. A front landscape setback is included.



02.09. North South Section. A street edge alignment is proposed to help define the streetscape. The carpark, located under the building footprint, allows for deep soil planting in the rear garden. The topography falls away from the building exposing the carpark along the rear garden. There is a potential for garden apartments to locate along this edge and to provide an improved elevation to the communal open space.



02.10.

Access and Parking

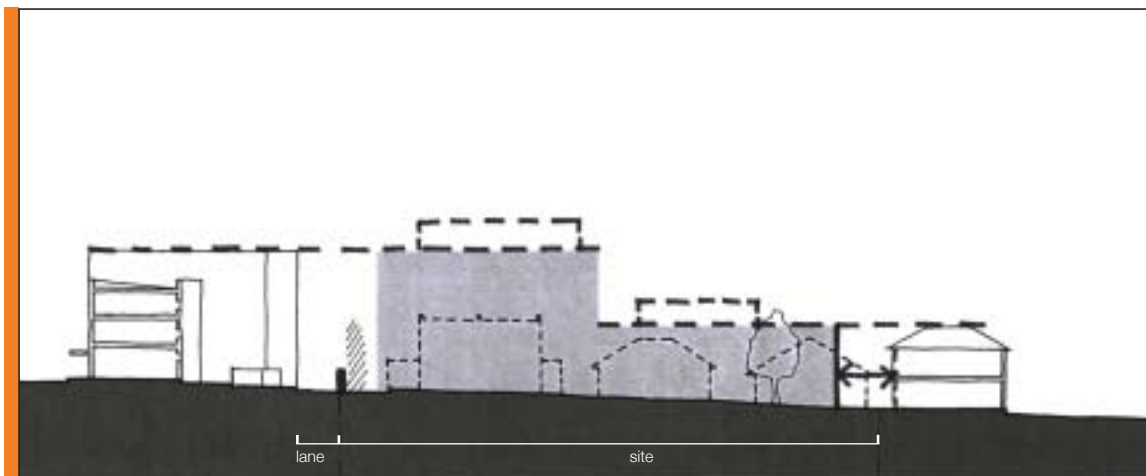
Vehicular access to the development is proposed from the laneway. Pedestrian access is from the street. It is divided into two main entries to articulate the street edge and maintain the existing rhythm of entries along the street. Parking is located under the building footprint. The southern edge may require special attention if the slope of the site exposes the parking level.



02.11.

Building Performance

A narrow building footprint is proposed to capture prevailing breezes and to facilitate natural ventilation. All apartment units have living areas facing north and receive suitable access to daylight.



02.12. East West Section. The proposed building heights step down the street in relation to the topography and the existing buildings. An additional storey may be possible if it is setback from the front and side facades. New fencing, a small side setback and a landscape buffer are proposed along the laneway. A larger side setback is proposed adjacent to the single house to ensure adequate privacy and amenity for residents on both sites.



.Site Configuration

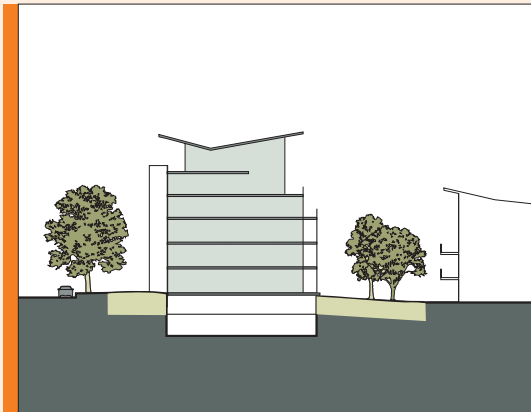
.Deep Soil Zones

Deep soil zones are areas of natural ground with relatively natural soil profiles retained within a development. Deep soil zones have important environmental benefits, these include:

- promoting healthy growth of large trees with large canopies
- protecting existing mature trees
- allowing infiltration of rain water to the water table and reduction of stormwater runoff.

On many sites there may not be a natural soil profile. For example many urban areas may have artificial soils conditions resulting from pre-existing uses, heavy disturbance, compaction, filling with demolition material or other imported material among others. While these conditions may not be ideal for plant growth, it is still possible to achieve healthy vegetation growth through careful analysis of soil conditions, appropriate soil treatments and careful plant selection.

Deep soil zones are related to the provision of open space and may be constrained by the density or location of a proposed development. (see Open Space)



02.13. Carparking is located under the building footprint to promote deep soil zones in the front and rear of the development.

Objectives

- To assist with management of the water table.
- To assist with management of water quality.
- To improve the amenity of developments through the retention and/or planting of large and medium size trees.

Better design practice

- Optimise the provision of consolidated deep soil zones within a site by:
 - the design of basement and sub-basement car parking, so as not to fully cover the site
 - the use of front and side setbacks.
- Optimise the extent of deep soil zones beyond the site boundaries by locating them contiguous with the deep soil zones of adjacent properties.
- Promote landscape health by supporting for a rich variety of vegetation type and size.
- Increase the permeability of paved areas by limiting the area of paving and/or using pervious paving materials.

✓ Rules of Thumb

- A minimum of 25 percent of the open space area of a site should be a deep soil zone; more is desirable. Exceptions may be made in urban areas where sites are built out and there is no capacity for water infiltration. In these instances, stormwater treatment measures must be integrated with the design of the residential flat building. (see Stormwater Management)



.Site Configuration

.Fences + Walls

Fences and walls include all built vertical landscape elements designed to define boundaries between one space and the next or to rationalise a change in level. The design of fences and walls has an impact on the real and perceived safety and security of residents as well as on the amenity of the public domain and the identity of the residential apartment development.



02.14. A picket and pillar fence defines the street boundary in keeping with the style of the development and the neighbourhood.



02.15. Materials, the rhythm of solid to void and planting are combined to enhance visual amenity from the street whilst ensuring privacy and security for residents.

Objectives

To define the edges between public and private land.

- To define the boundaries between areas within the development having different functions or owners.
- To provide privacy and security.
- To contribute positively to the public domain.

Better Design Practice

- Respond to the identified architectural character for the street and/or the area. Design considerations may include:
 - materials selection, including percentage of solid to transparent materials
 - height
 - vertical or horizontal rhythms along the street, such as vertical entry elements, boundary markers or fence posts frequency
 - location and frequency of entry openings or gates
 - location from site boundary, such as alignment with boundary or 600 millimetres from boundary to provide planting along footpath.
- Clearly delineate the private and public domain without compromising safety and security by:
 - designing fences and walls which provide privacy and security while not eliminating views, outlook, light and air
 - limiting the length and height of retaining walls along street frontages.
- Contribute to the amenity, beauty and useability of private and communal open spaces by incorporating some of the following in the design of fences and walls:
 - benches and seats
 - planter boxes
 - pergolas and trellises
 - barbeques
 - water features
 - composting boxes and worm farms.
- Retain and enhance the amenity of the public domain by:
 - avoiding the use of continuous lengths of blank walls at street level
 - using planting to soften the edges of any raised terraces to the street, such as over sub basement car parking, and reduce their apparent scale.
- Select durable materials, which are easily cleaned and graffiti resistant.

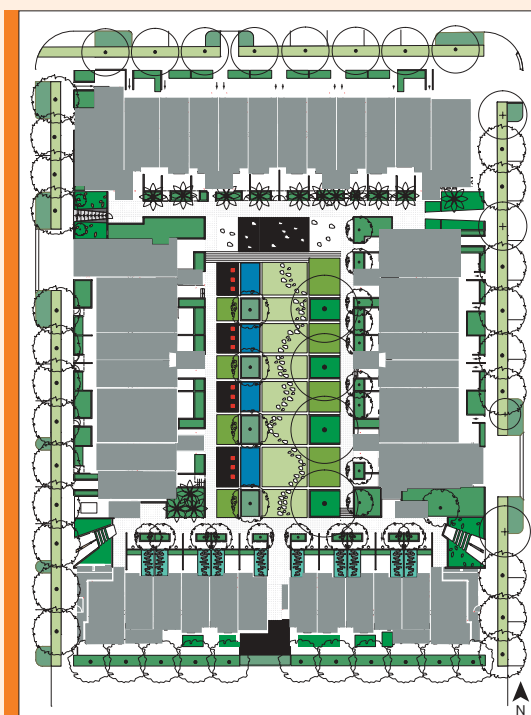


.Site Configuration

.Landscape Design

Landscape design includes the planning, design, construction and maintenance of all utility, open space and garden areas. It is fundamental to the design of residential flat development. Together, landscape and buildings can operate as an integrated and sustainable system, resulting in greater aesthetic quality and amenity for occupants and the adjoining public domain. As such, it should not be generated by left-over spaces resulting from building siting and location.

Landscape design builds on the existing site's natural and cultural features to contribute to a development's positive relationship to its context and site. Landscape design should optimise useability, privacy and social opportunity, equitable access and respect for neighbours' amenity. It should also take into account practical establishment and long-term management.



02.16. A geometric composition of plantings, water features and paved areas create a central focus and outlook for the development.



02.17. Well considered walls, fencing, pathways and mature vegetation define a clear separation between communal and private open spaces.

Objectives

- To add value to residents' quality of life within the development in the forms of privacy, outlook and views.
- To provide habitat for native indigenous plants and animals.
- To improve stormwater quality and reduce quantity.
- To improve the microclimate and solar performance within the development.
- To improve urban air quality.
- To contribute to biodiversity.

Better Design Practice

- Improve the amenity of open space with landscape design which:
 - provides appropriate shade from trees or structures
 - provides accessible routes through the space and between buildings
 - screens cars, communal drying areas, swimming pools and the courtyards of ground floor units
 - allows for locating art works where they can be viewed by users of open space and/or from within apartments.
- Contribute to streetscape character and the amenity of the public domain by:
 - relating landscape design to the desired proportions and character of the streetscape
 - using planting and landscape elements appropriate to the scale of the development
 - mediating between and visually softening the bulk of large development for the person on the street.
- Improve the energy efficiency and solar efficiency of dwellings and the microclimate of private open spaces. Planting design solutions include:
 - trees for shading low-angle sun on the eastern and western sides of a dwelling
 - trees that do not cast a shadow over solar collectors at any time of the year
 - deciduous trees for shading of windows and open space areas in summer



02.18. The site's topography has been used to create a series of smaller more intimate spaces using retaining walls and planter beds, which step down across the site.



02.19. The detailing of the courtyard edge allows a visual connection between the street and the communal space while clearly defining the public and private domains.



02.20. A series of courtyards and pathways have distinct landscape design solutions unique to each space, its function and location.

- locating evergreen trees well away from the building to permit the winter sun access
- varying heights of different species of trees and shrubs to shade walls and windows
- locating pergolas on balconies and courtyards to create shaded areas in summer and private areas for outdoor living
- locating plants appropriately in relation to their size at maturity.
- Design landscape which contributes to the site's particular and positive characteristics, for example by:
 - enhancing habitat and ecology
 - retaining and incorporating trees, shrubs and ground covers endemic to the area, where appropriate
 - retaining and incorporating changes of level, visual markers, views and any significant site elements.
- Contribute to water and stormwater efficiency by integrating landscape design with water and stormwater management, for example, by:
 - using plants with low water demand to reduce mains consumption
 - using plants with low fertiliser requirements
 - using plants with high water demand, where appropriate, to reduce run off from the site
 - utilising permeable surfaces
 - using water features
 - incorporating wetland filter systems.
- Provide a sufficient depth of soil above paving slabs to enable growth of mature trees.
- Minimise maintenance by using robust landscape elements.



.Site Configuration

.Open Space

Open space is a critical environmental resource as well as ‘breathing space’ for residential flat development. It may be public (accessible and usable by the general public), communal (shared by all residents of a development) or private (associated with a single dwelling and for the exclusive use of the occupants). The size, location and design treatment of open space will vary depending on the context of the site and the scale of development. The primary function of open space is to provide amenity in the form of:

- landscape design
- daylight and ventilation access to apartments
- visual privacy
- opportunities for recreation and social activities
- water cycle management. (see Stormwater Management)



02.21. Landscaping, grassed terraces and a pool provide smaller spaces within the larger courtyard, creating a variety of passive recreational areas and outlook for apartments.



02.22. Courtyard gardens provide private open space for residents within a larger common landscape space.

Objectives

- To provide residents with passive and active recreational opportunities.
- To provide an area on site that enables soft landscaping and deep soil planting.
- To ensure that communal open space is consolidated, configured and designed to be useable and attractive.
- To provide a pleasant outlook.

Better Design Practice

- Provide communal open space which is appropriate and relevant to the context and the building's setting. This will vary, for example, between urban and suburban areas, so that:
 - the requirement for communal open space may decrease proportionately as FSR increases in high density areas
 - where communal open space is difficult to accommodate on site, councils may need to consider the adequacy of public open space provision in the locality
 - councils may require public space benefits in the form of public walkways, arcades, plazas and parks for large developments on key sites and/or in key locations
 - communal open space may be accommodated on a podium or roof(s) in a mixed-use building with commercial and/or retail on the ground floor, provided it has adequate amenity
 - communal open space may be required to fit with and enhance the existing pattern of deep soil zones and vegetated settings for residential development in suburban areas
 - communal open space may be reduced as a trade off for increased private open space in smaller developments.



02.23. This communal open space combines hard materials and soft landscaping to provide a unique outlook and a focus for residents.



02.24. The pool provides an informal meeting place and passive recreational areas for residents.

- Where communal open space is provided, facilitate its use for the desired range of activities by:
 - locating it in relation to buildings to optimise solar access to apartments
 - consolidating open space on the site into recognisable areas with reasonable space, facilities and landscape
 - designing its size and dimensions to allow for the 'program' of uses it will contain
 - minimising overshadowing
 - carefully locating ventilation duct outlets from basement car parks.
- Provide private open space for each apartment capable of enhancing residential amenity, in the form of:
 - balcony, deck, terrace, garden, yard, courtyard and/or roof terrace. Where the primary private open space is a balcony. (see Balconies)
- Locate open space to increase the potential for residential amenity by designing apartment buildings which:
 - are sited to allow for landscape design
 - are sited to optimise daylight access in winter and shade in summer. (see Daylight)
 - have a pleasant outlook
 - have increased visual privacy between apartments. (see Building Separation and Visual Privacy)
- Provide environmental benefits including habitat for native fauna, native vegetation and mature trees, a pleasant microclimate, rainwater percolation and outdoor drying area. (see Landscape Design, Deep Soil Zones, Stormwater Management)

✓ Rules of Thumb

- The area of communal open space required should generally be at least between 25 and 30 percent of the site area. Larger sites and brownfield sites may have potential for more than 30 percent.
- Where developments are unable to achieve the recommended communal open space, such as those in dense urban areas, they must demonstrate that residential amenity is provided in the form of increased private open space and/or in a contribution to public open space.
- The minimum recommended area of private open space for each apartment at ground level or similar space on a structure, such as on a podium or car park, is 25m²; the minimum preferred dimension in one direction is 4 metres. (see Balconies for other private open space requirements)



.Site Configuration

.Orientation

Building orientation is concerned with the way buildings are laid out on a site and the way their internal spaces are arranged. It has an impact on urban form-the street and the block-and on residential amenity. Maximising the number of apartments with northern orientation for solar access is an important consideration, but it must be balanced with:

- maintaining a desired streetscape character (eg. by aligning buildings to the street)
- providing for enjoyment of views (eg. towards water)
- fitting with the topography (eg. not dominating skylines or requiring significant cut and fill)
- supporting desired streetscape character
- accommodating contextual constraints (eg. noise)
- responding to existing overshadowing (eg. adjacent buildings or trees).



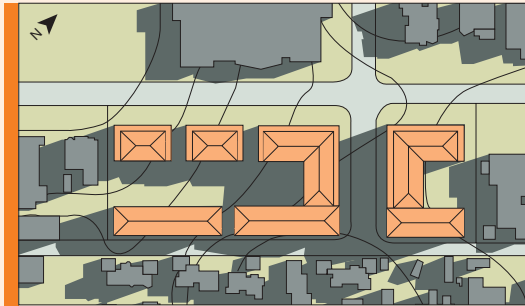
02.25. North orientation and lot size will influence the choice of building type best suited to optimise daylight access to apartments.

Objectives

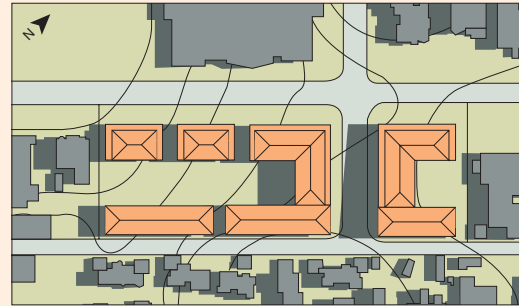
- To optimise solar access to residential apartments within the development and adjacent development.
- To contribute positively to desired streetscape character.
- To support landscape design of consolidated open space areas.
- To protect the amenity of existing development.
- To improve the thermal efficiency of new buildings.

Better design practice

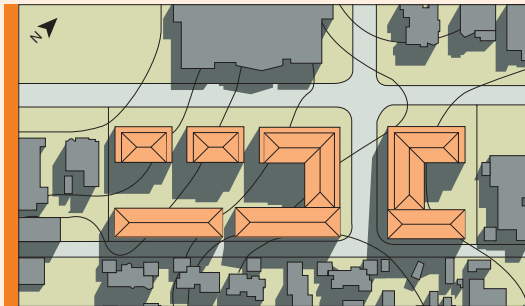
- Plan the site to optimise solar access by:
 - positioning and orienting buildings to maximise north facing walls (within 30 degrees east and 20 degrees west of north) where possible
 - providing adequate building separation within the development and to adjacent buildings (see Building Separation, Side and Rear Setbacks).
- Select building types or layouts which respond to the streetscape while optimising solar access. Where streets are to be edged and defined by buildings, design solutions include:
 - align buildings to the street on east-west streets
 - use courtyards, L-shaped configurations and increased setbacks to northern (side) boundaries on north-south streets.
- optimise solar access to living spaces and associated private open spaces by orienting them to the north.
- Detail building elements to modify environmental conditions, as required, to maximise sun access in winter and sun shading in summer (see Energy Efficiency and Daylight Access).



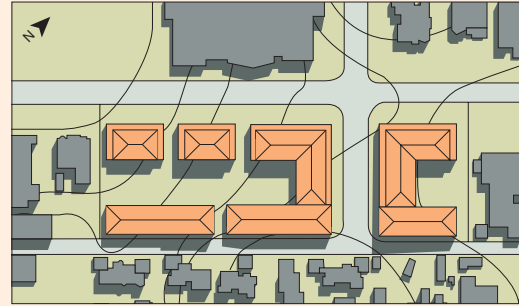
02.26. June 21 9.00am



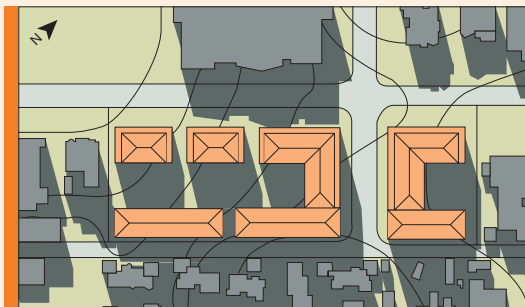
02.29. September 21 9.00am



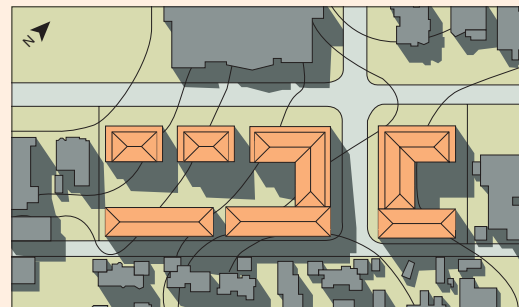
02.27. June 21 12.00pm



02.30. September 21 12.00pm



02.28. June 21 3.00pm



02.31. September 21 3.00pm

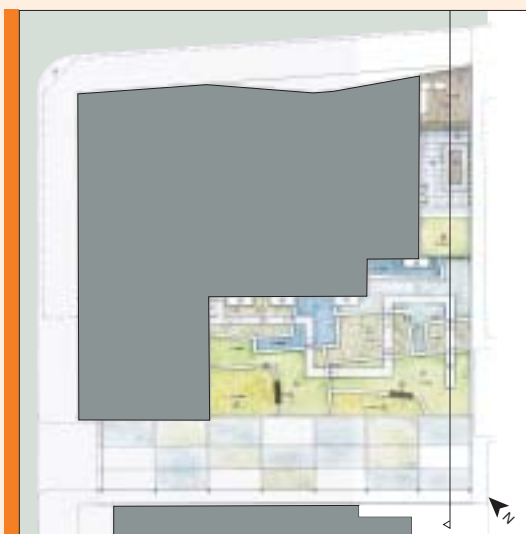
These shadow diagrams document the movement of shadows across the site during mid-winter (June 21) and the equinoxes (March and September 21). They are important for demonstrating the impact of shadows within and beyond the site.



.Site Configuration

.Planting on Structures

An increasingly common scenario in urban areas is the establishment of landscape areas on top of basement car parks, on podiums, and/or on roofs. Quality landscape design and open space amenity relies in part on the quality and health of plants. The plants in these areas are grown in total containment with artificial soils, drainage and irrigation. Plants grown in such situations are subject to a range of environmental stresses that affect the health and vigour of the plants, and ultimately their survival.



02.32. This roof courtyard features an artificial wetland and a series of platforms planted with shrubs and grasses.

Objectives

- To contribute to the quality and amenity of communal open space on roof tops, podiums and internal courtyards.
- To encourage the establishment and healthy growth of trees in urban areas.

