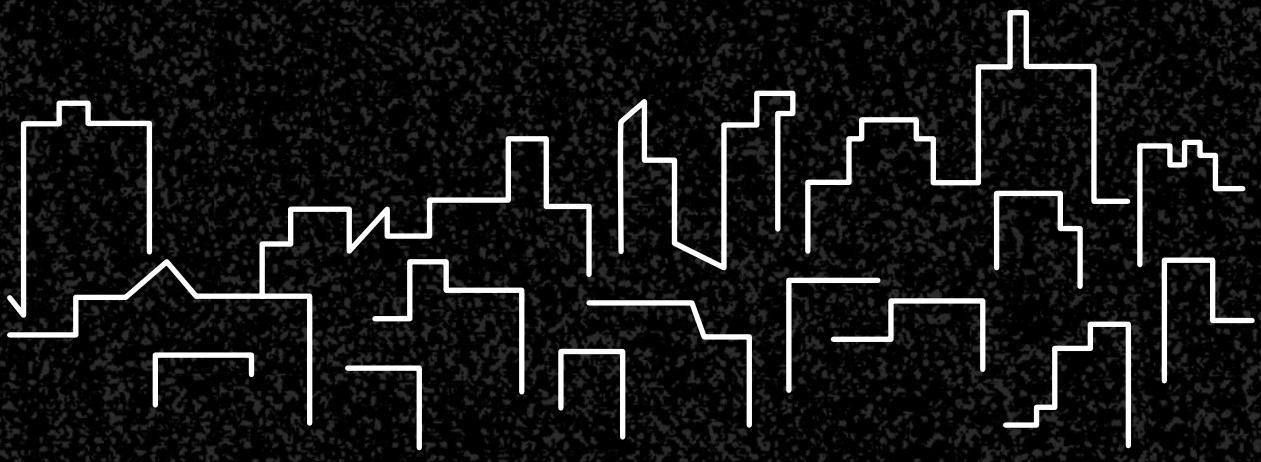
DEPARTMENT OF ENVIRONMENT, LAND, WATER & PLANNING_ BETTER APARTMENTS DESIGN STANDARDS RESPONSE PAPER

SEPTEMBER 2016



[redacted] IS AN ARCHITECTURE FIRM THAT REVOLUTIONISES THE WAY ARCHITECTURE IS PRACTISED

EXECUTIVE SUMMARY

With 100,000 new residents moving to Greater Melbourne every year, the supply of future housing stock, in terms of both quantity and quality, is fundamental to the successful growth of Melbourne as a city. Following Melbourne's trends of population and economic urbanisation, higher density living, in the form of apartments, has become an increasingly popular model of development. For the first time in Melbourne's history, apartments have become the most approved form of new housing stock. The function and liveability of new apartments must cater for a diverse range of occupants, and the quality of this new housing stock must remain a high priority for the Victorian Government. This paper intends to respond to the *'Better Apartments Draft Design Standards'* (Aug 2016) and build upon the standards, using expert knowledge and experience, to provide better design outcomes.

In parallel to a booming population, Melbourne is currently experiencing an exponentially worsening issue of housing affordability. The gap between average income levels and average housing prices is widening, and forcing an increasing number of Melbourne's population out of home ownership. Melbourne is currently the ninth worst city in the world in terms of housing affordability, with individuals having to spend anywhere between 42% and 63% of their salary on housing costs to live in, or around Melbourne's central employment districts. Higher density housing provides an opportunity to ensure that a diverse range of housing stock is available to a broad range of Melbourne's growing population, especially those on low to middle incomes.

The proposed Better Apartments Design Standards provide a benchmark for future apartments which seeks to eliminate current poor design and built outcomes. In doing so, future apartments will be able to provide more livable, flexible, and sustainable environments to cater for a range of occupants. Managing the high quality design of new apartments is important, however ensuring that affordable housing options are available for Melbourne's growing population is also critical.

Collectively, the standards present a positive initiative for apartment design moving forward. However it is not known how adopting these standards will impact future housing supply or affordability. A trial period of one year should be considered to help mitigate any undesirable long term effects and allow the industry to properly test, adjust to, and provide commentary on the proposed standards. This would also provide the opportunity to properly evaluate the impact the standards will have on the Victorian building industry and related sectors.

[redacted] is committed to achieving excellent design, with high density multi-residential developments as a preeminent typology. The scope of this document covers the key aspects of high quality apartment design, focussing on issues such as daylight amenity, apartment planning, and sustainable practices. By focusing on these key issues, we hope to provide a positive contribution to the discussion on better apartment design in Victoria.

[redacted]

01_BUILDING SETBACK

Aim:
The standard seeks to ensure that new apartment buildings are setback an appropriate distance from side and rear boundaries to receive an adequate amount of daylight and privacy.

Clearly defined building setbacks help establish the built form and developable envelope of a site. The setback controls aim to preserve the existing and preferred neighbourhood characteristics by defining and maintaining a continuity of built form. These setbacks and boundary conditions inherently influence the natural daylight and privacy conditions within the apartments, in particular on the lower levels of a building.

A base condition for setbacks provide clarity through the feasibility and planning process however these setbacks should be considered as a discretionary measure with the ability for modified setbacks and site specific design responses to existing boundary conditions. As a result of limited flexibility in setback controls there is a reduced opportunity to position a building, or buildings, within the site. The inability for site conditions to inform the design and siting of a building results in a compromised outcome as the relationship with neighbouring buildings, existing streets and access to the best amenity is restricted.