Better Design Practice

- Design for optimum conditions for plant growth by:
 - providing soil depth, soil volume and soil area appropriate to the size of the plants to be established
 - providing appropriate soil conditions and irrigation methods
 - providing appropriate drainage.
- Design planters to support the appropriate soil depth and plant selection by:
 - ensuring planter proportions accommodate the largest volume of soil possible. Minimum soil depths will vary depending on the size of the plant however, soil depths greater than 1.5 metres are unlikely to have any benefits for tree growth.
 - providing square or rectangular planting areas rather than long narrow linear areas.
- Increase minimum soil depths in accordance with:



02.33. This section illustrates the suitability of the landscape design to limited soil depths on a roof structure.



02.34. Sculptural planters provide adequate depth for small trees and visually enhance the design of adjacent spaces.

- the mix of plants in a planter for example where trees are planted in association with shrubs, groundcovers and grass
- the level of landscape management, particularly the frequency of irrigation
- anchorage requirements of large and medium trees
- soil type and quality.

Reference:

Hitchmough, J.D. Urban Landscape Management, Sydney: Inkata Press, 1994



02.35. Shade trees and planters enclose a small courtyard and provide intimacy within a larger communal open space.

✓ Rules of Thumb

- In terms of soil provision there is no minimum standard that can be applied to all situations as the requirements vary with the size of plants and trees at maturity. The following are recommended as minimum standards for a range of plant sizes:
- Large trees such as figs (canopy diameter of up to 16 metres at maturity)
 - minimum soil volume 150 cubic metres
 - minimum soil depth 1.3 metre
 - minimum soil area 10 metre x 10 metre area or equivalent
- Medium trees (8 metre canopy diameter at maturity)
 - minimum soil volume 35 cubic metres
 - minimum soil depth 1 metre
 - approximate soil area 6 metre x 6 metre or equivalent
- Small trees (4 metre canopy diameter at maturity)
 - minimum soil volume 9 cubic metres
 - minimum soil depth 800mm
 - approximate soil area 3.5 metre x 3.5 metre or equivalent
- Shrubs
 - minimum soil depths 500-600mm
- Ground cover
 - minimum soil depths 300-450mm
- Turf
 - minimum soil depths 100-300mm
 - any subsurface drainage requirements are in addition to the minimum soil depths quoted above



.Site Configuration

.Stormwater Management

Stormwater is the run off from buildings and the paved areas surrounding them. The design and implementation of appropriate management practices during construction, and during the life of the building, can reduce the potentially significant impact of development upon natural waterways. Water sensitive urban design seeks to minimise impacts on the total water cycle by reducing the stormwater discharge rate and protecting stormwater quality. There is a connection between effective stormwater management and the stability of the water table.

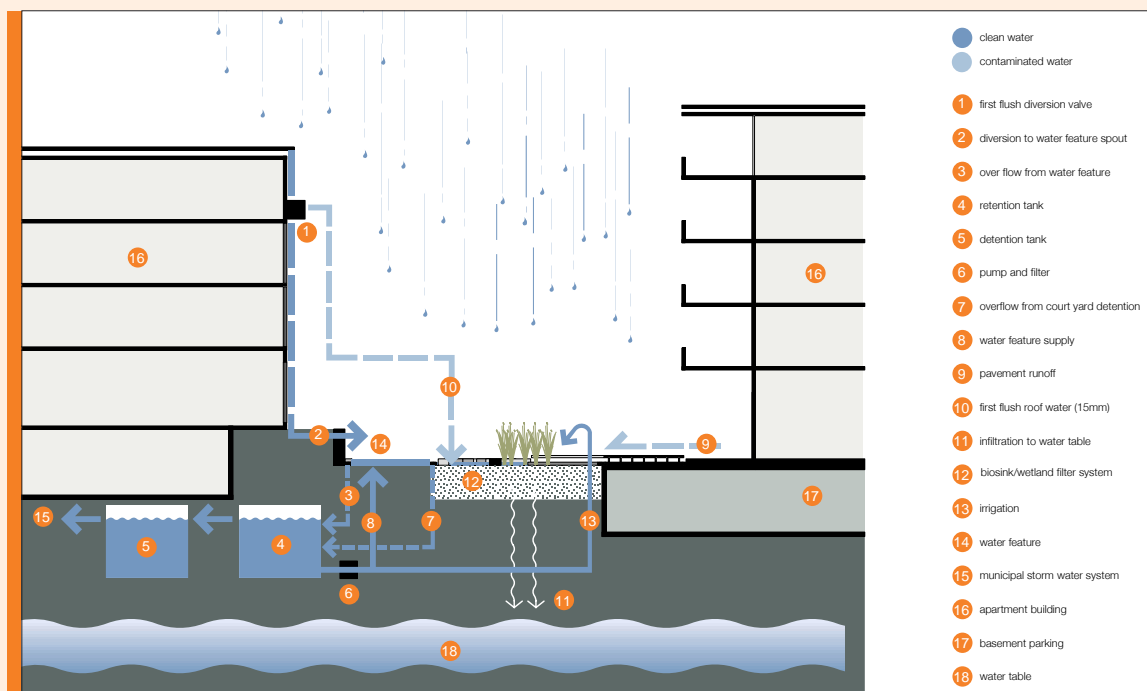
Objectives

- To minimise the impacts of residential flat development and associated infrastructure on the health and amenity of natural waterways.
- To preserve existing topographic and natural features, including watercourses and wetlands.
- To minimise the discharge of sediment and other pollutants to the urban stormwater drainage system during construction activity.

Better Design Practice

- Reduce the volume impact of stormwater on infrastructure by retaining it on site. Design solutions may include:
 - minimising impervious areas by using pervious or open pavement materials
 - retaining runoff from roofs and balconies in water features as part of landscape design or for reuse for activities such as toilet flushing, car washing and garden watering
 - landscape design incorporating appropriate vegetation
 - minimising formal drainage systems (pipes) with vegetated flowpaths (grass swales), infiltration or biofiltration trenches and subsoil collection systems in saline areas
 - water pollution control ponds or constructed wetlands on larger developments.
- Optimise deep soil zones. All development must address the potential for deep soil zones. (see Deep Soil Zones)
- On dense urban sites where there is no potential for deep soil zones to contribute to stormwater management, seek alternative solutions. Structural stormwater treatment measures may be used including:
 - litter or gross pollutant traps to capture leaves, sediment and litter
 - on-site detention storage.
- Protect stormwater quality by providing for:
 - sediment filters, traps or basins for hard surfaces
 - treatment of stormwater collected in sediment traps on soils containing dispersive clays.

- Reduce the need for expensive sediment trapping techniques by controlling erosion. Design solutions include:
 - landscape design incorporating appropriate vegetation
 - stable (non-eroding) flowpaths conveying water at non-erosive velocities.
- consider using grey water for site irrigation. (see Water Conservation)



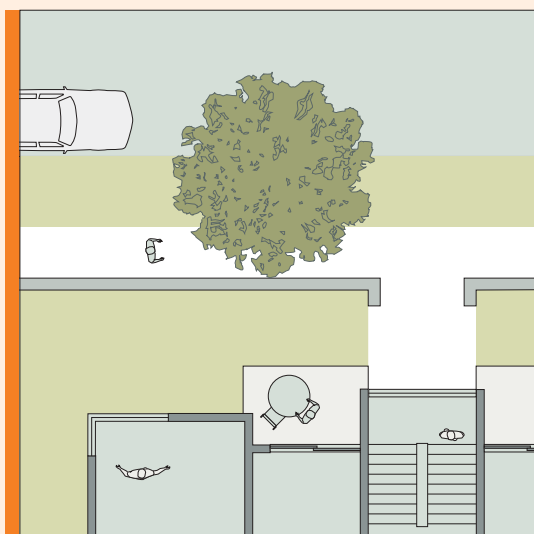
02.36. This diagram illustrates an integrated stormwater recycling system. Stormwater quantities can be reduced and water quality increased, by circulating rainwater through a connected water feature and wetland system.



.Site Amenity

.Safety

The built environment has an impact on perceptions of safety and security, as well as on the actual opportunities for crime. A development which provides safe ground level entry and exit during all times of the day and night will minimise opportunities for crime. Design for safety works by enabling casual surveillance, reinforcing territory, controlling access and managing space.



02.37. Windows, balconies and front doors address the street, provide surveillance and make both the street and the apartment building more secure during the day and at night.

Objectives

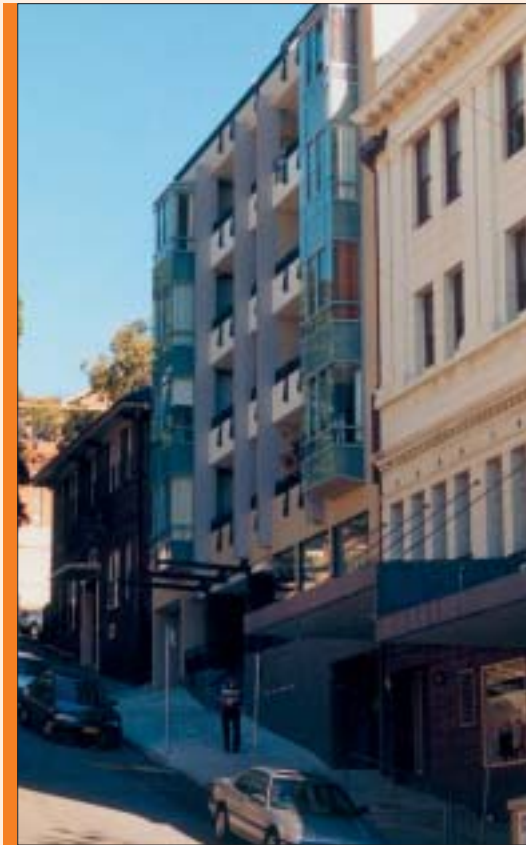
- To ensure residential flat developments are safe and secure for residents and visitors.
- To contribute to the safety of the public domain.

Better Design Practice

- Reinforce the development boundary to strengthen the distinction between public and private space. This can be actual or symbolic and may include:
 - employing a level change at the site and/or building threshold (subject to accessibility requirements)
 - signage
 - entry awnings
 - fences, walls and gates
 - change of material in paving between the street and the development.
- Optimise the visibility, functionality and safety of building entrances by:
 - orienting entrances towards the public street
 - providing clear lines of sight between entrances, foyers and the street
 - providing direct entry to ground level apartments from the street rather than through a common foyer
 - direct and well-lit access between car parks and dwellings, between car parks and lift lobbies and to all unit entrances.
- Improve the opportunities for casual surveillance by:
 - orienting living areas with views over public or communal open spaces, where possible
 - using bay windows and balconies, which protrude beyond the main facade and enable a wider angle of vision to the street
 - using corner windows, which provide oblique views of the street
 - providing casual views of common internal areas, such as lobbies and foyers, hallways, recreation areas and car parks.
- Minimise opportunities for concealment by:
 - avoiding blind or dark alcoves near lifts and stairwells, at the entrance and within indoor car parks, along corridors and walkways
 - providing well-lit routes throughout the development
 - providing appropriate levels of illumination for all common areas
 - providing graded illumination to car parks and illuminating entrances higher than the minimum acceptable standard.



02.38. Landscape lighting, common stairwell lighting and projected internal lighting increase safety within the common areas throughout the development.



02.39. Projecting bay windows over the street increase surveillance along the street.

- Control access to the development by:
 - making apartments inaccessible from the balconies, roofs and windows of neighbouring buildings
 - separating the residential component of a development's car parking from any other building use and controlling car park access from public and common areas
 - providing direct access from car parks to apartment lobbies for residents
 - providing separate access for residents in mixed-use buildings
 - providing an audio or video intercom system at the entry or in the lobby for visitors to communicate with residents
 - providing key card access for residents.

References

'Crime Prevention and the Assessment of Development Applications', Guidelines under Section 79C of the Environmental Planning Assessment Act, 1979, NSW Department of Urban Affairs and Planning, Sydney.

✓

Rules of Thumb

- Carry out a formal crime risk assessment for all residential developments of more than 20 new dwellings.



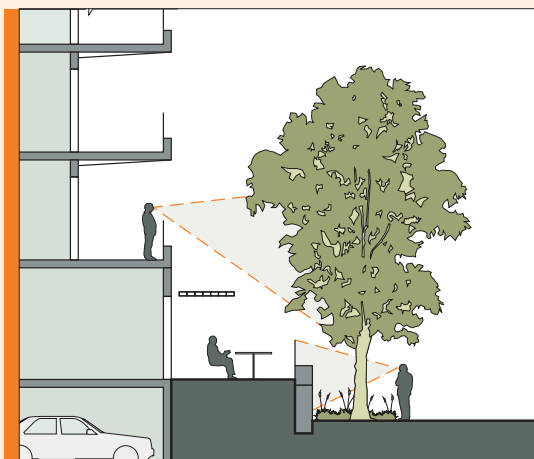
.Site Amenity

.Visual Privacy

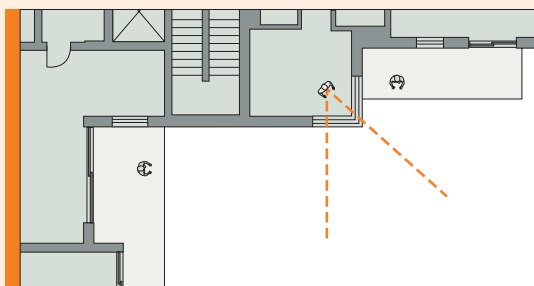
Visual privacy measures protects residents' ability to carry out private functions within all rooms and private open spaces without compromising views, outlook, ventilation and solar access or the functioning of internal and external spaces. The consideration of visual privacy requires an understanding of the adjacent context, site configuration, topography, the scale of the development and the layout of the apartments.

Degrees of privacy are influenced by a number of factors:

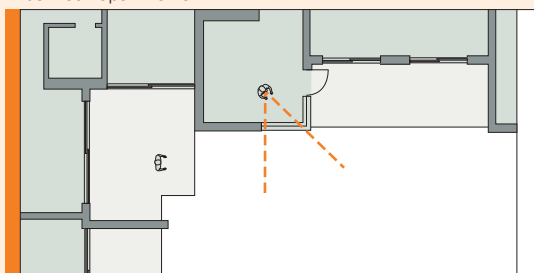
- the activities of each of the areas where overlooking may occur
- the times and frequency these spaces are being used
- the occupants' expectations of privacy and their ability to control overlooking with screening devices.



02.40. A change in level, retaining walls and vegetation define a boundary between private open space and communal open space.



02.41. Locating circulation cores at the re-entrant (internal) corners of buildings can improve separation and privacy between apartments.



02.42. Re-entrant corner balconies are best used as a secondary outlook for an apartment.

Objectives

- To provide reasonable levels of visual privacy externally and internally, during the day and at night.
- To maximise outlook and views from principal rooms and private open space without compromising visual privacy.

Better Design Practice

- Locate and orient new development to maximise visual privacy between buildings on site and adjacent buildings by:
 - providing adequate building separation (see Building Separation)
 - employing appropriate rear and site setbacks (see Side and Rear Setbacks)
 - utilise the site layout to increase building separation by, for example, orienting buildings on narrow sites to the front and rear of the lot, thereby utilising the street width and rear garden depth to increase the separation distance.
- Design building layouts to minimise direct overlooking of rooms and private open spaces adjacent to apartments by:
 - balconies to screen other balconies and any ground level private open space
 - separating communal open space, common areas and access routes through the development from the windows of rooms, particularly habitable rooms
 - changing the level between ground floor apartments with their associated private open space, and the public domain or communal open space. (see Ground Floor Apartments)
- Use detailed site and building design elements to increase privacy without compromising access to light and air. Design detailing may include:
 - offset windows of apartments in new development and adjacent development windows
 - recessed balconies and/or vertical fins between adjacent balconies



02.43. Building elements provide privacy between spaces - pergolas limit overlooking, and solid walls and sliding screens limit horizontal views.

- solid or semi-solid balustrades to balconies
- louvres or screen panels to windows and/or balconies
- fencing (see Fences and Walls)
- vegetation as a screen between spaces
- incorporating planter boxes into walls or balustrades to increase the visual separation between areas
- utilise pergolas or shading devices to limit overlooking of lower apartments or private open space.



02.44. Lower level balconies have solid balustrades, limiting views from the street. Higher level balconies are set back beyond pedestrian sightlines and therefore glazed balustrades are appropriate.

✓ Rules of Thumb

- Refer to Building Separation minimum standards (see Building Separation).



.Site Access

.Building Entry

Building entrances define the threshold between the public street and private areas within the building. They may lead into a common entry or directly into the private space of an apartment from the street. Building entries provide a public presence and interface within the public domain thereby contributing to the identity of a residential development.



02.45. This well-defined entry is differentiated by a change in colour from the surrounding facade.



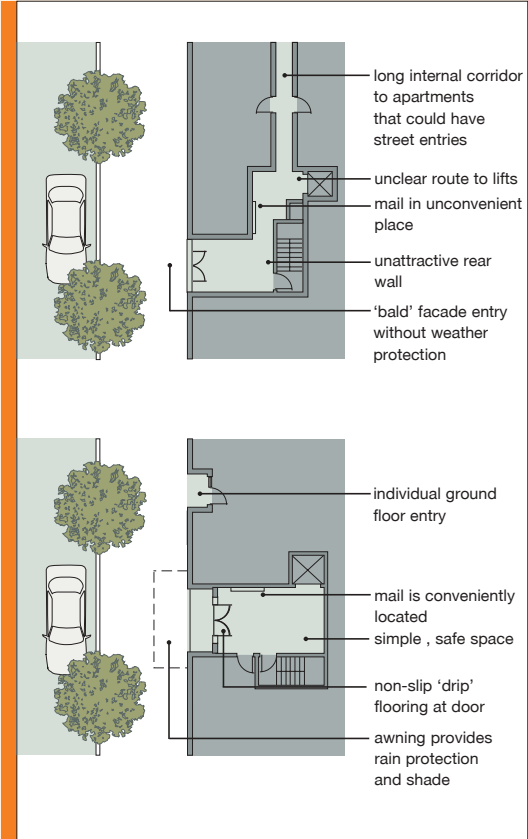
02.46. The facade of this building distinguishes the residential entry from the commercial shop fronts with a vertical element.

Objectives

- To create entrances which provide a desirable residential identity for the development.
- To orient the visitor.
- To contribute positively to the streetscape and building facade design.

Better Design Practice

- Improve the presentation of the development to the street by:
 - locating entries so that they relate to the existing street and subdivision pattern, street tree planting and pedestrian access network
 - designing the entry as a clearly identifiable element of the building in the street
 - utilising multiple entries-main entry plus private ground floor apartment entries-where it is desirable to activate the street edge or reinforce a rhythm of entries along a street.
- Provide as direct a physical and visual connection as possible between the street and the entry.
- Achieve clear lines of transition between the public street, the shared private, circulation spaces and the apartment unit.
- Ensure equal access for all (See Pedestrian Access).
- Provide safe and secure access. Design solutions include:
 - avoid ambiguous and publicly accessible small spaces in entry areas
 - provide a clear line of sight between one circulation space and the next
 - provide sheltered, well lit and highly visible spaces to enter the building, meet and collect mail.
- Generally provide separate entries from the street for:
 - pedestrians and cars
 - different uses, for example, for residential and commercial users in a mixed-use development
 - ground floor apartments, where applicable (see Ground Floor Apartments).
- Design entries and associated circulation space of an adequate size to allow movement of furniture between public and private spaces.
- Provide and design mailboxes to be convenient for residents and not to clutter the appearance of the development from the street. Design solutions include:



02.47. This diagram illustrates a contrast between undesirable practice (top) and better practice (bottom) for entry and lobby design.

- locating them adjacent to the major entrance and integrated into a wall, where possible
- setting them at 90 degrees to the street, rather than along the front boundary.



02.48. Multiple private entries along a street activate the street and create visual interest.

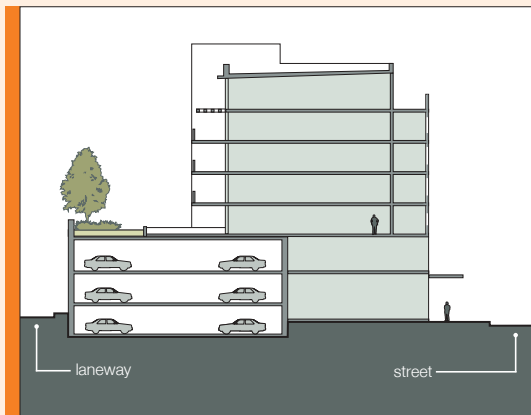


.Site Access

.Parking

Accommodating parking on site (underground or on-grade) has a significant impact on the site layout, landscape design, deep soil zones and stormwater management. The amount of parking provided is related to the size of the development, however, parking provision should also be considered in relation to the local context.

The location of public transport facilities, services and recreational facilities within walking or cycling distance may reduce the need for parking spaces.



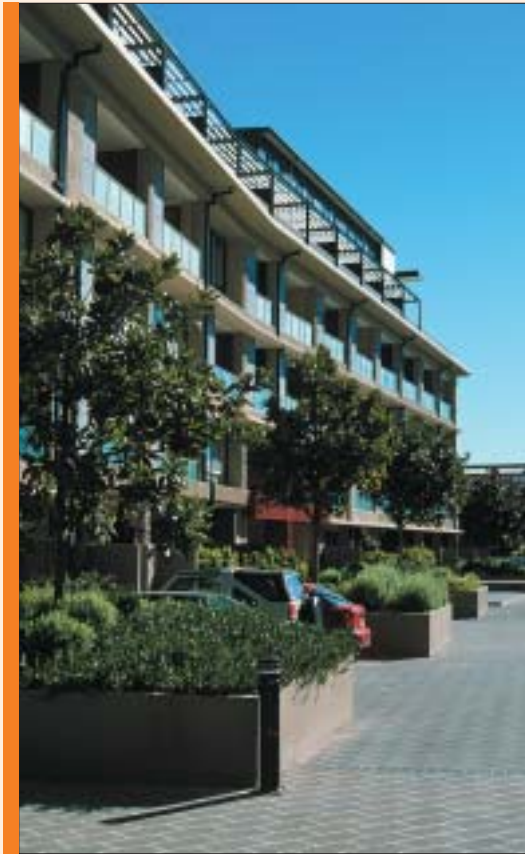
02.49. Above ground car parking is located to the rear of the site behind commercial and retail uses.

Objectives

- To minimise car dependency for commuting and recreational transport use and to promote alternative means of transport-public transport, bicycling, and walking.
- To provide adequate car parking for the building's users and visitors, depending on building type and proximity to public transport.
- To integrate the location and design of car parking with the design of the site and the building.

Better Design Practice

- Determine the appropriate car parking space requirements in relation to:
 - the development's proximity to public transport, shopping and recreational facilities
 - the density of the development and the local area
 - the site's ability to accommodate car parking-this may be affected by other requirements, such as deep soil zones, water table, topography and size and shape of the lot.
- Limit the number of visitor parking spaces, particularly in small developments where the impact on landscape and open space is significant.
- Give preference to underground parking, whenever possible. Design considerations include:
 - retaining and optimising the consolidated areas of deep soil zones
 - facilitating natural ventilation to basement and sub-basement car parking areas, where possible
 - integrating ventilation grills or screening devices of carpark openings into the facade design and landscape design
 - providing safe and secure access for building users, including direct access to residential apartments, where possible
 - provide a logical and efficient structural grid. There may be a larger floor area for basement car parking than for upper floors above ground. Upper floors, particularly in slender residential buildings, do not have to replicate basement car parking widths.



02.50. Where on-grade carparking is necessary, its impact can be reduced by quality paving and landscaping between smaller groups of car spaces.

- Where above ground enclosed parking cannot be avoided, ensure the design of the development mitigates any negative impact on streetscape and street amenity by:
 - avoid exposed parking on the street frontage
 - hiding car parking behind the building facade. Where wall openings (windows, fenestrations) occur, ensure they are integrated into the overall facade scale, proportions and detail
 - 'wrapping' the car parks with other uses, for example, retail along street edges with parking behind
- Minimise the impact of on-grade car parking by:
 - locating parking on the side or rear of the lot away from the primary street frontage
 - screening cars from view of streets and buildings
 - allowing for safe and direct access to building entry points
 - incorporating parking into the landscape design of the site. Considerations include:
 - vegetation between parking bays and to ameliorate views
 - canopy/shade planting
 - selection of paving material
 - screening from communal and private open space areas
- Provide bicycle parking, which is easily accessible from ground level and from apartments.



.Site Access

.Pedestrian Access

Design for pedestrian access focuses on delivering high quality, safe and pleasant walking environments. It is person-centred rather than vehicle-centred. Pedestrian access should also be equitable access, which provides a barrier-free environment where all people who live in and visit the development can enjoy the public domain, and can access apartments and communal use areas in residential developments.



02.51. A safe pedestrian pathway mediates between private building entries and on-grade car parking.

Objectives

- To promote residential flat development which is well connected to the street and contributes to the accessibility of the public domain.
- To ensure that residents, including users of strollers and wheelchairs and people with bicycles, are able to reach and enter their apartment and use communal areas via minimum grade ramps, paths, access ways or lifts.

Better Design Practice

- Utilise the site and its planning to optimise accessibility to the development.
- Provide high quality accessible routes to public and semi-public areas of the building and the site, including major entries, lobbies, communal open space, site facilities, parking areas, public streets and internal roads.
- Promote equity by:
 - ensuring the main building entrance is accessible for all from the street and from car parking areas
 - integrating ramps into the overall building and landscape design.
- Design ground floor apartments to be accessible from the street, where applicable, and to their associated private open space. (see Ground Floor Apartments)
- Maximise the number of accessible, visitable and adaptable apartments in a building. Australian Standards are only a minimum, for example:
 - where an apartment development contains clusters of buildings, consider providing more than one accessible entrance
 - demonstrate that adaptable units can be converted.
- Separate and clearly distinguish between pedestrian accessways and vehicle accessways.
- Consider the provision of public through-site pedestrian accessways in large development sites.

References

AS 1428, AS 4299, BCA: Access to Premises.

✓ Rules of Thumb

- Identify the access requirements from the street or car parking area to the apartment entrance.
- Follow the accessibility standard set out in Australian Standard AS 1428 (parts 1 and 2), as a minimum.
- Provide barrier free access to at least 20 percent of dwellings in the development.



.Site Access

.Vehicle Access

Vehicle access is the ability for cars and maintenance and service vehicles to access the development. The location, type and design of vehicle access points to a development will have significant impacts on the streetscape, the site layout and the building facade design. It is important that vehicle access is integrated with site planning from the earliest stages to balance any potential conflicts with streetscape requirements and traffic patterns and to minimise potential conflicts with pedestrians.



02.52. The location of the carpark entry on the secondary facade minimises its impact on the primary streetscape.



02.53. This elevation treats the carpark entry as part of the whole elevation. It narrows the width of the entry and defines an opening in proportion to the other facade elements.



02.54. This small site on a steep hill has split the entry and exit driveways to maintain a consistent scale of facade openings.

Objectives

- To integrate adequate car parking and servicing access without compromising street character, landscape or pedestrian amenity and safety.
- To encourage the active use of street frontages.

Better Design Practice

- Ensure that pedestrian safety is maintained by minimising potential pedestrian/vehicle conflicts. Design approaches include:
 - limiting the width and number of vehicle access points
 - ensuring clear site lines at pedestrian and vehicle crossings
 - utilising traffic calming devices
 - separating and clearly distinguishing between pedestrian and vehicular accessways.
- Ensure adequate separation distances between vehicular entries and street intersections.
- Optimise the opportunities for active street frontages and streetscape design by:
 - making vehicle access points as narrow as possible
 - limit the number of vehicle accessways to a minimum
 - locating car park entry and access from secondary streets and lanes.
- Improve the appearance of car parking and service vehicle entries, for example, by:
 - or screening garbage collection, loading and servicing areas visually away from the street.
 - setback or recess carpark entries from the main facade line
 - avoid 'black holes' in the facade by providing security doors to carpark entries
 - where doors are not provided, ensure that the visible interior of the carpark is incorporated into the facade design and material selection and that building services-pipes and ducts-are concealed
 - return the facade material into the carpark entry recess for the extent visible from the street as a minimum.

✓ Rules of Thumb

- Generally limit the width of driveways to a maximum of six metres.
- Locate vehicle entries away from main pedestrian entries and on secondary frontages.

.Part 03

Building Design

Tools for improving the design of residential flat buildings

.Residential Flat Design Code

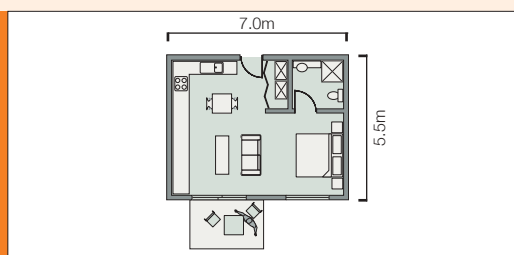
.Part 03



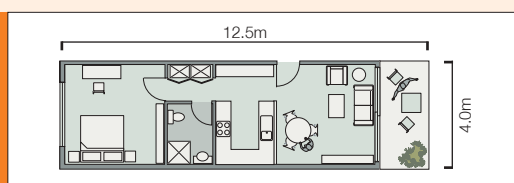
.Building Configuration

.Apartment Layout

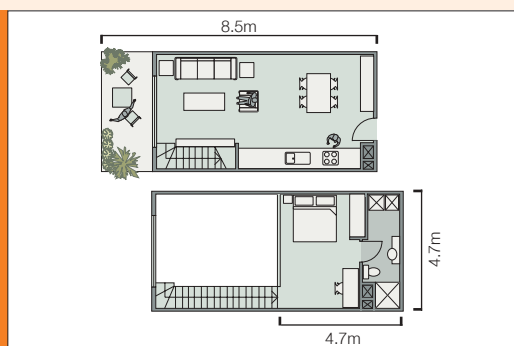
The internal layout of an apartment establishes the spatial arrangement of rooms, the circulation between rooms, and the degrees of privacy for each room. In addition, the layout directly impacts the quality of residential amenity, such as access to daylight and natural ventilation, and the assurance of acoustic and visual privacy. The apartment layout also includes private open space.



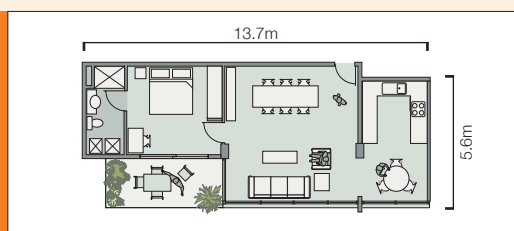
03.01. Studio apartment



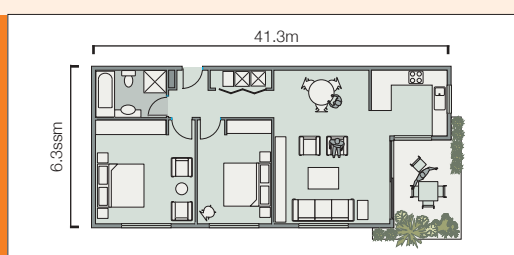
03.02. One bedroom cross through apartment



03.03. One bedroom maisonette/loft apartment



03.04. One bedroom single aspect apartment



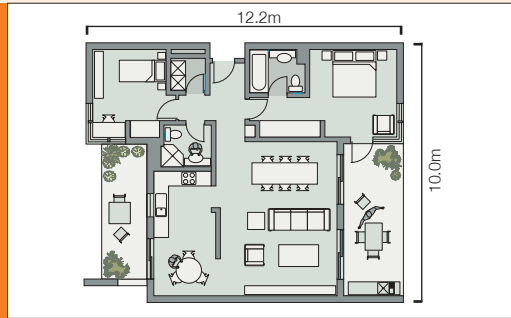
03.05. Two bedroom corner apartment

Objectives

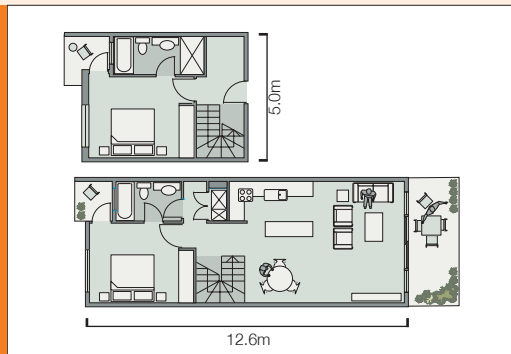
- To ensure the spatial arrangement of apartments is functional and well organised.
- To ensure that apartment layouts provide high standards of residential amenity.
- To maximise the environmental performance of apartments.
- To accommodate a variety of household activities and occupants' needs.

Better Design Practice

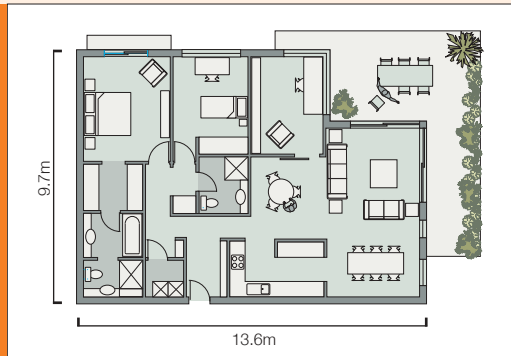
- Determine appropriate apartment sizes in relations to:
 - geographic location and market demands, for example, CBD and coastal areas have different market demands, areas near universities may require more studio apartments.
 - the spatial configuration of an apartment, not just its plan, for example, maisonette apartments are often small in square metres but have double-height living spaces.
 - affordability; a range of apartment sizes provides more choice for more people.
- Ensure apartment layouts are resilient over time. Design issues to address may include:
 - accommodating a variety of furniture arrangements
 - providing for a range of activities and privacy levels between different spaces within the apartment
 - utilising flexible room sizes and proportions or open plans (see Flexibility)
 - ensuring circulation by stairs, corridors and through rooms is planned as efficiently as possible thereby increasing the amount of floor space in rooms.
- Design apartment layouts, which respond to the natural and built environments and optimise site opportunities, by:
 - providing private open space in the form of a balcony, a terrace, a courtyard or a garden for every apartment (see Open Space, Balconies)
 - orienting main living spaces toward the primary outlook and aspect and away from neighbouring noise sources or windows
 - locating main living spaces adjacent to main private open space
 - locating habitable rooms, and where possible kitchens and bathrooms, on the external face of the buildings thereby maximises the number of rooms



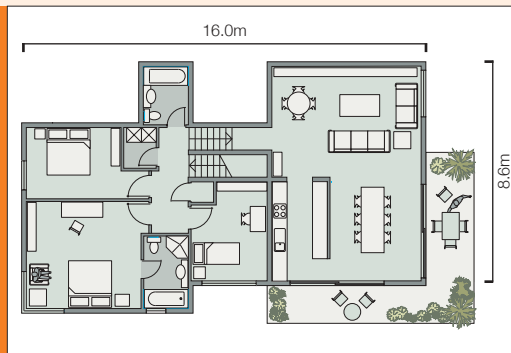
03.06. Two bedroom cross through apartment



03.07. Two bedroom cross over apartment



03.08. Two bedroom corner apartment with study



03.09. Three bedroom apartment

Note: Enlarge drawings by 153% for scale 1:200 when photocopying

with windows

- maximising opportunities to facilitate natural ventilation and to capitalise on natural daylight, for example by providing:
- corner apartments
- cross-over or cross-through apartments
- split-level or maisonette apartments
- shallow, single-aspect apartments (see Natural Ventilation and Daylight Access).
- Avoid locating kitchen as part of the main circulation spaces of an apartment, such as a hallway or entry space.
- Include adequate storage space in apartment (see Storage).
- Ensure apartment layouts and dimensions facilitate furniture removal and placement.



Apartment Type	Area	m ²
03.01 Studio	Internal Area	38.5m ²
	External Area	6m ²
03.02 One bedroom, cross through	Internal Area	50m ²
	External Area	8m ²
03.03 One bedroom masionette/loft	Internal Area	62m ²
	External Area	9.4m ²
03.04 One bedroom single aspect	Internal Area	63.4m ²
	External Area	10m ²
03.05 Two bedroom corner	Internal Area	80m ²
	External Area	11m ²
03.06 Two bedroom cross through	Internal Area	89m ²
	External Area	21m ²
03.07 Two bedroom cross-over	Internal Area	90m ²
	External Area	16m ²
03.08 Two bedroom corner with study	Internal Area	121m ²
	External Area	33m ²
03.09 Three bedroom	Internal Area	124m ²
	External Area	24m ²

This table and the accompanying illustrations provide information on a variety of unit types. Dimensions, areas and furniture layouts are included. These examples are a comparative tool for recognising well-organised, funtional, and high quality apartment layouts.

✓ Rules of Thumb

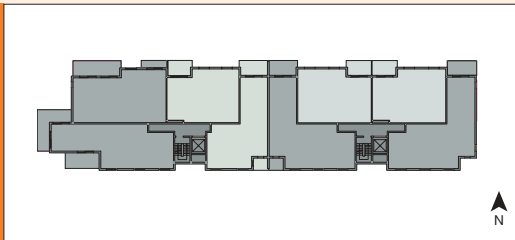
- Single-aspect apartments should be limited in depth to 8 metres from a window.
- The back of a kitchen should be no more than 8 metres from a window.
- The width of cross-over or cross-through apartments over 15 metres deep should be 4 metres or greater to avoid deep narrow apartment layouts.
- Buildings not meeting the minimum standards listed above, must demonstrate how satisfactory daylighting and natural ventilation can be achieved, particularly in relation to habitable rooms (see Daylight Access and Natural Ventilation).
- If council chooses to standardise apartment sizes, a range of sizes that do not exclude affordable housing should be used. As a guide, the Affordable Housing Service suggest the following minimum apartment sizes, which can contribute to housing affordability: (apartment size is only one factor influencing affordability)
 - 1 bedroom apartment 50m²
 - 2 bedroom apartment 70m²
 - 3 bedroom apartment 95m²



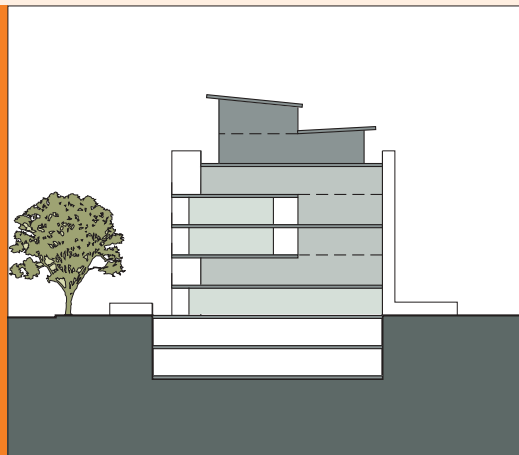
.Building Configuration

.Apartment Mix

A mix of apartment types provides housing choice and supports equitable housing access. By accommodating a range of household types, a mix of apartments can ensure apartment buildings support the needs of society now and in the future. This is particularly important because apartment buildings form a significant and often permanent part of the urban fabric.



03.10. This plan uses a mix of two and three bedroom apartments to optimise the building layout and to provide northern sunlight access for all apartments.



03.11. A variety of apartment sizes and types contributes to an articulated building form response to the context and environment.

One Bedroom Apartment Two Bedroom Apartment Three Bedroom Apartment

Objectives

- To provide a diversity of apartments types, which cater for different household requirements now and in the future.
- To maintain equitable access to new housing by cultural and socio-economic groups.

Better Design Practice

- Provide a variety of apartment types between studio-, one-, two-, three- and three plus-bedroom apartments, particularly in large apartment buildings. Variety may not be possible in smaller buildings, for example, up to six units.
- Refine the appropriate apartment mix for a location by:
 - considering population trends in the future as well as present market demands
 - noting the apartment's location in relation to public transport, public facilities, employment areas, schools and universities and retail centres.
- Locate a mix of one- and three-bedroom apartments on the ground level where accessibility is more easily achieved for disabled, elderly people or families with children.
- Optimise the number of accessible and adaptable apartments to cater for a wider range of occupants. Australian Standards are only a minimum.
- Investigate the possibility of flexible apartment configurations, which support change in the future (see Flexibility).



.Building Configuration

.Balconies

Balconies are outdoor spaces, which enhance the amenity and lifestyle choices of apartment residents. They provide private open space, extend the living spaces of the apartment and capitalise on the temperate climate. Balconies are also important architectural elements, contributing to the form and articulation of apartment buildings.



03.12. Primary balconies provide generous shaded outdoor living areas and add depth to the facade.



03.13. The detail design of these partially solid balustrades, sun shades and privacy screens contribute to the overall facade composition.

Objectives

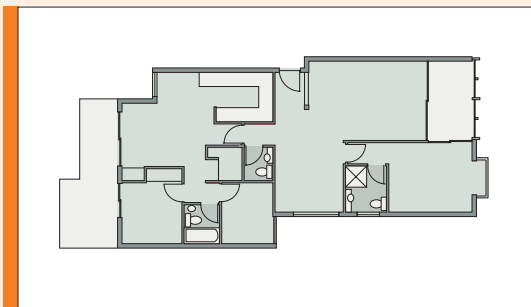
- To provide all apartments with private open space.
- To ensure balconies are functional and responsive to the environment thereby promoting the enjoyment of outdoor living for apartment residents.
- To ensure that balconies are integrated into the overall architectural form and detail of residential flat buildings.
- To contribute to the safety and liveliness of the street by allowing for casual overlooking and address.

Better Design Practice

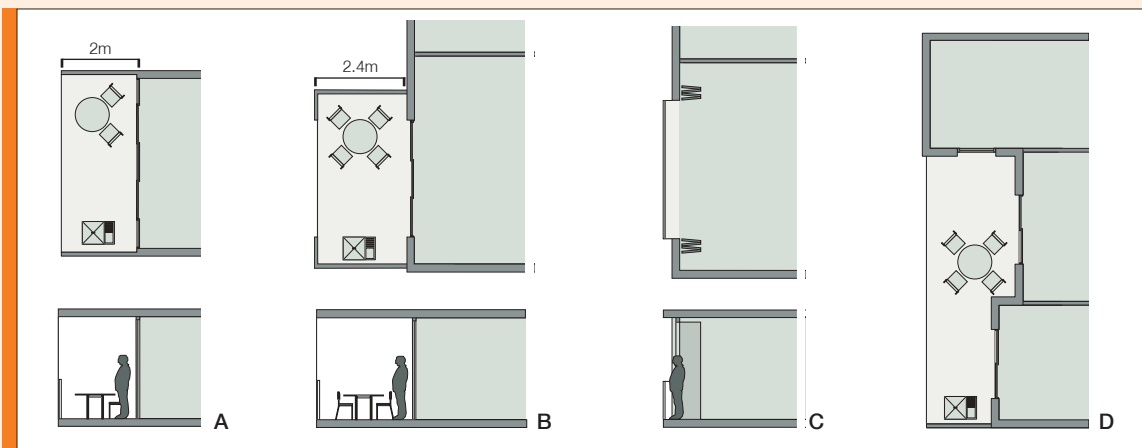
- Where other private open space is not provided, provide at least one primary balcony (see Ground Floor Apartments, Open Space)
- Primary balconies should be:
 - located adjacent to the main living areas, such as living room, dining room or kitchen to extend the dwelling living space
 - sufficiently large and well proportioned to be functional and promote indoor/outdoor living. A dining table and two chairs (smaller apartment) and four chairs (larger apartment) should fit on the majority of balconies in any development.
- Consider secondary balconies, including Juliet balconies or operable walls with balustrades, for additional amenity and choice:
 - in larger apartments
 - adjacent to bedrooms
 - for clothes drying, site balconies off laundries or bathrooms; they should be screened from the public domain.
- Design and detail balconies in response to the local climate and context thereby increasing the usefulness of balconies. This may be achieved by:
 - locating balconies facing predominantly north, east or west to provide solar access
 - utilising sun screens, pergolas, shutters and operable walls to control sunlight and wind
 - providing balconies with operable screens, Juliet balconies or operable walls/sliding doors with a balustrade in special locations where noise or high winds prohibit other solutions - along rail corridors, on busy roads or in tower buildings
 - choose cantilevered balconies, partially cantilevered balconies and/or recessed balconies in response to daylight, wind, acoustic privacy and visual privacy



03.14. The operable screens increase the usefulness of these balconies by providing weather protection, daylight control and privacy screening.



03.15. This three bedroom apartment has two balconies, which cater to the varying needs of a family.



03.16. **A** - A 2m deep balcony can comfortably accommodate a table and two chairs. **B** - A 2.4m balcony deep balcony is needed for a table and four chairs. **C** - Operable walls may be more appropriate in some context. **D** - Balconies with access from multiple rooms improve the amenity of an apartment.

✓ Rules of Thumb

- Provide primary balconies for all apartments with a minimum depth of 2 metres. Developments which seek to vary from the minimum standards must demonstrate that negative impacts from the context-noise, wind-can not be satisfactorily mitigated with design solutions.
- Require scale plans of balcony with furniture layout to confirm adequate, useable space when an alternate balcony depth is proposed.



.Building Configuration

.Ceiling Heights

Ceiling heights are measured from finished floor to finished ceiling level. Ceiling heights are design elements for defining the three-dimensional space of an apartment, in conjunction with walls and floors. Well designed and appropriately defined ceilings ensure quality residential amenity and create spatial interest and hierarchy in apartments.



03.17. Higher ceilings and high level windows promote daylight access into deeper plans and improve the spatial quality of apartments.



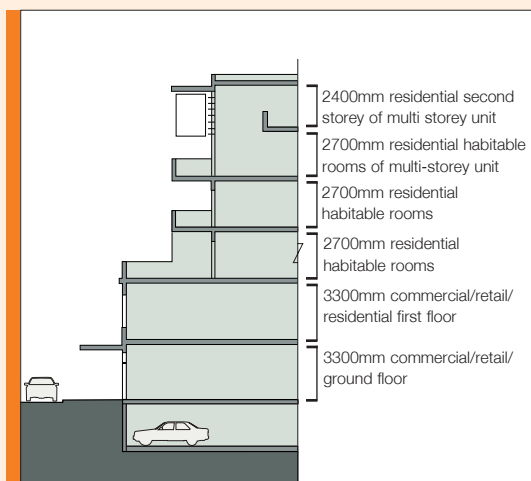
03.18. The double height ceiling in this apartment spatially unifies the two floor levels, creating a pleasant well-lit living area.

Objectives

- To increase the sense of space in apartments and provide well proportioned rooms.
- To promote the penetration of daylight into the depths of the apartment.
- To contribute to flexibility of use.
- To achieve quality interior spaces while considering the external building form requirements.

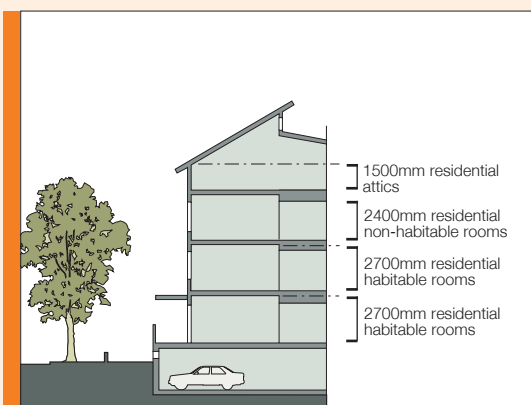
Better Design Practice

- Design better quality spaces in apartments by using ceilings to:
 - define a spatial hierarchy between areas of an apartment using double height spaces, raked ceilings, changes in ceiling heights and/or the location of bulkheads
 - enable better proportioned rooms, for example, smaller rooms often feel larger and more spacious when ceilings are higher
 - maximise heights in habitable rooms by stacking wet areas from floor to floor. This ensures that services and their bulkheads are located above bathroom and storage areas rather than habitable spaces
 - promote the use of ceiling fans for cooling and heating distribution.
- Facilitate better access to natural light by using ceiling heights which:
 - promote the use of taller windows, highlight windows and fan lights. This is particularly important for apartments with limited light access, such as ground floor units and apartments with deep floor plans
 - enable the effectiveness of light shelves in enhancing daylight distribution into deep interiors.
- Design ceiling heights which promote building flexibility over time for a range of other uses, including retail or commercial, where appropriate.
- Coordinate internal ceiling heights and slab levels with external height requirements and key datum lines. External building elements requiring coordination may include:
 - datum lines and parapet lines set by the context or structure plan
 - adjacent heritage building's cornices and string courses
 - exterior awning levels or colonnade heights (see Facades).



03.19. This section illustrates appropriate ceiling heights for mixed use buildings.

- Count double height spaces with mezzanines as two storeys (see Building Height).
- Cross check ceiling heights with building height controls to ensure compatibility of dimensions, especially where multiple uses are proposed.



03.20. This section illustrates appropriate ceiling heights for residential flat buildings.

✓ Rules of Thumb

- The following recommended dimensions are measured from finished floor level (FFL) to finished ceiling level (FCL). These are minimums only and do not preclude higher ceilings, if desired.
 - in mixed use buildings: 3.3 metre minimum for ground floor retail or commercial and for first floor residential, retail or commercial to promote future flexibility of use
 - in residential flat buildings in mixed use areas: 3.3 metre minimum for ground floor to promote future flexibility of use
 - in residential flat buildings or other residential floors in mixed use buildings:
 - in general, 2.7 metre minimum for all habitable rooms on all floors, 2.4 metres is the preferred minimum for all non-habitable rooms, however 2.25m is permitted.
 - for two storey units, 2.4 metre minimum for second storey if 50 percent or more of the apartment has 2.7 metre minimum ceiling heights
 - for two-storey units with a two storey void space, 2.4 metre minimum ceiling heights
 - attic spaces, 1.5 metre minimum wall height at edge of room with a 30 degree minimum ceiling slope.
- Developments which seek to vary the recommended ceiling heights must demonstrate that apartments will receive satisfactory daylight (eg. shallow apartments with large amount of window area).



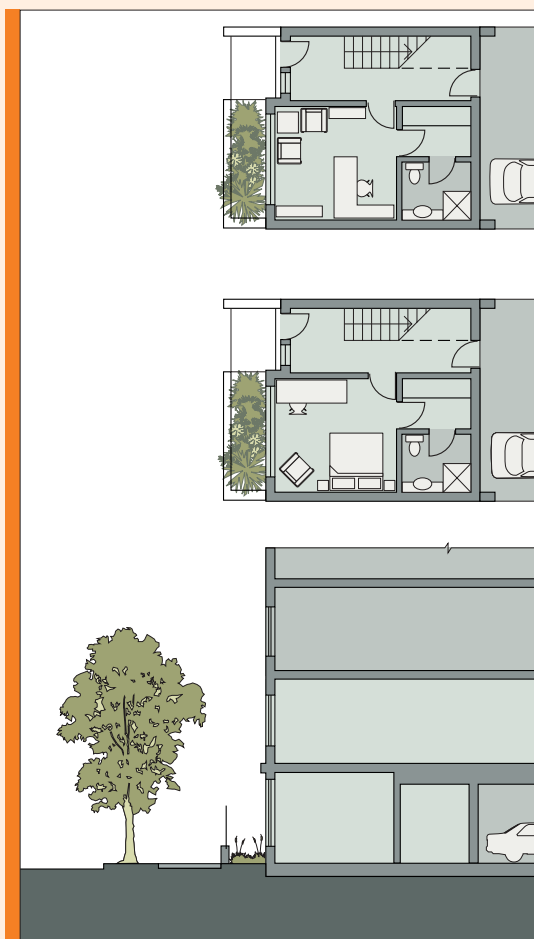
.Building Configuration

.Flexibility

Flexible flat design ensures that buildings can accommodate a wider range of inhabitants and their changing lifestyle needs, such as:

- household structure changes; single, couple, family, extended family
- live/work housing arrangements
- changing mobility and access needs, including the elderly or young children in prams
- future changes in use; residential to commercial office.

Flexible design provides the potential for 'housing for life', increases the life span of buildings and exercises sustainable practice.



03.21. Locating a bedroom with an ensuite on the ground floor of this two storey apartment facilitates a variety of uses: small business, third bedroom, share housing for independent adults, or housing for an elderly parent.

Objectives

- To encourage housing designs which meet the broadest range of the occupants' needs possible.
- To promote 'long life loose fit' buildings, which can accommodate whole or partial changes of use.
- To encourage adaptive re-use.
- To save the embodied energy expended in building demolition.

Better Design Practice

- Provide robust building configurations, which utilise multiple entries and circulation cores, especially in larger buildings over 15 metres long
 - thin building cross sections, which are suitable for residential or commercial uses
 - a mix of apartment types (see Apartment Mix)
 - higher ceilings in particular on the ground floor and first floor (see Ceiling Heights)
 - separate entries for the ground floor level and the upper levels
 - sliding and/or movable wall systems.
- Provide apartment layouts, which accommodate the changing use of rooms. Design solutions may include:
 - windows in all habitable rooms and to the maximum number of non-habitable rooms
 - adequate room sizes or open-plan apartments, which provide a variety of furniture layout opportunities
 - dual master-bedroom apartments, which can support two independent adults living together or a live/work situation.
- Utilise structural systems, which support a degree of future change in building use or configuration. Design solutions may include:
 - a structural grid, which accommodates car parking dimensions, retail, commercial and residential uses vertically throughout the building
 - the alignment of structural walls, columns and services cores between floor levels
 - the minimisation of internal structural walls
 - higher floor to floor dimensions on the ground floor



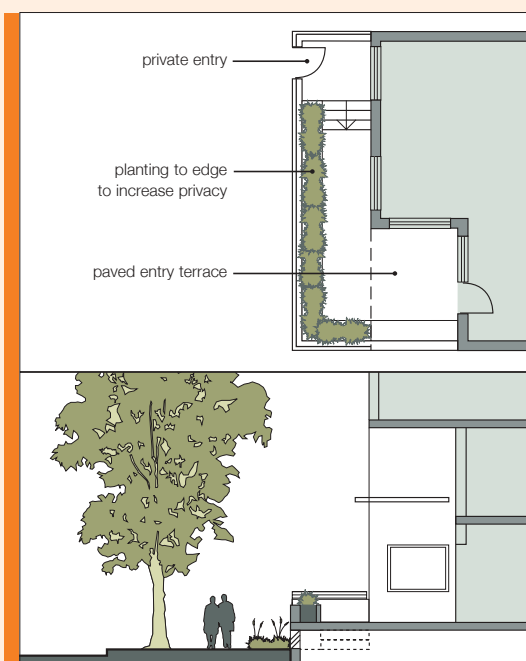
- and possibly the first floor
- knock-out panels between apartments to allow two adjacent apartments to be amalgamated.
- Promote accessibility and adaptability by ensuring:
 - the number of accessible and visitable apartments is optimised
 - adequate pedestrian mobility and access is provided (see Pedestrian Access).



.Building Configuration

.Ground Floor Apartments

Ground floor apartments are special because they offer the potential for direct access from the street and on-grade private landscape areas. They also provide opportunities for the apartment building and its landscape to respond to the streetscape and the public domain at the pedestrian scale. Ground floor apartments also support housing choice by providing accessibility to the elderly and/or disabled and support families with small children. Ground floor apartments extend the lifestyle choices available in apartment buildings by facilitating activities, such as gardening, play and pet ownership.



03.22. This private entry terrace is raised above ground to provide privacy and to facilitate car park ventilation. Planting along the terrace edge contributes to a quality streetscape.



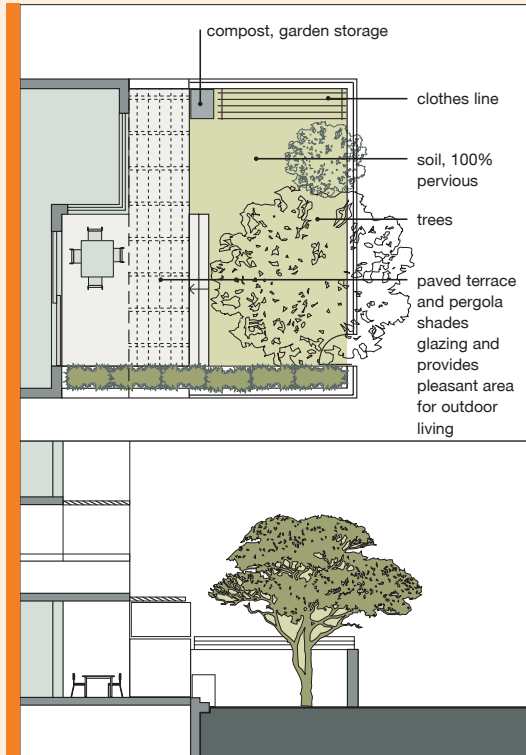
03.23. Street level metal picket fencing with planting provides screening to car park ventilation louvres.

Objectives

- To contribute to the desired streetscape of an area and to create active safe streets.
- To increase the housing and lifestyle choices available in apartment buildings.

Better Design Practice

- Design front gardens or terraces, which contribute to the spatial and visual structure of the street while maintaining adequate privacy for apartment occupants. This can be achieved by: animating the street edge, for example, by promoting individual entries for ground floor apartments. This creates more pedestrian activity along the street and articulates the street edge by:
 - balancing privacy requirements and pedestrian accessibility
 - providing appropriate fencing, lighting and/ or landscaping to meet privacy and safety requirements of occupants while contributing to a pleasant streetscape (see Fences + Walls, Landscape Design and Safety)
 - utilising a change in level from the street to the private garden or terrace to minimise site lines from the streets into the apartment for some apartments
 - increasing street surveillance with doors and windows facing onto the street.
- Ensure adequate privacy and safety of ground floor units located in urban areas with no street setbacks by:
 - stepping up the ground floor from the level of the footpath a maximum of 1.2 metres (see Fences + Walls for detail considerations)
 - designing balustrades and establishing window sill heights to minimise site lines into apartments, particularly in areas with no street setback
 - determining appropriateness of individual entries (see Building Entry, Safety)
 - ensuring safety bars or screens are integrated into the overall elevation design and detailing.
- Promote housing choice by:
 - providing private gardens, which are directly accessible from the main living spaces of the apartment and support a variety of activities
 - maximising the number of accessible and visitable



03.24. Well landscaped private courtyards extend the liveable space of the apartment and provide a variety of paved and soft landscaped areas. Utility functions, such as clothes drying, are also provided.



03.25. Planting along fences visually screens private terraces from the carpark.

apartments on the ground floor

- supporting a change or partial change in use, such as a home office accessible from the street or a corner shop (see Mixed Use, Flexibility and Ceiling Heights).

- Increase opportunities for solar access in ground floor units, particularly in denser areas by:
 - providing higher ceilings and taller windows (see Ceiling Heights)
 - choosing trees and shrubs which provide solar access in winter and shade in summer (see Landscape Design).

✓ Rules of Thumb

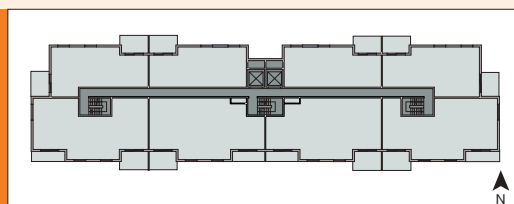
- Optimise the number of ground floor apartments with separate entries and consider requiring an appropriate percentage of accessible units. This relates to the desired streetscape and topography of the site.
- Provide ground floor apartments with access to private open space, preferably as a terrace or garden.



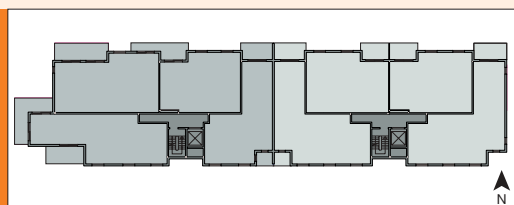
.Building Configuration

.Internal Circulation

Lobbies, stairs, lifts and corridors make up the common circulation spaces within a building. Important design considerations include safety, amenity and durability. In addition, the location, proportion, extent and frequency of these elements have a direct relationship with the building's form, layout and articulation.



03.26. Conventional practice locates single aspect units along a double loaded corridor.



03.27. Better practice uses multiple cores to support more dual aspect apartments with better daylight access and cross ventilation.



03.28. The use of multiple lift and stair cores promotes more entries along a street and articulates a long building facade.

Objectives

- To create safe and pleasant spaces for the circulation of people and their personal possessions.
- To facilitate quality apartment layouts, such as dual aspect apartments.
- To contribute positively to the form and articulation of the building facade and its relationship to the urban environment.
- To encourage interaction and recognition between residents to contribute to a sense of community and improve perceptions of safety.

Better Design Practice

- Increase amenity and safety in circulation spaces by:
 - providing generous corridor widths and ceiling heights, particularly in lobbies, outside lifts and apartment entry doors
 - providing appropriate levels of lighting, including the use of natural daylight, where possible
 - minimising corridor lengths to give short, clear sight lines
 - avoiding tight corners
 - providing legible signage noting apartment numbers, common areas and general directional finding
 - providing adequate ventilation.
- Support better apartment building layouts by designing buildings with multiple cores which:
 - increase the number of entries along a street
 - increase the number of vertical circulation points
 - give more articulation to the facade
 - limiting the number of units off a circulation core on a single level.
- Articulate longer corridors. Design solutions may include:
 - utilising a series of foyer areas
 - providing windows along or at the end of a corridor.
- Minimise maintenance and maintain durability by using robust materials in common circulation areas. (See Building Entry, Natural Ventilation)



Rules of Thumb

- In general, where units are arranged off a double-loaded corridor, the number of units accessible from a single core/corridor should be limited to eight. Exceptions may be allowed:
 - for adaptive reuse buildings
 - where developments can demonstrate the achievement of the desired streetscape character and entry response
 - where developments can demonstrate a high level of amenity for common lobbies, corridors and units, (cross over, dual aspect apartments).



.Building Configuration

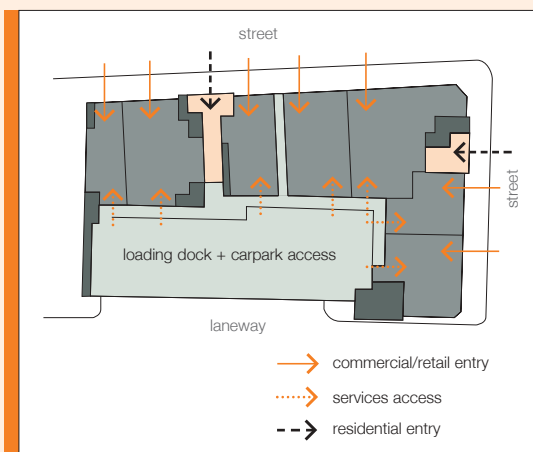
.Mixed Use

Mixed use development promotes a finer grain mix of uses within urban areas and challenges previous planning practices, which segregated land into individual uses. These developments integrate uses either horizontally with different uses adjacent to each other or, more commonly in residential flat buildings, vertically with different uses stacked within the same building.

Mixed use development is best located in higher density urban areas, local centres or in mini-centres within larger residential areas.



03.29. This mixed use development provides continuous retail and commercial uses along the street front.



03.30. The organisation of the ground floor clearly distinguishes between residential entries, shop front entries and service entries off the loading area to the rear.

Objectives

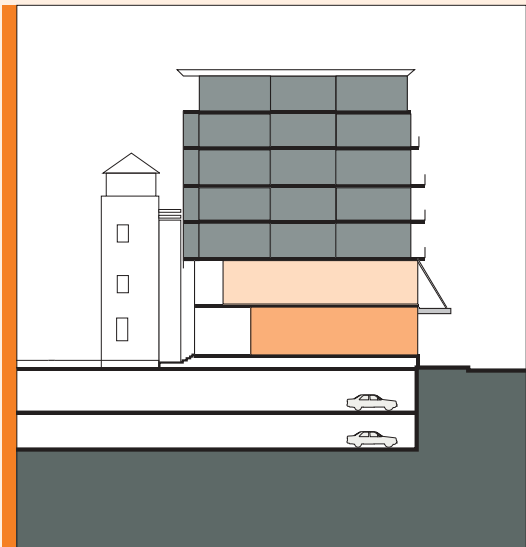
- To support the integration of appropriate retail and commercial uses with housing.
- To create more active lively streets and urban areas, which encourage pedestrian movement, service the needs of the residents and increase the area's employment base.
- To ensure that the design of mixed use developments maintains residential amenities and preserves compatibility between uses.

Better Design Practice

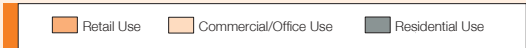
- Choose a mix of uses that complement and reinforce the character, economics and function of the local area.
- Choose a compatible mix of uses, for example, food retail, small-scale commercial and residential is a better mix than car repair and residential.
- Consider building depth and form in relation to each use's requirements for servicing and amenity. The compatibility of various uses can be addressed by utilising:
 - flexible building layouts, which promote variable tenancies or uses (see Flexibility)
 - optimal floor to ceiling heights, for example, 3.3 metres for commercial office or 3.3 to 4 metres for active public uses, such as retail and restaurants (see Ceiling Heights)
 - optimal building depths, such as 10-18 metres for residential and smaller commercial uses
 - extra care where larger footprint commercial spaces- cinemas, supermarkets, department stores-are integrated with residential uses.
- Design legible circulation systems, which ensure the safety of users by:
 - isolating commercial service requirements, such as loading docks, from residential access, servicing needs and primary outlook
 - locating clearly demarcated residential entries directly from the public street
 - clearly distinguishing commercial and residential entries and vertical access points. The coming and going of strangers can lead to security issues, especially for the residential component



03.31. This mixed use development has a supermarket on the ground floor with residential above. Many of the apartments have recessed balconies to improve privacy.



03.32. This section shows how commercial on the second floor provides an additional acoustic buffer for apartments from noisier uses on the ground floor retail level.



- providing security entries to all entrances into private areas, including car parks and internal courtyards
- providing safe pedestrian routes through the site, where required.
- Ensure the building positively contributes to the public domain and streetscape by:
 - fronting onto major streets with active uses
 - avoiding the use of blank walls at the ground level.
- Address acoustic requirements for each use by:
 - separate residential uses, where possible, from ground floor leisure or retail uses by utilising an intermediate quiet-use barrier, such as offices
 - design for acoustic privacy from the beginning of the project to ensure that future services, such as air conditioning, do not cause acoustic problems later.
- Recognising the ownership/lease patterns and separating requirements for purposes of BCA for considerations.

References:

Mixed Use in Urban Centres: Guidelines for Mixed Use Development, Department of Urban Affairs and Planning, 2000.



.Building Configuration

.Storage

Providing storage space for items ancillary to people's living needs is particularly important in residential developments where the size of dwellings and their configuration are constrained. Storage is conventionally calculated on an apartment by apartment basis, proportional to the size of the apartment.

Objectives

- To provide adequate storage for everyday household items within easy access of the apartment.
- To provide storage for sporting, leisure, fitness and hobby equipment.

Better Design Practice

- Locate storage conveniently for apartments. Options include providing:
 - at least 50 percent of the required storage within each apartment and accessible from either the hall or living area. Storage within apartments is best provided as cupboards accessible from entries and hallways and/or from under internal stairs
 - dedicated storage rooms on each floor within the development, which can be leased by residents as required
 - providing dedicated and/or leasable storage in internal or basement car parks. Leasing storage provides choice and minimises the impact of storage on housing affordability.
- Provide storage, which is suitable for the needs of residents in the local area and able to accommodate larger items, such as:
 - sporting equipment (skiing, surfing, golfing etc)
 - bicycles.
- Ensure that storage separated from apartments is secure for individual use.
- Where basement storage is provided:
 - ensure that it does not compromise natural ventilation in car parks or create potential conflicts with fire regulations
 - exclude it from FSR calculations.
- Consider providing additional storage in smaller apartments in the form of built-in cupboards to promote a more efficient use of small spaces.

✓ Rules of Thumb

- In addition to kitchen cupboards and bedroom wardrobes, provide accessible storage facilities at the following rates:

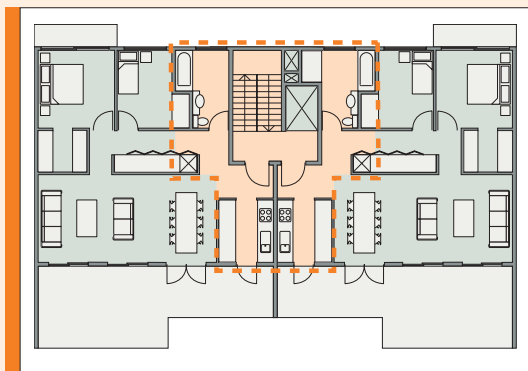
- studio apartments	6m ³
- one-bedroom apartments	6m ³
- two-bedroom apartments	8m ³
- three plus bedroom apartments	10m ³



.Building Amenity

.Acoustic Privacy

Acoustic privacy is a measure of sound insulation between apartments and between external and internal spaces. Designing for acoustic privacy relates to the location and separation of buildings within a development and the arrangement of apartments and internal spaces within apartments.



03.33. This typical apartment floor plan locates living spaces away from noise sources, such as the lift and stairs. Quiet bedrooms are also located separate from main living areas.

Objectives

- To ensure a high level of amenity by protecting the privacy of residents within residential flat buildings both within the apartments and in private open spaces.

Better Design Practice

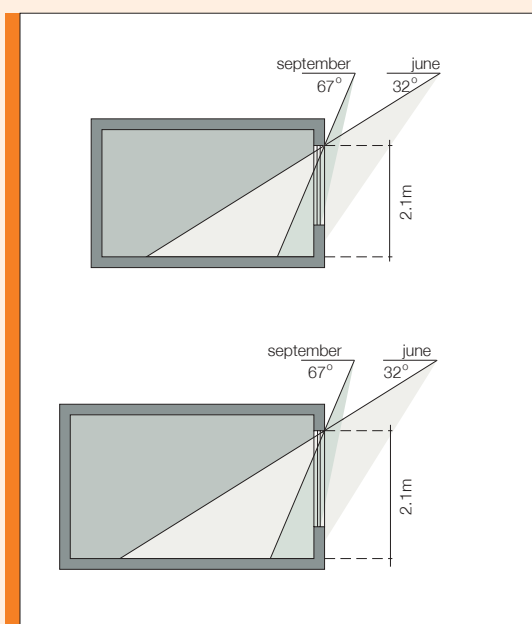
- Utilise the site and building layout to maximise the potential for acoustic privacy by providing adequate building separation within the development and from neighbouring buildings.
- Arrange apartments within a development to minimise noise transition between flats by:
 - locating busy, noisy areas next to each other and quieter areas next to other quiet areas, for example, living rooms with living rooms, bedrooms with bedrooms
 - using storage or circulation zones within an apartment to buffer noise from adjacent apartments, mechanical services or corridors and lobby areas
 - minimising the amount of party (shared) walls with other apartments.
- Design the internal apartment layout to separate noisier spaces from quieter spaces by:
 - grouping uses within an apartment-bedrooms with bedrooms and service areas like kitchen, bathroom, laundry together.
- Resolve conflicts between noise, outlook and views by using design measures including:
 - double glazing
 - operable screened balconies
 - continuous walls to ground level courtyards where they do not conflict with streetscape or other amenity requirements.
- Reduce noise transmission from common corridors or outside the building by providing seals at entry doors.



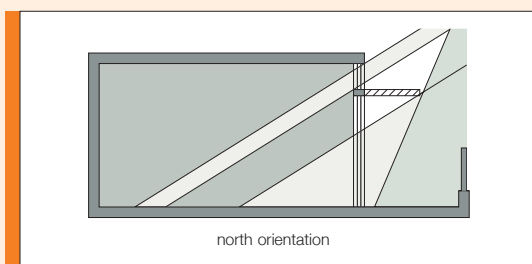
.Building Amenity

.Daylight Access

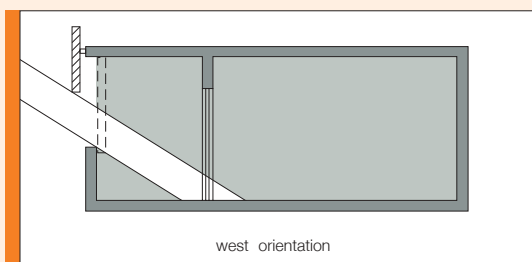
Daylight consists of skylight - diffuse light from the sky - and sunlight - direct beam radiation from the sun. It changes with the time of day, season, and weather conditions. This variability contributes to pleasant environments in which to live and work. Within an apartment, daylighting reduces reliance on artificial light, improving energy efficiency and residential amenity.



03.34. Higher ceilings and higher window heads allow deeper sunlight penetration.



03.35. On north facing windows, projecting horizontal louvers admit winter sun while shading summer sun.



03.36. On west facing windows, vertical louvre panels or sliding screens protect from glare and low afternoon sun.

Objectives

- To ensure that daylight access is provided to all habitable rooms and encouraged in all other areas of residential flat development.
- To provide adequate ambient lighting and minimise the need for artificial lighting during daylight hours.
- To provide residents with the ability to adjust the quantity of daylight to suit their needs.

Better Design Practice

- Plan the site so that new residential flat development is oriented to optimise northern aspect.
- Ensure direct daylight access to communal open space between March and September and provide appropriate shading in summer (see Open Space and Landscape Design).
- Optimise the number of apartments receiving daylight access to habitable rooms and principal windows:
 - ensure daylight access to habitable rooms and private open space, particularly in winter
 - use skylights, clerestory windows and fanlights to supplement daylight access
 - promote two-storey and mezzanine, ground floor apartments or locations where daylight is limited to facilitate daylight access to living rooms and private open spaces
 - limit the depth of single aspect apartments
 - ensure single aspect, single-storey apartments have a northerly or easterly aspect
 - locate living areas to the north and service areas to the south and west of the development
 - limit the number of south-facing apartments and increase their window area
 - use light shelves to reflect light into deeper apartments.
- Design for shading and glare control, particularly in summer:
 - using shading devices, such as eaves, awnings, colonnades, balconies, pergolas, external louvres and planting
 - optimising the number of north-facing living spaces
 - providing external horizontal shading to north-facing windows
 - providing vertical shading to east or west windows

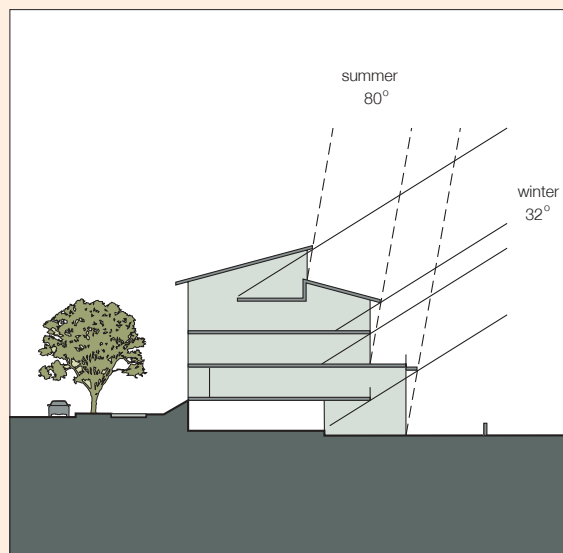


03.37. A combination of louvres provide shading for different times of the day.

- using high performance glass but minimising external glare off windows:
 - avoid reflective films
 - use a glass reflectance below 20 percent
 - consider reduced tint glass.
- Limit the use of lightwells as a source of daylight by prohibiting their use as the primary source of daylight in habitable rooms. Where they are used:
 - relate lightwell dimensions to building separation, for example, if non-habitable rooms face into a light well under 12 metres high, the lightwell should measure 6 x 6 metres. Where smaller dimensions are proposed, satisfactory acoustic privacy, visual privacy and daylight access must be demonstrated. (see Building Separation)
 - conceal building services and provide appropriate detail and materials to visible walls
 - ensure lightwells are fully open to the sky
 - allow exceptions for adaptive reuse buildings, if satisfactory performance is demonstrated.



03.38. Sun shading is an integral component of the building form and facade design.



03.39. Double height apartments on the ground floor and on the top floors facilitate better daylight access.

✓ Rules of Thumb

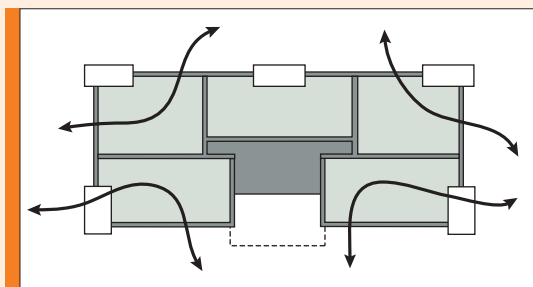
- Living rooms and private open spaces for at least 70 percent of apartments in a development should receive a minimum of three hours direct sunlight between 9 am and 3 pm in mid winter. In dense urban areas a minimum of two hours may be acceptable.
- Limit the number of single-aspect apartments with a southerly aspect (SW-SE) to a maximum of 10 percent of the total units proposed. Developments which seek to vary from the minimum standards must demonstrate how site constraints and orientation prohibit the achievement of these standards and how energy efficiency is addressed (see Orientation and Energy Efficiency).
- See Apartment Layout for additional rules of thumb.



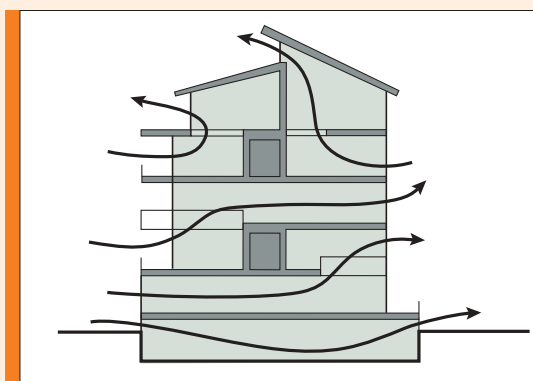
Building Amenity

Natural Ventilation

Natural ventilation is the circulation of sufficient volumes of fresh air through an apartment to create a comfortable indoor environment. Designing for natural ventilation exercises sustainable practice by responding to the local climate and by reducing or eliminating the need for mechanical ventilation. To achieve natural ventilation the design concept must address the building's orientation, the apartment's configuration and the external building envelope.



03.40. Corner apartments can achieve effective natural ventilation.



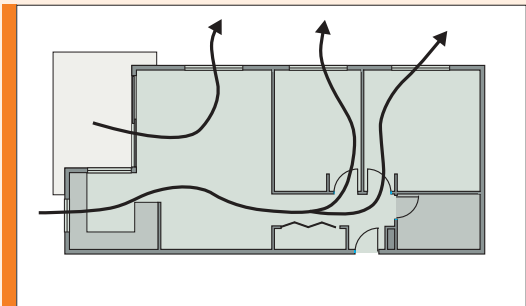
03.41. Good cross ventilation can be achieved with cross over apartments, maisonette apartments and semi-basement car parks.

Objectives

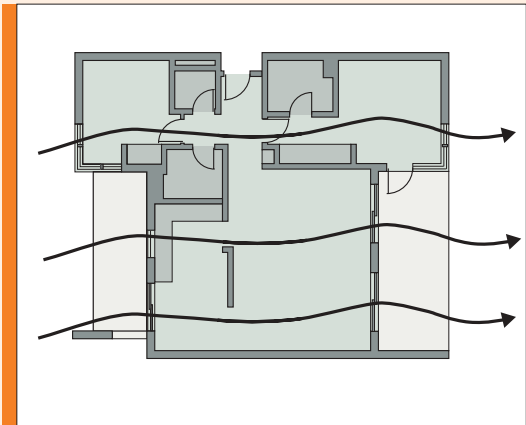
- To ensure that apartments are designed to provide all habitable rooms with direct access to fresh air and to assist in promoting thermal comfort for occupants.
- To provide natural ventilation in non-habitable rooms, where possible.
- To reduce energy consumption by minimising the use of mechanical ventilation, particularly air conditioning.

Better Design Practice

- Plan the site to promote and guide natural breezes by:
 - determining prevailing breezes and orient buildings to maximise use, where possible (see Orientation)
 - locating vegetation to direct breezes and cool air as it flows across the site and by selecting planting or trees that do not inhibit airflow.
- Utilise the building layout and section to increase the potential for natural ventilation. Design solutions may include:
 - facilitating cross ventilation by designing narrow building depths and providing dual aspect apartments, for example, cross through apartments and corner apartments.
 - facilitating convective currents by designing units which draw cool air in at lower levels and allow warm air to escape at higher levels, for example, maisonette apartments and two-storey apartments.
 - consider alternative solutions for cross ventilating single aspect apartments.
- Design the internal apartment layout to promote natural ventilation by:
 - minimising interruptions in air flow through an apartment. The more corners or rooms airflow must negotiate, the less effective the natural ventilation
 - grouping rooms with similar usage together, for example, keeping living spaces together and sleeping spaces together. This allows the apartment to be compartmentalised for efficient summer cooling or winter heating (see Energy Efficiency).
- Select doors and operable windows to maximise natural ventilation opportunities established by the apartment layout. Design solutions may include:
 - locating small windows on the windward side and larger windows on the leeward side of the building thereby utilising air pressure to draw air through the apartment



03.42. Natural ventilation in this corner apartment is drawn through windows having different orientation. This layout works well in upper floor apartments.



03.43. This optimal layout allows air flow directly from one side of the apartment to the other.

- using higher level casement or sash windows, clerestory windows or operable fanlight windows- including above internal doors - to facilitate convective currents. This is particularly important in apartments with only one aspect
- selecting windows which the occupants can reconfigure to funnel breezes into the apartment, such as vertical louvred, casement windows and externally opening doors.
- Coordinate design for natural ventilation with passive solar design techniques (see Energy Efficiency).
- Explore innovative technologies to naturally ventilate internal building areas or rooms - such as bathrooms, laundries and underground car parks - using stack effect ventilation or solar chimneys, for example.

✓

Rules of Thumb

- Building depths, which support natural ventilation typically range from 10 to 18 metres.
- Sixty percent (60%) of residential units should be naturally cross ventilated.
- Twenty five percent (25%) of kitchens within a development should have access to natural ventilation.
- Developments, which seek to vary from the minimum standards, must demonstrate how natural ventilation can be satisfactorily achieved, particularly in relation to habitable rooms.



.Building Form

.Awnings + Signage

Awnings increase the useability and amenity of public footpaths by protecting pedestrians from sun and rain. They encourage pedestrian activity along streets and, in conjunction with active edges such as retail frontages, support and enhance the vitality of the local area. Awnings, like building entries, provide a public presence and interface within the public domain thereby contributing to the identity of a development.

Signage is an important consideration in the design of residential flat buildings located in mixed use areas. Where signage is required for business identification its design should be compatible with the desired streetscape character, with the scale and proportions of the development and without obscuring or dominating important views.



03.44. Solid awnings provide shade as well as rain protection and protect window displays from harsh light and heat.



03.45. Signage contributes to the building's image from a distance.



03.46. Signage gives identity to the entry and legibility for visitors.

Objectives

- To provide shelter for public streets.
- To ensure signage is in keeping with desired streetscape character and with the development in scale, detail and overall design.

Better Design Practice

Awnings

- Encourage pedestrian activity on streets by providing awnings to retail strips, where appropriate, which:
 - give continuous cover in areas which have a desired pattern of continuous awnings
 - complement the height, depth and form of the desired character or existing pattern of awnings
 - provide sufficient protection for sun and rain.
- Contribute to the legibility of the residential flat development and amenity of the public domain by locating local awnings over building entries.
- Enhance safety for pedestrians by providing under-awning lighting.

Signage

- Councils should prepare guidelines for signage based on the desired character and scale of the local area. Considerations include:
 - special character areas, for example, heritage, natural or conservation areas
 - views and vistas, for example, skyline and views
 - streetscape and landscape, for example, scale of built form, tree canopies, street furniture and details.
- Integrate signage with the design of the development by responding to scale, proportions and architectural detailing.
- Provide clear and legible way finding for residents and visitors.

References

State Environmental Planning Policy No 64 (SEPP 64) - Advertising and Signage



.Building Form

.Facades

Facades are the external face of buildings in the public realm and within a site. Their architectural quality contributes to the character and design of the public domain. High architectural quality requires the appropriate composition of building elements, textures, materials and colours and reflects the use, internal design and structure of a development.

The composition and detailing of the building facade has an impact on its apparent scale as well as its appearance. The pattern or rhythm established by the proportions of the facade, the modulation of the external walls, the design of facade elements, their materials and their detailing are all important considerations.



03.47. This facade balances strong horizontal and vertical framing elements with sunscreen and balustrade infill components.



03.48. The more traditional design of this elevation uses a variety of repeated forms and a restrained material palette.



03.49. This elevation defines a distinct top, middle and base, utilising materials sympathetic to the local context.

Objectives

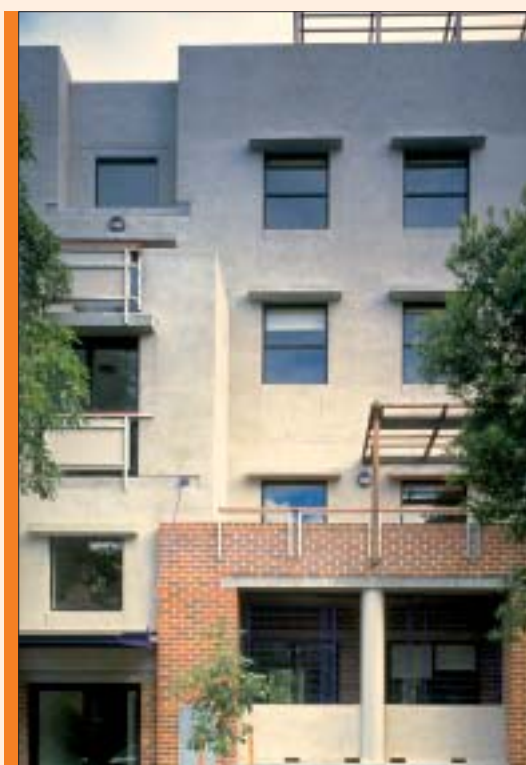
- To promote high architectural quality in residential flat buildings.
- To ensure that new developments have facades which define and enhance the public domain and desired street character.
- To ensure that building elements are integrated into the overall building form and facade design.

Better Design Practice

- Consider the relationship between the whole building form and the facade and/or building elements. The number and distribution of elements across a facade determine simplicity or complexity. Columns, beams, floor slabs, balconies, window openings and fenestrations, doors, balustrades, roof forms and parapets are elements, which can be revealed or concealed and organised into simple or complex patterns.
- Compose facades with an appropriate scale, rhythm and proportion, which respond to the building's use and the desired contextual character. Design solutions may include but are not limited to:
 - defining a base, middle and top related to the overall proportion of the building
 - expressing key datum lines in the context using cornices, a change in materials or building set back
 - expressing the internal layout of the building, for example, vertical bays or its structure, such as party wall-divisions
 - expressing the variation in floor to floor height, particularly at the lower levels
 - articulating building entries with awnings, porticos, recesses, blade walls and projecting bays
 - selecting balcony types which respond to the street context, building orientation and residential amenity: cantilevered, partially recessed, wholly recessed, or Juliet balconies will all create different facade profiles
 - detailing balustrades to reflect the type and location of the balcony and its relationship to the facade detail and materials



03.50. Use of varying facade alignments and sunscreens articulate the taller mass of this building.



03.51. This building facade is ordered using rectilinear elements, clearly defined volumes and a change of materials.

- using a variety of window types to create a rhythm or express the building uses, for example, a living room versus a bathroom
- incorporating architectural features which give human scale to the design of the building at street level. These can include entrance porches, awnings, colonnades, pergolas and fences
- using recessed balconies and deep windows to create articulation and define shadows thereby adding visual depth to the facade.
- Design facades to reflect the orientation of the site using elements such as sun shading, light shelves and bay windows as environmental controls, depending on the facade orientation.
- Express important corners by giving visual prominence to parts of the facade, for example, a change in building articulation, material or colour, roof expression or increased height.
- Coordinate and integrate building services, such as drainage pipes, with overall facade and balcony design.
- Coordinate security grills/screens, ventilation louvres and carpark entry doors with the overall facade design (see Parking).

Reference

Residential Flat Design Pattern Book



.Building Form

.Roof Design

The roof is an important architectural element for the overall composition and expression of a building. The shape and form of a roof and its associated elements responds to the environment and the context. Quality roof design responds to various viewpoints within the local context, such as the roofscape observed from adjacent taller buildings and the silhouette viewed from the street below. In some areas the roof forms part of a distant view and sits within a larger skyline.



03.52. This roofscape design subdivides the appearance of a large building into multiple volumes sympathetic to the existing neighbourhood.



03.53. The roofline is punctuated by maisonette apartments, which rise above the dominant horizontality of the building.



03.54. A variety of roof forms, pitched roofs with dormers and towers are used to reflect roof forms of the surrounding urban context. Service plantrooms are well concealed.

Objectives

- To provide quality roof designs, which contribute to the overall design and performance of residential flat buildings.
- To integrate the design of the roof into the overall facade, building composition and desired contextual response.
- To increase the longevity of the building through weather protection.

Better Design Practice

- Relate roof design to the desired built form. Some design solutions may include:
 - articulating the roof, or breaking down its massing on large buildings, to minimise the apparent bulk or to relate to a context of smaller building forms
 - using a similar roof pitch or material to adjacent buildings, particularly in existing special character areas or heritage conservation areas. Avoid directly copying the elements and detail of single family houses in larger flat buildings; this often results in inappropriate proportion, scale and detail for residential flat buildings
 - minimising the expression of roof forms gives prominence to a strong horizontal datum in the adjacent context, such as an existing parapet line
 - using special roof features, which relate to the desired character of an area, to express important corners.
- Design the roof to relate to the size and scale of the building, the building elevations and three dimensional building form. This includes the design of any parapet or terminating elements and the selection of roof materials.
- Design roofs to respond to the orientation of the site, for example, by using eaves and skillion roofs to respond to sun access.
- Minimise the visual intrusiveness of service elements by integrating them into the design of the roof. These elements include lift over-runs, service plants, chimneys, vent stacks, telecommunication infrastructures, gutters, downpipes and signage.
- Support the use of roofs for quality open space in denser urban areas by
 - providing space and appropriate building systems to support the desired landscape design (see Landscape Design and Open Space)



03.55. This contemporary interpretation of an attic contributes to a dynamic night time roofscape.

- incorporating shade structures and wind screens to encourage open space use
- ensuring open space is accessible.
- Facilitate the use or future use of the roof for sustainable functions, for example:
 - allow rainwater tanks for water conservation
 - orient and angle roof surfaces suitable for photovoltaic applications
 - allow for future innovative design solutions, such as water features or green roofs.
- Where habitable space is provided within the roof optimise residential amenity in the form of attics or penthouse apartments (see Ceiling Heights).

Reference

Residential Flat Design Pattern Book



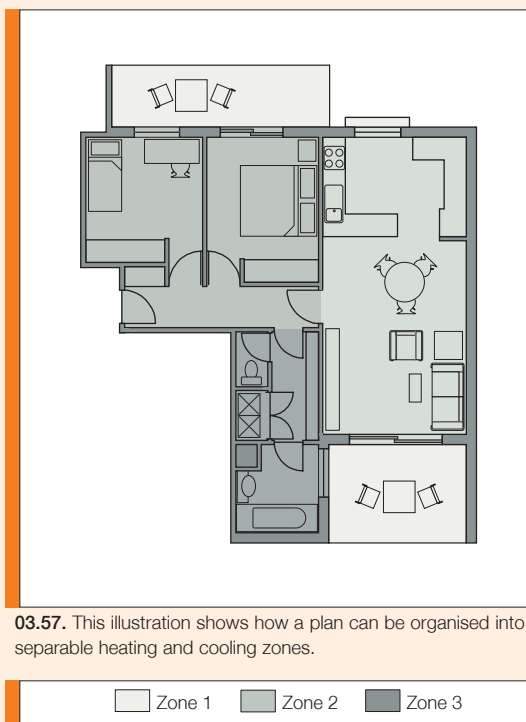
03.56. The feature roof line of this building gives the building a strong identity.



.Building Performance

.Energy Efficiency

The ability of the residential flat development to optimise thermal performance, thermal comfort and daylighting will contribute to the energy efficiency of buildings, provide increased amenity to occupants and reduce greenhouse emissions and, with them, the cost of supplying energy.



Objectives

- To reduce the necessity for mechanical heating and cooling.
- To reduce reliance on fossil fuels.
- To minimise greenhouse gas emissions.
- To support and promote renewable energy initiatives.

Better Design Practice

- Incorporate passive solar design techniques to optimise heat storage in winter and heat transfer in summer by:
 - maximising thermal mass in floor and walls in northern rooms of dwelling/building
 - polishing concrete floors and/or using tiles or timber floors rather than carpets
 - limiting the number of single aspect apartments with a southerly aspect (SW-SE) to a maximum of 10 percent of the total units proposed
 - insulating roof/ceiling to R2.0, external walls to R1.0 and the floor - including separation from basement car parking - to R1.0.
- Improve the control of mechanical space heating and cooling by:
 - designing heating/cooling systems to target only those spaces which require heating or cooling, not the whole apartment
 - designing apartments so that entries open into lobbies or vestibules and are isolated from living areas by doorways
 - allowing for adjustable awnings and blinds to be attached to the outside of windows to keep the heat out in summer
 - providing gas bayonets to living areas, where gas is available
 - providing reversible ceiling fans for improving air movement in summer and for distributing heated air in winter.
- Provide or plan for future installation of photovoltaic panels by:
 - designing the roof so that photovoltaic panels can be mounted parallel to the roof plane
 - locating trees where they will not shade existing or planned photovoltaic installations.
- Improve the efficiency of hot water systems by

- insulating a hot water system or systems with a Greenhouse Score of 3.5 or greater and which suits the needs of the development and/or individual dwellings
- installing water-saving devices, such as flow regulators, AAA rated shower heads, dual flush toilets and tap aerators.
- Reduce reliance on artificial lighting by:
 - providing a mix of lighting fixtures, including dimmable lighting, to provide for a range of activities in different rooms
 - designing to allow for different possibilities for lighting the room, for example, low background lighting supplemented by task or effect lighting for use as required
 - using separate switches for special purpose lighting
 - using high efficiency lighting, such as compact fluorescent, for common areas
 - using motion detectors for common areas, lighting doorways and entrances, outdoor security lighting and car parks.
- Maximise the efficiency of household appliances by:
 - selecting an energy source with minimum greenhouse emissions
 - installing high efficiency refrigerators/freezers, clothes washers and dishwashers
 - providing areas for clothes to be dried through natural ventilation.
- See Daylight Access and Natural Ventilation for additional energy efficiency information.



.Building Performance

.Maintenance

Detailed design and material selection support long-term maintenance of residential flat development. On-going maintenance ensures the longevity of quality architectural and landscape design, sustains and increases the value of property and minimises the life-cycle cost of a development to owners.

Objective

- To ensure long life and ease of maintenance for the development.

Better Design Practice

- Design windows to enable cleaning from inside the building, where possible.
- Select manually operated systems, such as blinds, sunshades, pergolas and curtains in preference to mechanical systems.
- Incorporate and integrate building maintenance systems into the design of the building form, roof and facade.
- Select durable materials, which are easily cleaned and are graffiti resistant.
- Select appropriate landscape elements and vegetation and provide appropriate irrigation systems (see Landscape Design).
- For developments with communal open space, provide a garden maintenance and storage area, which is efficient and convenient to use and is connected to water and drainage.





.Building Performance

.Waste Management

The minimisation and management of waste from residential flat development can contribute to the visual and physical amenity of the building as well as limiting potentially harmful impacts on the environment. Minimising waste is relevant to all stages of the building's life cycle, from construction to demolition. It also includes the way in which waste is stored and collected.

Objectives

- To avoid the generation of waste through design, material selection and building practices.
- To plan for the types, amount and disposal of waste to be generated during demolition, excavation and construction of the development.
- To encourage waste minimisation, including source separation, reuse and recycling.
- To ensure efficient storage and collection of waste and quality design of facilities.

Better Design Practice

- Incorporate existing built elements into new work, where possible.
- Recycle and reuse demolished materials, where possible.
- Specify building materials that can be reused and recycled at the end of their life.
- Integrate waste management processes into all stages of the project, including the design stage.
- Support waste management during the design stage by:
 - specifying modestly for the project needs
 - reducing waste by utilising the standard product/component sizes of the materials to be used
 - incorporating durability, adaptability and ease of future services upgrades.
- Prepare a waste management plan for green and putrescible waste, garbage, glass, containers and paper.
- Locate storage areas for rubbish bins away from the front of the development where they have a significant negative impact on the streetscape, on the visual presentation of the building entry and on the amenity of residents, building users and pedestrians.
- Provide every dwelling with a waste cupboard or temporary storage area of sufficient size to hold a single day's waste and to enable source separation.
- Incorporate on-site composting, where possible, in self contained composting units on balconies or as part of the shared site facilities.

References

Waste Planning in Multi-Unit dwellings: Best Practice Design Guidelines, 'Inner Sydney Waste Board'.



Rules of Thumb

- Supply waste management plans as part of the development application submission as per the NSW Waste Board.



.Building Performance

.Water Conservation

Water is our most precious resource. Residential flat design can contribute to environmental sustainability by integrating measures for improved water efficiency. Water can be conserved in two ways:

1. by reducing water demand from the mains
2. by re-using water which would otherwise be lost as run off or waste water.

Objectives

- To reduce mains consumption of potable water.
- To reduce the quantity of urban stormwater run off.

Better Design Practice

- Use AAA rated appliances to minimise water use.
- Encourage the use of rainwater tanks.
- Collect, store and use rainwater on site. This may be used for car washing, watering the garden, toilet flushing, laundry and clothes washing. Once treated, rainwater can also be used for potable supply.
- Incorporate local indigenous native vegetation in landscape design (see Landscape Design).
- Consider grey water recycling.

References

AS/NZS 3500 1.2: Water Supply - Acceptable Solutions provides guidance for the design of rainwater tanks with dual water supply systems.

NSW Dept. of Health: Guidance on the use of rainwater tanks.

NSW Code of Practice: Plumbing and Drainage.

Committee on uniformity of Plumbing and Drainage Regulations in NSW, 1999.



Rules of Thumb

- Rainwater is not to be collected from roofs coated with lead- or bitumen-based paints, or from asbestos-cement roofs. Normal guttering is sufficient for water collections provided that it is kept clear of leaves and debris.



.Appendices

Appendix 1: SEPP 65 Design Quality Principles

Introduction to the principles

Good design is a creative process which, when applied to towns and cities, results in the development of great urban places: buildings, streets, squares and parks. Good design is inextricably linked to its site and locality, responding to the landscape, existing built form, culture and attitudes. It provides sustainable living environments, both in private and public areas. Good design serves the public interest and includes appropriate innovation to respond to technical, social, aesthetic, economic and environmental challenges. The design quality principles do not generate design solutions, but provide a guide to achieving good design and the means of evaluating the merit of proposed solutions.

Principle 1: Context

Good design responds and contributes to its context. Context can be defined as the key natural and built features of an area. Responding to context involves identifying the desirable elements of a location's current character or, in the case of precincts undergoing a transition, the desired future character as stated in planning and design policies. New buildings will thereby contribute to the quality and identity of the area.

Principle 2: Scale

Good design provides an appropriate scale in terms of the bulk and height that suits the scale of the street and the surrounding buildings. Establishing an appropriate scale requires a considered response to the scale of existing development. In precincts undergoing a transition, proposed bulk and height needs to achieve the scale identified for the desired future character of the area.

Principle 3: Built form

Good design achieves an appropriate built form for a site and the building's purpose, in terms of building alignments, proportions, building type 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.

Principle 4: Density

Good design has a density appropriate for a site and its context, in terms of floor space yields (or number of units or residents). Appropriate densities are sustainable and consistent with the existing density in an area or, in precincts undergoing a transition, are consistent with the stated desired future density. Sustainable densities respond to the regional context, availability of infrastructure, public transport, community facilities and environmental quality.

Principle 5: Resource, energy and water efficiency

Good design makes efficient use of natural resources, energy and water throughout its full life cycle, including construction. Sustainability is integral to the design process. Aspects include demolition of existing structures, recycling of materials, selection of appropriate and sustainable materials, adaptability and reuse of buildings, layouts and built form, passive solar design principles, efficient appliances and mechanical services, soil zones for vegetation and reuse of water.

Principle 6: Landscape

Good design recognises that together landscape and buildings operate as an integrated and sustainable system, resulting in greater aesthetic quality and amenity for both occupants and the adjoining public domain. Landscape design builds on the existing site's natural and cultural features in responsible and creative ways. It enhances the development's natural environmental performance by co-ordinating water and soil management, solar access, micro-climate, tree canopy and habitat values. It contributes to the positive image and contextual fit of development through respect for streetscape and neighbourhood character, or desired future character. Landscape design should optimise useability, privacy and social opportunity, equitable access and respect for neighbours' amenity, and provide for practical establishment and long term management.

Principle 7: Amenity

Good design provides amenity through the physical, spatial and environmental quality of a development. Optimising amenity requires appropriate room dimensions and shapes, access to sunlight, natural ventilation, visual and acoustic privacy, storage, indoor and outdoor space, efficient layouts and service areas, outlook and ease of access for all age groups and degrees of mobility.

Principle 8: Safety and security

Good design optimises safety and security, both internal to the development and for the public domain. This is achieved by maximising overlooking of public and communal spaces while maintaining internal privacy, avoiding dark and non-visible areas, maximising activity on streets, providing clear, safe access points, providing quality public spaces that cater for desired recreational uses, providing lighting appropriate to the location and desired activities, and clear definition between public and private spaces.

Principle 9: Social dimensions

Good design responds to the social context and needs of the local community in terms of lifestyles, affordability, and access to social facilities. New developments should optimise the provision of housing to suit the social mix and needs in the neighbourhood or, in the case of precincts undergoing transition, provide for the desired future community.

Principle 10: Aesthetics

Quality aesthetics require the appropriate composition of building elements, textures, materials and colours and reflect the use, internal design and structure of the development. Aesthetics should respond to the environment and context, particularly to desirable elements of the existing streetscape or, in precincts undergoing transition, contribute to the desired future character of the area.

Appendix 2: Pre-Development Application Recommendations

Discussions with council are encouraged at an early stage in the development proposal process to discuss and agree the overall design approach before a detailed building design is developed. The intent is to have the locality analysis available so that parameters can be agreed rather than providing the analysis only at the development application stage thus saving time and costs associated with revisions and major modifications.

For pre-development application discussions, the proposal is usually in sketch form, showing the broad design strategies for the site layout and building mass and illustrating the design issues, such as the internal layout of the building, its adjoining private and public open spaces and the opportunities and constraints of the local context. Design options may be appropriate to illustrate a variety of solutions for discussion, particularly on large or difficult sites.

All plans, elevations and sections should be drawn to scale and include a graphic scale bar and true north point. Drawings may be in sketch form. Note: Some elements of these drawings may already be documented in the consent authority's design based development control plan. Councils should select the individual requirements appropriate to their areas and each development.

Scale Local

Submission -Local context sketch plan - 1:5000

Showing, where applicable:

- the site to be developed
- significant local features such as water courses, heritage items, buildings and construction areas
- existing buildings, shopping and employment areas
- traffic and road patterns, pedestrian routes and public transport nodes
- parks, community facilities and open space
- existing development controls

Purpose

To explain the site's development capacity by showing the relationship of the site to the surrounding area, e.g. how well it is serviced by public transport and the amount of accessible open space, etc. This will allow both the council and applicant to discuss the site constraints and opportunities in relation to proximity to transport and facilities, local open space, corrections to pedestrian networks, traffic issues etc.

Submission - Streetscape elevations - 1:200, 1:500

- photographs for at least 50m in both directions, or the adjacent three properties in both directions, whichever is the lesser
- for sites with multiple street addresses, photographs should be prepared for each separate address
- properties opposite the site should also be documented in the same manner

Purpose

Photographs or drawings of the nearby existing buildings helps in an appreciation of the existing scale of the area, the spacing of development and architectural character.

Submission - Aerial photograph -

1:1000 or 1:2000

Aerial photographs of site and context, preferably in colour.

Purpose

Aerial photographs help in understanding a site's position relative to the structure of the area as well as illustrating building footprints, vegetation, the grain of the area and extent of open space.

Scale Site

Submission - Existing site plan - 1:500

Drawings indicating:

- site boundaries
- spot levels and 1 metre contours
- existing significant vegetation, built and topographic features
- location and height of adjacent buildings, their window locations and private open space

Purpose

The site plan illustrates the detail of the existing site conditions including levels, buildings, vegetation and the sites relationship to adjoining buildings.

Submission - Analysis - 1:500

A drawn and written explanation of the local and site constraints and opportunities revealed through the above documentation.

Purpose

This explanation draws together both the context and site analysis to arrive at conclusions about what development options might be appropriate for the site and what essential relationships are required to respond to the existing context.

Submission - Sketch concept plan - 1:500

Showing:

- the indicative footprint of the proposal
- site entry points
- areas of communal open space, private open space
- indicative ground plane treatment, indicative locations of planting and deep soil zones
- any proposed site amalgamation or subdivision

Purpose

Indicative sketch showing the proposed development option or options and how it responds sensitively to the site context analysis e.g. location relative to existing buildings and retention of existing landscape, connection to existing street and pedestrian networks etc.

Scale Building

Submission - Building organisation sketch - 1:200 or 1:500

Showing:

- the general location and size of vertical and horizontal circulation of lifts
- communal facilities, servicing points
- indicative apartment location, size and orientation

Purpose

These drawings demonstrate how the interior of the building might be arranged indicatively. They illustrate how planning creates positive relationships for privacy, outlook etc.

Submission - Sketch building mass elevations - 1:500 or 1:200

Showing:

- the basic massing of the proposal in the context of the adjacent 3 properties, or for 50m in each direction, on each elevation. This drawing should show, in diagrammatic form
- the components of the elevations (base, middle, top; primary elements)
- building separation along the street
- the profile of any existing buildings

Purpose

Elevations illustrate the proposed massing relative to the site and surrounding typography, existing buildings and streetscape to determine the proposal is appropriate to its setting.

Submission - Sketch sections - 1:500 or 1:200

Showing:

- the proposal and adjacent buildings
- the relationship of the proposal to the ground plane, streets and open spaces.

Purpose

To determine how the proposal addresses:

- relationships between the building and the street at ground level
- building massing and separation relative to adjoining development
- likely areas for deep soil zones
- possible privacy issues

Submission - Image board

Images of precedents relevant to the proposal including:

- entry treatments
- materials
- design of balconies
- use of landscape
- courtyard spaces

Purpose

To indicate the proposed architectural quality and styling of the development prior to detailed design.

Submission - Schedule

Showing:
indicative FSR and number of apartments

Purpose

The schedule provides indicative FSR based on massing envelope and approximate number of apartments.

Submission - Brief statement

An explanation of the proposal in terms of the 10 design quality principles set out in Part 2 of State Environmental Planning Policy No. 65.

Purpose

To enable a preliminary assessment of the proposal against existing controls and SEPP 65.

.Appendix 3: Development Application Recommendations

State Environmental Planning Policy no. 65 (SEPP 65) lists additional recommendations for residential flat development applications. These recommendations supplement the consent authorities existing development application requirements. The following table elaborates on the SEPP recommendations and suggests more detailed and well-resolved drawings to facilitate better design practice. The majority of this information is likely to already be formulated following the previous development application requirements in Appendix 2.

All plans, elevations and sections should be drawn to scale and include a graphic scale bar and true north point.

Scale Local

<p>Submission - Local context sketch plan - 1:5000</p> <p>Showing where applicable:</p> <ul style="list-style-type: none">• the site to be developed• significant local features, parks and open space, heritage items and buildings• existing buildings on site• traffic and road patterns, pedestrian routes, bus stops and train stations• shopping and employment areas and community facilities• significant natural features and water courses, conservation areas, sensitive natural areas and their setbacks <p><i>Note: Some elements of this drawing may be documented in the consent authority's design based development control plan.</i></p>	<p>Purpose</p> <p>The local context plan helps to explain the site's development capacity by showing the relationship of the site to the surrounding area and by addressing issues, such as how well the site is serviced by public transport, the amount of accessible open space, etc.</p>
<p>Submission - Streetscape elevations</p> <ul style="list-style-type: none">• drawings or photomontage for at least 50m in both directions, or the adjacent three properties in both directions, whichever is the lesser• for sites with multiple street addresses, photographs should be prepared for each separate address• properties opposite the site should also be documented in the same manner	<p>Purpose</p> <p>The elevations should demonstrate that the proposal satisfies the desired future character of the area and where appropriate responds to:</p> <ul style="list-style-type: none">• the height and scale of existing buildings• important local features such as heritage and public buildings• the rhythm or pattern of buildings along the street and in relation to the street trees, fences and materials.
<p>Submission - Streetscape elevations</p> <p>Aerial photographs of site and context, preferably in colour.</p>	<p>Purpose</p> <p>The photograph illustrates the existing context, elevations and grain of the area and notes the proposed development's response to:</p> <ul style="list-style-type: none">• building types and subdivision pattern• vegetated corridors and significant landscape elements both on streets and in the private domain• the proportion of building to open space within lots.

Scale Site

Submission - Existing site plan - 1:500

Drawings indicating:

- site boundaries
- spot levels and 1 metre contours
- existing significant vegetation, built and landscape features
- location and height of adjacent buildings, their window locations and private open space

Submission - Existing site sections - 1:500 or 1:200

Drawings that:

- extend at least 50m beyond the site in 2 directions, or including the adjacent 3 properties in both directions
- are taken at 90 degrees and indicate building heights and existing vegetation.

Purpose

Plans and sections of the existing site illustrate the existing structure of the area for comparison with the development proposal. It aids the development assessment by showing existing:

- street width, height, and streetscape elements
- adjacent buildings (including setbacks)
- vegetation, particularly mature trees
- topographical constraints, such as steep slopes.

Submission - Analysis - 1:500

A drawn and written explanation of the local and site constraints that:

- demonstrates the opportunities and constraints of the site
- supports the broad site planning principles and design decisions. (see Site Analysis)
- responds to reports relating to traffic, site drainage, daylight access, environmental design, etc.

Purpose

This analysis demonstrates major design decisions in relation to site layout and the adjacent context and illustrates the design and decision making process.

Submission - Site plan - 1:500

Showing:

- the indicative footprint of the proposal
- site entry points and areas of communal open space
- private open space, indicative locations of planting
- indicative ground plane treatment and deep soil zones
- any proposed site amalgamation of subdivision.

Purpose

The site plan shows how the broad site planning principles are resolved in response to:

- the appropriateness of the development for its site
- bulk and scale
- relationship between the building layout and landscape areas
- connections to existing street and pedestrian networks
- the relationship to streetscape and existing buildings.

Submission - Shadow diagrams

Showing:

- Solar access to the site and adjacent properties at summer solstice (Dec 21), winter solstice (June 21) and the equinox (March and September 21) at 9.00am, 12.00 midday, 3.00pm and 6.00pm

Purpose

Diagrams indicate how the final design impacts adjacent properties and their access to daylight and demonstrates satisfactory access to daylight for proposed open spaces and apartments.

Submission - Landscape plan - 1:200 or 1:500

Accurately showing:

- the building footprint of the proposal and locating site entries
- ramps, stairs and retaining wall levels
- lines of fencing, security and access points
- built elements (pergolas, walls, planters, water features)
- details of public, communal open space and private open space
- trees to be removed shown dotted
- trees to remain and proposed trees/planting including species and size
- deep soil zones and/or adequate soil depth for planting on structures
- detailed ground plane treatment with general materials and finishes indicated
- site lighting

Purpose

The landscape plan demonstrates how the landscape design:

- improves the amenity and privacy of private spaces
- responds to local indigenous species, soil type and climatic factors
- is designed to suit the function of the spaces in which it is located
- improves habitat for native species
- reduces the need for watering and fertilising
- provides outlook for residents
- contributes to high quality residential design.

Scale Building**Submission - Landscape plan - 1:200 or 1:500**

Indicating for example:

- apartment layouts, corridors, lifts and stairs
- pedestrian accessibility and entries
- vehicle and service access and parking
- communal facilities, services
- fenestrations, balconies etc.

Purpose

Floor plans indicate the

- apartment layouts
- natural ventilation and daylight access
- views and outlooks and privacy
- legibility, safety and security of building entrances and circulation spaces
- location of services
- private open space.

Submission - Elevations - 1:100 or 1:200

Indicating for example:

- height and key datum lines
- building length and articulation
- the composition of the facade and roof design
- existing buildings on the site
- building entries (pedestrian, vehicular and service)
- profile of buildings on adjacent properties or for 50m in each direction, whichever is most appropriate.

Submissions - Sections - 1:100 or 1:200

Showing:

- adjacent buildings
- the relationship of the proposal to the ground plane, the street and open spaces
- the location and treatment of car parking
- building separation within the development and between neighbouring buildings
- ceiling heights.

Purpose

Sections show the resolution of internal building layout, site design, and public domain including:

- the relationship of the building to the ground
- the relationship of the layout to streets and open spaces
- appropriate ceiling heights
- privacy
- daylight access and natural ventilation
- overshadowing.

Submissions - Sections - 1:100 or 1:200

Showing:

- adjacent buildings
- the relationship of the proposal to the ground plane, the street and open spaces
- the location and treatment of car parking
- building separation within the development and between neighbouring buildings
- ceiling heights.

Purpose

Sections show the resolution of internal building layout, site design, and public domain including:

- the relationship of the building to the ground
- the relationship of the layout to streets and open spaces
- appropriate ceiling heights
- privacy
- daylight access and natural ventilation
- overshadowing.

Submission - Materials and finishes board

Showing representative materials, samples and colours of the proposal.

Purpose

Finishes show the proposed design quality and character of the development by including:

- colours, materials and finishes
- design of balconies
- landscape species, external spaces.

Submission - Photomontages

Photomontages or similar rendering or perspective drawings illustrating the proposal in its context.

Purpose

The photomontage illustrates the likely appearance of the development in its context and how successfully it integrates with its surroundings.

<p>Submission - Photomontages</p> <p>Schedules on a floor by floor basis provide information on:</p> <ul style="list-style-type: none">• FSR• number of apartments and aspect• apartment sizes and types	<p>Purpose</p> <p>The schedule demonstrates the capacity of the site, the appropriateness of apartment mix, and the quality of apartments provided.</p>
<p>Submission - Statement of Environmental Effects (in addition to the consent authority's normal requirements)</p> <ul style="list-style-type: none">• an explanation of the proposal's response to the 10 design quality principles set out in Part 2 of SEPP 65• a description of the compliance with applicable development controls such as setbacks, building heights, FSR and site coverage.	<p>Purpose</p> <p>The statement demonstrates that the proposal achieves the principles of quality residential flat building design.</p>
<p>Submission - Models - 1:500</p> <ul style="list-style-type: none">• with the massing of the proposal in the context of 3 adjacent properties (particularly for developments over 20 apartment units or on contentious sites)• this may also be a three dimensional computer generated model showing views of the development from adjacent streets and buildings.	<p>Purpose</p> <p>Models demonstrate the proposal's actual three dimensional relationship to the surrounding context.</p>

Appendix 4: Local Context Analysis

The importance of contextual analysis

The aim of contextual analysis is to recognise why a place is as it is. Contextual analysis will highlight the elements that reinforce the locality's desired identity as well as the inconsistencies that could detract from it.

Contextual analysis enables:

- an understanding of the existing form of a locality and the relationships that have caused its development
- an identification of the qualities and character of the existing urban form
- the identification of a successful development pattern and the identification of inappropriate developments.

This kind of analysis assists the writing of residential flat development controls because it:

- identifies opportunities for locating residential flat development within the local area and the region
- provides an understanding of the economic capacity of an area and its ability to support particular types of residential flat development
- provides an understanding of the local community and identifies their housing needs
- identifies impact of residential flat development on existing infrastructure and open space and informs decisions about developer contributions, incentives and bonuses
- provides knowledge of the existing street, block and lot patterns and informs decisions about future subdivision and amalgamation requirements to facilitate residential flat development
- identifies development and building types to be replicated, modified or avoided
- enables the design of building envelopes and development controls which anticipate future development and support the desired character of a local area
- provides a body of work which can support future negotiations with development applicants.

Social Context

Understanding the social context and needs of the local community in terms of lifestyle, affordability, access to social facilities and employment opportunities influence the choice and location of residential flat developments. Quality design outcomes and successful project delivery require integration of the proposed development's aims, council's goals for a particular area and the processes which involve and support the local community.

Quality of Life

As our towns and cities continue to grow, increasing residential and working populations put development pressure on open spaces and natural resources as well as on existing built and services infrastructure. Increasing the population in an area requires increasing amenity to ensure that places remain liveable for the whole community.

Housing Choice

There are many factors affecting where we live, the type of housing we live in and whether it is owned or rented. Some of these factors have to do with what is available, some with people's preferred household structure and some with what people can afford. A mix of dwelling types - from

apartments to detached houses - can provide housing choice for a diverse population, including older people, people with disabilities and people with lower incomes.

Employment Opportunities

Locating residential flat development in town centres and mixed use areas increases the opportunities for residents to work locally and to use local retail and leisure facilities. Living near public transport nodes also facilitates the use of this type of transport and improves access to employment outside the local area. Residential development can include a component of commercial space to enable people to work from home.

Economic Context

Economic capacity is tied to the physical ability of a locality to support growth and change, including the provision of community infrastructure and services. It is important to balance the interests of the public domain and the community's goals with realistic commercial expectations, market demands, real estate and development profit.

Factors that affect feasibility include:

- changing market demands
- land ownership patterns
- future development potential
- investment performance
- regional placement
- financial requirements for infrastructure and community service provision
- incentives and trade-offs (eg. affordable housing provision, upgrading of public open space, access connections)
- cumulative impacts
- flexibility of building stock for adaptive reuse
- local business opportunities.

Environmental Context

The environmental context is comprised of natural processes, which are a combination of the natural environment and the built environment. It extends beyond local boundaries and is continually influenced by the on-going change of the built environment. Natural processes are important determinants of the quality and character of the urban structure; they affect the ecology and future sustainability of our cities.

Natural Environment

The natural environment is one of the key influences on the layout and form of our cities, towns and neighbourhoods. It includes elements such as landform, watercourses, drainage patterns, coastlines, vegetation, geology and climatic conditions (including daylight orientation and prevailing wind patterns). The natural environment also includes the transformation of these elements into urban infrastructure, such as canals, viaducts, reclaimed land and parkland. It influences the layout of

streets, open space, block patterns and lot subdivision and also establishes landmarks and vistas.

Infrastructure Systems

Infrastructure systems are integral to the urban environment and have a significant impact on the physical and visual amenity of public streets and spaces. The location of infrastructure impacts on the layout of streets, land use decisions and the location of urban housing. Visible elements, which include overhead cables, pylons, electricity substations and service pit covers, impact on streetscapes. Maintenance of underground services also impact on streetscapes and can result in damage to paving and to streetscape character. Infrastructure easements through blocks and lots can influence the siting of residential flat buildings.

Site Pollutants

Contaminants threaten the health of people, animals and plants. Chemicals or other wastes, which make the area unsafe or unfit for occupation, may affect a contaminated site. The environmental degradation caused by contamination results in reduced capacity of the land to support flora, such reductions may be short or long term.

Care must be taken to ensure that affected areas can be made suitable for the proposed land use, including residential flat development. See State Environmental Planning Policy No 55: Remediation of Land for further considerations regarding residential flat development, contaminated sites and remediation work.

Transport Systems

A clear and legible vehicular network serves the needs of pedestrians and cyclists as well as motorists. Good access and circulation through and within the development area can increase the usability of streets and associated public spaces because they are more lively, inviting and safe.

Accessible, well serviced public transport provides an alternative means of travel to the private car. Rail stations and bus routes, which are close and convenient to people's homes, work and leisure activities, provide increased amenity and choice for potential public transport users and help reduce car dependency.

Pedestrian networks, which may be formal or informal, are formed by any places where pedestrians can go, such as footpaths, streets and laneways. They also include routes through or alongside buildings in the public and private domain and through open spaces, like parks and recreation areas. Pedestrian networks can be used by commuters, recreational walkers or both. Well located, connected, accessible and safe walking routes with good amenity enhance the attractiveness and useability of the public domain.

In theory, a cycle network consists of all public streets as well as dedicated cycle routes. In practice, many streets are unsafe for cyclists and links to recreational cycling routes can be unclear or incomplete. Streets, which are designed to encourage cycle use and are connected to recreational (including regional) cycle routes, provide recreational as well as commuter travel opportunities. Safe bicycle storage within residential flat developments further promotes cycle use as a viable transportation alternative. See State Environmental Planning Policy No 66 (SEPP 66): Integration of Land Use and Transport for guidance to achieve better integration of land use and transport planning at the local level.

Urban Form Context

Urban form defines the fabric of our cities, towns and neighbourhoods. It is made up of buildings, landscapes and the spaces they define. Understanding the existing urban form of an area provides clues to determining the future shape and scale of a particular place. Residential flat development is a component of urban form. The desired future urban form of an area directly influences decisions about the location, size and type of residential flat development.



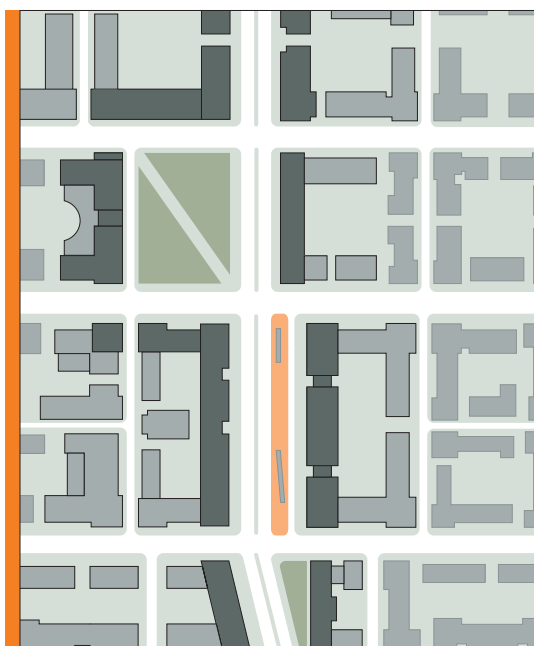
A4.01. Locating residential flats in urban centres optimises the use of public transport, promotes better urban form, and assists in the creation of open space corridors.

Regional Context and Urban Centres

Regional transport networks, cycle and pedestrian routes, existing land uses, ecological and infrastructure systems, open-space networks and visual connections extend beyond the local boundaries and have significant influence on local decision making. Understanding the dynamics between a local area and its region is necessary to determine the viability and location of residential flat development, particularly in relation to urban centres, public transport, regional roads, open-space networks, entertainment and social facilities, schools and employment precincts. Residential flat development is an essential component of creating vibrant, mixed use urban centres, which promote public transport modes and efficient land use.



A4.02. This neighbourhood lies between two town centres. It is bounded by a rail corridor to the south, regional roads to the north and west, and parklands to the east. Within the neighbourhood are two distinct character areas with differing block patterns, topography and building types.



A4.03. Taller mixed use and residential flat buildings align with the street edge and reinforce the edges of the street layout, town centre park and the linear urban square at the rail station.

Neighbourhood and Precinct Areas

Neighbourhoods are parts of cities, towns or suburbs. Most neighbourhoods are contained within well-defined edges or boundaries, these can be natural features, major thoroughfares and infrastructure, changes in use, or a change in street or block pattern. Neighbourhoods usually have a focus. Unlike an urban centre, which will be characterised by greater intensity and diversity of use, a neighbourhood centre can be as small as a couple of shops, a train station, a park, a church or a school.

Precincts are physical areas of a city, suburb or town with a consistent use and/or character. A special use, culture or history may define them. Examples would include health, education and legal precincts, a Chinatown precinct or a heritage conservation area. Consistent urban elements, such as streetscapes, vegetation, building types and materials may also help define a precinct.

Open Space

Public open space is important because it can provide a range of benefits for a range of people:

- active and passive recreation
- conservation of natural features & cultural sites
- improved amenity for the urban environment
- buffer zones between conflicting uses
- stormwater management
- pedestrian links.

Together with streets and public buildings, public open spaces help create a civic identity and local character. A variety of public and private open spaces are necessary to provide amenity to apartment residents. In urban areas where on-site communal open space opportunities are limited, more public open spaces may be required in the local area to support increasing populations. Landscape design and open space can soften people's perceptions of the scale sometimes associated with residential flat development.

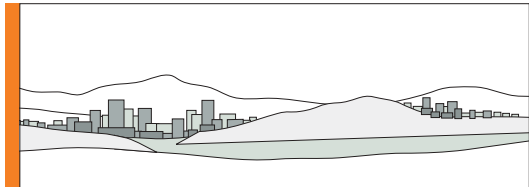


A4.04. A view corridor open to sky can increase the perception of openness in urban areas.

Views

Within the public domain views assist with orientation, help make a place memorable and contribute to a distinctive skyline. Views, which link a distant feature with the immediate locale, also create a sense of openness and space.

A vista or view corridor is a 'view through', usually defined by buildings. Streets can be view corridors, which visually and spatially link one part of an urban area to another. View corridors can be terminated or framed by an architectural landmark, such as a heritage building or a building element (church spire), public art, and/or a landscape feature, such as a hilltop or significant tree. They can also focus on the horizon, the water or the sky.

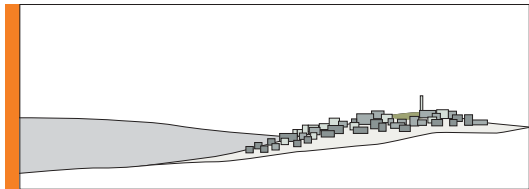


A4.05. The city skyline is defined within the height of surrounding hill tops. Lower buildings are located on the sloping hills and in the nearby town.

Topography

Topography - including natural features like ridges, gullies and watercourses - is the most distinctive and, usually, the longest established marker of an area's unique identity. Often the setting of a place is what defines it. Much of our landscape has been significantly modified from its natural state, particularly in urban areas, for example by cut and fill, where intervention for different kinds of development has altered the original topography. Often the landform tells a story about the history of the area; the street and subdivision layout and the kinds of use and building types. In this it is an important part of an area's cultural heritage.

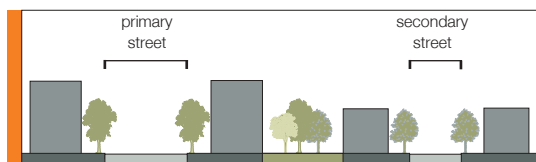
The location and form of new residential flat development in relation to topography is important in shaping the scale and character of an area.



A4.06. Building heights follow the topography and give visual prominence to the hill top park and feature element.



A4.07. A generally consistent height for new residential development in Pyrmont follows the line of the ridge, with a sharp change in level accentuating the existing cliff edge.



A4.08.



A4.09. Primary streets define the super block structure of this area. Local streets divide the super blocks into smaller block and lot sizes, which are better suited to a range of building types.

Street Layout

Street layout is an essential element for ordering an urban area. It rarely changes and is effectively in place for hundreds of years. Street hierarchy describes the different roles that streets have in the urban structure. The importance of the street in planning and designing residential flats is tied to the size as well as the function of streets. A main arterial road is likely to be wider, more heavily trafficked and noisier than a suburban street. Places with a legible street network provide greater opportunities for linking the site to its locality, for optimising access to public transport and for retaining views.



A4.10. Streetscapes help define the public realm of our cities.

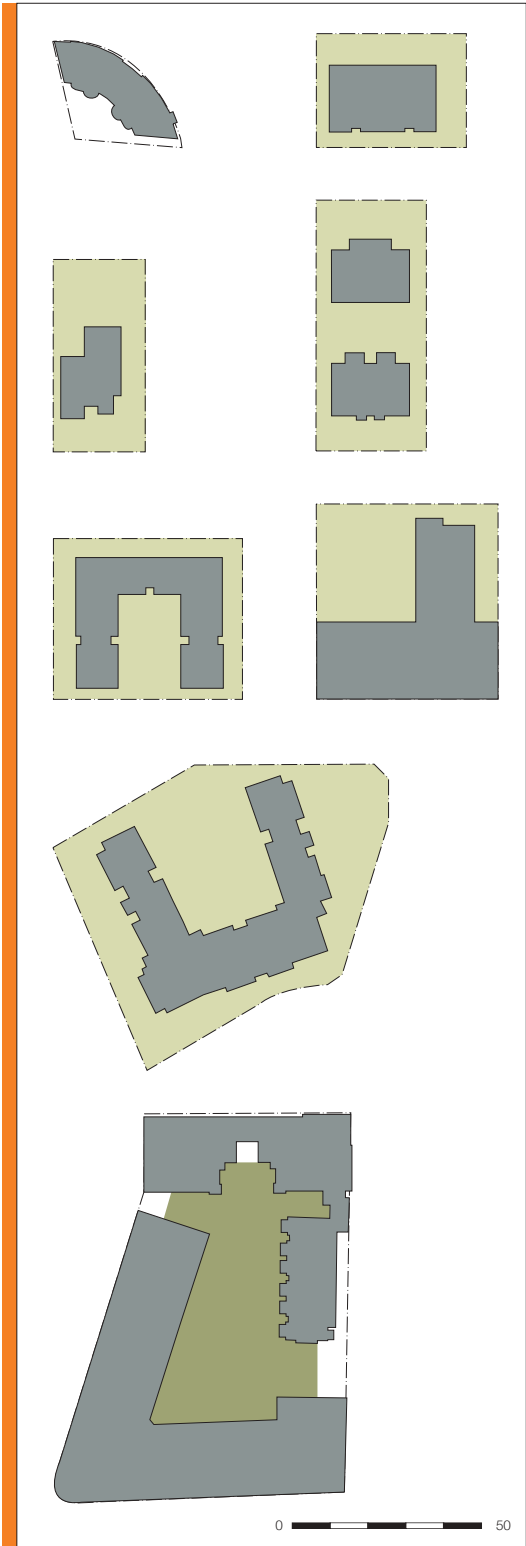
Streetscape

Streetscape is the three-dimensional space, which encloses and defines the street. Its form and proportions are given by the dimensions of the public domain - streets, footpaths, verges, street trees and street furniture - in relation to the dimensions of the private domain - the height, setbacks and massing of buildings. Streetscape has a social role in providing useable spaces with good amenity for pedestrians and residents. It also has a landscape role in providing an attractive setting for development.



A4.11. Well-designed residential buildings and quality landscape design create better streetscapes.

The scale of residential development is a key determinant of streetscape quality. It influences the street's proportions in relation to human scale and to other buildings along the street.



A4.12. This comparison illustrates the relationship of lot shapes and sizes to a variety of residential flat building types.

Blocks

There is a reciprocal relationship between street and block patterns. The street layout subdivides an area into blocks, but the uses and types of proposed buildings generally determine the size and proportion of blocks. For example, the block size in a warehouse district is normally bigger than in a residential neighbourhood and in a mixed use neighbourhood, blocks can be subdivided into lots of variable sizes to accommodate a range of uses and building types. In areas undergoing change from one use to another, such as a brownfield site, the street layout and the block sizes may also need to change.

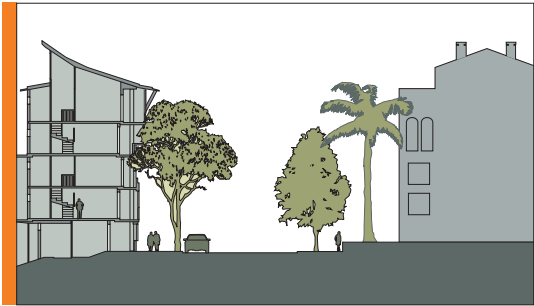
Although function mainly determines the size of blocks and lots, topography and significant natural features impact on block, lot and street layouts. Block shapes (and lots) are often irregular because of a street layout that responds to the contours of the land or other requirements.

Lots

While street layout subdivides an area into blocks, these are further subdivided into smaller building lots. The size and shape of building lots has a direct relationship with the building types proposed for site. In particular, where an area is changing to accommodate more and/or different building uses, the size and shape of building lots will determine the possible building types and densities. Amalgamation or subdivision of lots may be necessary to accommodate a desired change.

The range of lot sizes can change over time by subdividing or amalgamating existing lots or blocks. Site amalgamations and subdivisions can have a major impact on a streetscape by changing the characteristic rhythm of typical lots and buildings on a block.

Topography also affects the shape of lots. For example, on a sloping site, building lots can be irregularly shaped because of a street layout that responds to the contours of the land.



A4.13. New buildings and heritage buildings can be complementary in height and bulk without the need to replicate historical details.



A4.14. A consistent parapet height and similarly proportioned windows enhance the relationship between the new and the old.



A4.15. Mapping building uses provides an understanding of the actual mix of uses in an area and can help determine appropriate residential building types.

Heritage Buildings / Significant Elements

Heritage, which is shaped by nature, buildings and history, contributes to an understanding of our past, the towns and cities we live in and our relationship to the land. Heritage includes special buildings and places that reflect physical, social or cultural significance in a community as well as special indigenous places and natural landscapes. Heritage items need to be assessed to determine their significance, which in turn gives guidance to future development. Heritage items may include private and public buildings, street patterns, lot subdivision, neighbourhoods and public open spaces. Heritage buildings and places form the foundations of the built form and public domain of our cities.

Building Use

A single use zone is sometimes determined by existing statutory controls. In contrast, mixed use areas support a finer grain mix of uses in an area or in a development. Mixed use developments contribute to the vibrancy and economic sustainability of an area by combining residential uses with an appropriate range of supporting uses, such as live/work facilities, small scale retail and commercial opportunities for local residents.

.Glossary

Acoustic privacy	a measure of sound insulation between apartments, between apartments and communal areas, and between external and internal spaces
Accessible housing	housing that is designed and built to accommodate the needs of occupants with mobility impairment (Australian Standard 1428: Design for Access & Mobility Series)
Adaptable housing	housing that is designed and built to accommodate future changes to suit occupants with mobility impairment or life cycle needs (Australian Standard 4299: Adaptable Housing)
Adaptive reuse	the conversion of an existing building from one use(s) to another or from one configuration to another
Affordable Housing	housing for low to moderate income households. Affordable housing is usually required to be financially viable based on a ratio of housing costs to income.
Amenity	the 'liveability' or quality of a place which makes it pleasant and agreeable to be in for individuals and the community. Amenity is important in both the public and private domain and includes the enjoyment of sunlight, views, privacy and quiet.
Articulation zone	the area of three dimensional modelling at the periphery of the building, including any changes in facade alignment, balconies, bay windows and sun shading devices
AS 1428	Australian Standard 1428: Design for Access and Mobility Series
AS 4299	Australian Standard 4299: Adaptable Housing
BCA	Building Code of Australia
Brownfield Site	an area which has been built on in the past, often for industrial uses and characterised by large blocks and lots
Build to Line	a front setback expressed as a required distance from the street edge of the building envelope. In urban areas the build to line often corresponds to a zero front setback, to establish a consistent streetscape.
Building Line	the line formed by the main external face of the building, excluding any balcony or bay window projections
Building Sustainability Index	(BASIX) a comprehensive menu of best practice sustainability measures based on their relative effectiveness (available from PlanningNSW end of 2002)
Building zone	the area within which a building can be built, usually represented in plan and section. Corresponds to a building envelope
Core	vertical circulation (eg lift, stairs)
Cornice	decorative horizontal moulding at the top of a building which 'crowns' or finishes the external facade
Cross over apartments	apartments with two opposite aspects and with a change in level between one side of the building and the other
Cross through apartments	apartments on one level with two opposite aspects

Datum or datum line	a significant point or line in space established by the existing or desired context, often defined as an Australian Height Datum. For example, the top of significant trees or the cornice of a heritage building
Deck	an external platform, usually elevated, located alongside and accessible from an interior space and often made of timber
Double loaded corridor	corridor with apartments off both sides, generally associated with single aspect apartments
Dual aspect apartment	apartments which have at least two major external walls facing in different directions, including corner, cross over and cross through apartments
Facade	the external face of a building
Glass line	inside face of windows on the external walls of a building
Ground	the existing ground level at the time of the development application
Habitable room	any room or area used for normal domestic activities, including living, dining, family, lounge, bedrooms, study, kitchen, sun room and play room
Indigenous plants or animals	a plant or animal species occurring at a place within its historically known natural range and forming part of the natural biological diversity of a place
Internal Courtyard	communal space at ground level or above a structure (eg. podium), formed by the building and enclosed on 3 or more sides (see Building Separation) and open to the sky
Juliet balcony	small projecting balcony, generally ornamental or only large enough for one person standing
Lightwell	a shaft for air or light, enclosed on all sides or which has the potential to be enclosed by future adjoining development, and either open to the sky or glazed
Long life	loose fit buildings which can accommodate a range of existing and future uses
Maisonette apartment	a two-storey apartment, where the storeys are vertically stacked
Mezzanine	the second storey of an apartment, fully or partially open to a void (double height) space shared by both storeys
Non-habitable room	spaces of a specialised nature not occupied frequently or for extended periods, including bathrooms, toilets, pantries, walk-in wardrobes, corridors, lobbies, photographic darkrooms and clothes drying rooms
On-grade	on ground level (not on a building structure)
Open plan	apartment layouts where spaces are not divided into discrete rooms, but are open and connected to allow flexibility of use (typically living, dining, kitchen and study areas)
Operable screening device	sliding, folding or retractable elements on a building designed to provide shade, privacy, and protection from natural elements

Operable walls	internal walls which can be moved, for example by sliding, folding, or pivoting, to allow for different room configurations
Parapet	a horizontal low wall or barrier at the edge of a balcony or roof. Often taken to refer to the decorative element which establishes the street wall height of heritage buildings (see Cornice)
Perimeter block development	where buildings are generally aligned to the street, enclosing or partially enclosing an area in the middle of the block
Plan depth or width	measured from inside face of wall to inside face of wall or from inside face of glass to inside face of glass
Potable water	water which conforms to Australian Standards for drinking quality
Private Courtyard	private open space which may be on a structure (eg. podium, parking deck) or at ground level
SEPP	State Environmental Planning Policy
Silhouette	a building outline viewed against the sky
Stack ventilation / solar chimney	air convection resulting from hot air being pushed up and out by colder denser air which is drawn in at a lower level
Storey	a level in a development. This includes attic spaces with habitable rooms. It does not include space used for car parking, laundries or storeroom if the ceiling above the space is not more than 1200mm (measured from the lowest point on the site) above ground level
Terrace (outdoor area)	an unroofed and usually paved area connected to an apartment and accessible from at least one room. May be on-grade or on a structure (podium)
Underground	below ground level or less than 1.2 metres above ground level
Walk-up	an apartment building limited in height due to the number of stair flights a person will reasonably climb without a lift. Buildings are generally 2-3 storeys, with a 4th storey permitted only as an upper level to a 3rd storey apartment unit.
Yard	on-grade private open space with deep soil

References & Further Reading

Benson, Doug and Howell, Jocelyn. **Taken for Granted: the Bushland of Sydney and its Suburbs**, Sydney: Kangaroo Press, 1995.

Brown, G.Z. and DeKay, Mark. **Sun, Wind and Light: Architectural Design Strategies**, New York: John Wiley & Sons, 2001.

City West Development Corporation. **Pymont Point Master Plan**, Sydney: Department of Urban Affairs and Planning, 1994.

Commission for Architecture and the Built Environment. By Design: **Urban Design in the Planning System**, London: Department Environment Transport Regions, 2000.

Commonwealth Department of Housing and Development. AMCORD: **A National Resource Document for Residential Development**, Canberra: AGPS, 1995.

Fairley, A. and Moore, P. **Native Plants of the Sydney District: an Identification Guide**, Sydney: Kangaroo Press, 1989.

Herzog, Thomas. (editor) **Solar Energy in Architecture and Urban Planning**, Munich: Prestel, 1996.

Hollo, Nick. **Warm House Cool House, Sydney**: Choice Books, 1995.

Hitchmough, J.D. **Urban Landscape Management**, Sydney: Inkata Press, 1994.

Llewelyn-Davies in association with Urban Investment Metropolitan Transport Research Unit. **Sustainable Residential Quality: Exploring the Housing Potential of Large Sites**, London: London Planning Advisory Committee, 2000.

Llewelyn-Davies with Alan Baxter and Associates. **Urban Design Compendium**, London: English Partnership, 2000.

NSW Department of Urban Affairs and Planning and NSW Department of Public Works and Services, **Residential Flat Design Pattern Book**, Sydney: Department of Urban Affairs and Planning, 2001.

NSW Department of Urban Affairs and Planning and NSW Government Architect. **Better Urban Living: Guidelines for Urban Housing in NSW**, Sydney: Department of Urban Affairs and Planning, 1998.

NSW Department of Urban Affairs and Planning. Mixed Use in Urban Centres: **Guidelines for Mixed Use Development**, Sydney: Department of Urban Affairs and Planning, 2000.

NSW Department of Urban Affairs and Planning. Neighbourhood Character: **An Urban Design Approach for Identifying Neighbourhood Character**, Sydney: Department of Urban Affairs and Planning, 1998.

NSW Department of Urban Affairs and Planning. NSW Model Code: **A Model For Performance-Based Multi-Unit Housing Codes**, Sydney: Department of Urban Affairs and Planning, 1997.

NSW Department of Urban Affairs and Planning. Residential Densities: **A Handbook Illustrating the Urban Design Characteristics of Different Densities**, Sydney: Department of Urban Affairs and Planning, 1998.

Phillips, R.O. **Sunshine and Shade in Australasia**, Sydney: NSW National Building Technology Centre, 1987.

Polyzoides, Stefanos, Sherwood, Roger and Tice, James. **Courtyard Housing in Los Angeles**, New York: Princeton Architectural Press, 1992.

Rowe, Peter G. **Modernity and Housing**, Cambridge: MIT Press, 1995.

Royal Australian Institute of Architect in association with Department of Planning and Development, Smart Housing Choices: **A Directory of Medium-Density Housing in Victoria**, Victoria: Department of Planning and Development, 1992.

Schneider, F. (editor) **Floor Plan Atlas Housing**, Basel: Birkhäuser Verlag, 1994.

Sherwood, Roger. **Modern Housing Prototypes**, Cambridge: Harvard University Press, 1978.

Urhahn, G.B. and Bobic, M. A Pattern Image: **A Typological Tool for Quality Urban Planning**, Bussum: Thoth Publishers, 1994.

Websites:

National Solar Architecture Research Unit (SOLARCH), University of New South Wales.
www.fbe.unsw.edu.au/units/solarch, 1999

Marsh, Andrew and Raines, Caroline of Square One research Pty Ltd and Welsh School of Architecture, Cardiff University.
www.squ1.com, 2002

.Acknowledgments

Project Team

Urban Design Advisory Service

Deena Ridenour

Lynne Hancock

Anna Chan

Peter Sullivan

Advice & Contributions

Urban Design Advisory Service

Sarah Koshy

Helen Lochhead

Jan McCredie

Gabrielle Morrish

Matthew Pullinger

Bill Royal

Noni Ruker

Lisa Strudwick

Tanya Vincent

Additional Assistance

Sacha Coles

Kim Crestani

Deborah Dearing

Debbie Klinkhamer

Diane Marden (LGSA, DQP Reference Group)

Roderick Simpson

Reg Smith (DQP Reference Group)

Bruce Taper

Urban Design Advisory Committee (UDAC)

Ken Maher, Chairman (Hassell Pty Ltd)

Julie Bindon (JBA Pty Ltd, representing PIA)

Ian Costley (Mirvac, representing Property Council of Australia)

Graham Jahn (RAIA)

Chris Johnson (NSW Government Architect)

Evan Jones (PlanningNSW)

Leonard Lynch (Clouston, representing AILA)

Philip Thalís (Hill Thalís Architecture and Urban Projects)

Professor James Weirick (Landscape Architecture, UNSW)

We wish to thank all the architects, developers, government representatives, industry representatives, and planners, who attended the workshops and provided advice during the preparation of the Design Code.

Graphic Design

Massive

Production

Joel Spencer

.Image Credits

01.04.	Lyndhurst Gardens
01.14.	Lyndhurst Gardens
01.15.	Illustrations based on Newington Apartments
01.16.	Illustrations based on Newington Apartments
01.17.	Newington Apartments
01.18.	Newington Apartments
01.19.	Newington Apartments
01.20.	Illustrations based on Wylde Street Apartments
01.21.	Illustrations based on Wylde Street Apartments
01.22.	Wylde Street Apartments
01.28.	The Hudson
01.31.	Rockwall Gardens
01.32.	Domain
01.33.	Illustrations based on Crown Street Housing
01.34.	Illustrations based on Crown Street Housing
01.35.	Crown Street Housing
01.36.	Crown Street Housing
01.37.	Illustrations based on drawing from Hill Thalys Architecture + Urban Projects
01.38.	Illustrations based on drawing from Hill Thalys Architecture + Urban Projects
01.39.	Illustrations based on drawing from Hill Thalys Architecture + Urban Projects
01.40.	Illustrations based on drawing from Hill Thalys Architecture + Urban Projects
01.41.	Illustrations based on drawing from Hill Thalys Architecture + Urban Projects
01.42.	Illustrations based on drawing from Pyrmont Urban Design Strategy prepared by Edward Alexander for the Sydney Harbour Foreshore Authority 1995
01.43.	Illustrations based on drawing from Pyrmont Urban Design Strategy
01.44.	Illustrations based on drawing from Pyrmont Urban Design Strategy
01.45.	Illustrations based on drawing from Pyrmont Urban Design Strategy
01.46.	Illustrations based on drawing from Pyrmont Urban Design Strategy
01.47.	Illustrations based on drawing from Pyrmont Urban Design Strategy
01.48.	Illustrations based on drawing from Pyrmont Urban Design Strategy
01.50.	Background illustration by David Wardman
02.14.	Newington Apartments
02.15.	Moore Park Gardens
02.16.	Landscape design plan for Atlas by McGregor + Partners
02.17.	Crown Street Housing
02.18.	Newington Apartments
02.19.	Presidio
02.20.	Landscape design plan by Aspect
02.21.	Crown Street Housing
02.22.	Crown Street Housing
02.23.	Atlas
02.24.	The Hudson
02.32.	Landscape design plan by Aspect
02.33.	Landscape design section by Aspect
02.34.	The Hudson
02.35.	Crown Street Housing
02.36.	Stormwater diagram by McGregor + Partners
02.38.	Atlas
02.39.	Newcomen Street Apartments
02.43.	MacArthur Street Apartments
02.44.	Atlas

02.45.	The Hudson
02.46.	Domain
02.47.	Atlas
02.50.	The Hudson
02.51.	The Hudson
02.52.	Paddington Green
02.53.	Moore Park Gardens
02.54.	Newcomen Street Apartments
03.03.	Illustration based on plan by Allen Jack + Cottier
03.04.	Illustration based on plan by Allen Jack + Cottier
03.05.	Illustration based on plan by Allen Jack + Cottier
03.06.	Illustration based on plan from Newington Apartments
03.07.	Illustration based on plan by Allen Jack + Cottier
03.08.	Illustration based on plan from Rockwall Gardens
03.09.	Illustration based on plan from Moore Park Gardens
03.10.	Illustration based on plan from Kings Bay
03.12.	Newcomen Street Apartments
03.13.	Newington Apartments
03.14.	MacArthur Street Apartments
03.15.	Illustration based on plan from Newcomen Street Apartments
03.17.	Rockwall Gardens
03.18.	Newington Apartments
03.22.	Paddington Green
03.25.	The Hudson
03.27.	Illustration based on plan from Kings Bay
03.28.	Kings Bay
03.29.	Domain
03.30.	Illustration based on plan from the Domain
03.31.	The Peninsula
03.32.	Illustration based on section from Crown Street Housing
03.37.	Newington Apartments
03.38.	Newington Apartments
03.43.	Newington Apartments
03.44.	Domain
03.45.	The Hudson
03.46.	Moore Park Gardens
03.47.	Presidio
03.48.	Crown Street Housing
03.49.	The Point
03.50.	Domain
03.51.	MacArthur Street Apartments
03.52.	The Point
03.53.	Newington
03.54.	Crown Street Apartments
03.55.	Atlas
03.56.	The Point
03.57.	Illustrations based on plan from MacArthur Street Apartments
A4.07.	Section from Pyrmont Urban Design Strategy
A4.11.	MacArthur Street Apartments
A4.13.	Illustration based on section from the Point
A4.14.	Crown Street Housing

Cover Images

Main Image Newington Apartments

Thumbnail Images (L to R)

Kogarah Town Centre Development Control Plan prepared by Russell Olsson Urban Projects, illustrations based on public domain drawing by Jane Irwin, Crown Street Housing, Crown Street Housing.

Divider Images (Part 01 to 03)

Kogarah Town Centre Development Control Plan, Crown Street Housing, Crown Street Housing.

All other photographs and illustrations by the Urban Design Advisory Service.

Residential Flat Developments Featured

Atlas, Alexandria NSW - Turner + Associates and Stanisis Associates (architecture); McGregor + Partners (landscape architecture); Brett Boardman (photography)

Crown Street Housing, Surry Hills NSW - Architectus (architecture and landscape architecture); Walter Glover, Architectus (photography)

Domain, Marrickville NSW - Stanisis Associates and Turner + Associates (architecture); Frank Stanisis (photography)

The Hudson, Alexandria NSW - Allen Jack + Cottier (architecture); Anton James Design (landscape architecture); Nic Bailey (photography)

Kings Bay, Five Dock NSW - DEM Design Group (architecture); Philip Fischer (photography)

Lyndhurst Gardens, Woollahra NSW - Gilbert Hughes and Maloney (architecture); Brett Boardman (photography)

MacArthur Street Housing, Ultimo NSW - Tonkin Zulaikha Greer in association with Roderick Simpson (architecture); Eric Sierins (photography)

Moore Park Gardens, East Redfern NSW - Allen Jack + Cottier (architecture)

Newcomen Street Apartments, Newcastle NSW - JTCW Savage (architecture); Paul Foley, Martin Hunt (photography)

Newington Apartments, Newington NSW - HPA Architects in association with Bruce Eales and Associates, Vote Associates, Hassell, Peddle Thorpe and Walker (architecture); Patrick Bingham-Hall, Geoff Amber (photography)

Paddington Green, Paddington NSW - Allen Jack + Cottier (architecture)

The Peninsula, Manly NSW - Conybeare Morrison and Partners (architecture); Janet Marsden, Ron Israel (photography)

The Point, Pyrmont NSW - Candalepas Associates (architecture); Patrick Bingham-Hall, John Gollings (photography)

Presidio, Newtown NSW - Stanisis Associates and Turner + Associates (architecture); DM Taylor Landscape Architects; Brett Boardman (photography)

Rockwall Gardens, Potts Point NSW - Architects Johannsen and Associates (architecture); Fretwell Photography (photography)

Wylde St Apartment, Potts Point NSW - Aaron Bolot (architecture); Brett Boardman (photography)