The proposed setback standards drastically reduce the developable potential of a building above a height of 13.5m with severe consequences for residential development above a height of 25m. As noted at [redacted] development is constrained to a height of four stories where currently 10 storeys are deemed suitable. This site, along with other finer grain and infill sites would become undevelopable as a result of the proposed setbacks. This places a premium on larger development sites and affects the supply of apartments in the fringe suburbs where the majority of housing stock is provided through the development of smaller sites like this. This will have an immediate affect on the supply and affordability of future housing stock.

The aims outlined above look to ensure standards for daylight and privacy. These can be met without the requirement for prescriptive setbacks as demonstrated with the case studies at [redacted]

First Principles
_ *All apartments should have access to plentiful natural daylight*
_ *Building -to-Building Separation should ensure adequate privacy measures are met.*
_ *Building setbacks should allow for site responsive design outcomes.*
_ *Building setbacks should allow a degree of flexibility with building placement within a site.*

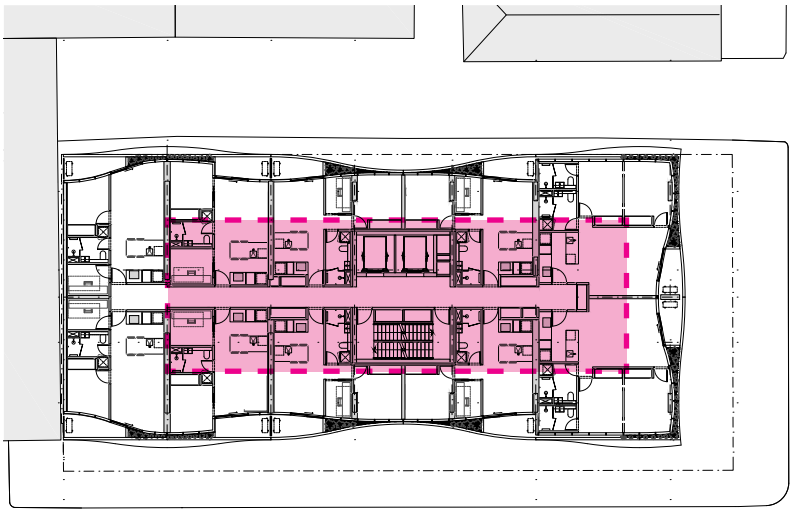
Application considerations
_ *Setbacks should allow for a modified building shape or floorplate to prevent a 'wedding cake' typology.*
_ *Setbacks should allow for the placement of a building to take advantage of the best amenity, solar orientation and view corridors.*
_ *Setbacks between two towers on the same site should allow for a considered design response and not mandatory separation distances.*
_ *A reduction to setback distances should be considered with appropriate measures which ensure that privacy within the apartments are maintained.*

[redacted] ADOPTS SETBACKS WHICH RESPOND TO EXISTING NEIGHBOURING AND REAR BOUNDARY CONDITIONS. THE APARTMENT DAYLIGHT AND PRIVACY CONDITIONS ARE MET WITH SETBACKS WHICH DIFFER FROM THE PROPOSED STANDARD.

PRESCRIPTIVE SETBACK CONDITIONS RESULT IN A DRASTICALLY COMPROMISED BUILDING ENVELOPE AND DO NOT CONSIDER THE EXISTING STREET INTERFACES. IN THIS INSTANCE REDUCED SETBACKS HAVE BEEN DEEMED APPROPRIATE GIVEN THE GENEROUS WIDTH OF THE EXISTING ROAD WAYS AND DISTANCE FROM NEIGHBOURING BUILDINGS.

NOTE: DEVELOPMENT ABOVE A HEIGHT OF 13.5M IS NOT POSSIBLE CONSIDERING INCREASED SETBACKS FOR SIDE AND REAR BOUNDARIES FROM 6-12M. THIS RESULTS IN A DEVELOPMENT WHICH IS 4 STOREYS IN STEAD OF 10.

EXISTING SETBACKS:	LANEWAY (NORTH) = 0M STREET (EAST) = 3.5M STREET (SOUTH) = 2.5M SIDE BOUNDARY (WEST) = 0M
PROPOSED SETBACKS:	LANEWAY (NORTH) = 6M STREET (EAST) = 6M STREET (SOUTH) = 6M SIDE BOUNDARY (WEST) = 6M

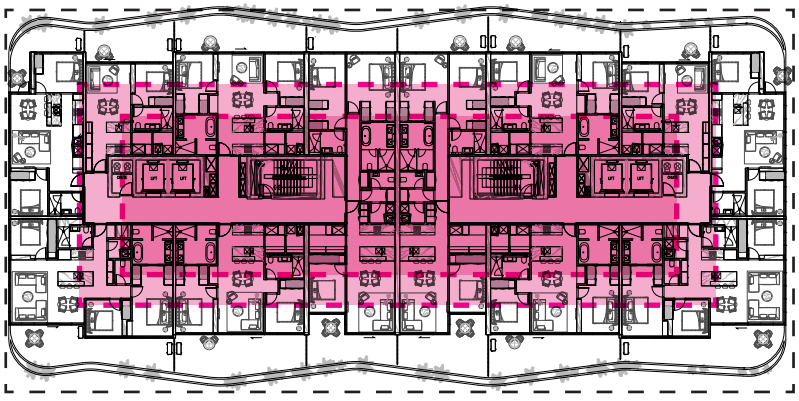


[redacted] ADOPTS SETBACKS WHICH RESPOND TO EXISTING NEIGHBOURING AND REAR BOUNDARY CONDITIONS. THE APARTMENT DAYLIGHT AND PRIVACY CONDITIONS ARE MET WITH SETBACKS WHICH DIFFER FROM THE PROPOSED STANDARD.

PRESCRIPTIVE SETBACK CONDITIONS RESULT IN A DRASTICALLY COMPROMISED BUILDING ENVELOPE AND DO NOT CONSIDER THE EXISTING STREET INTERFACES. IN THIS INSTANCE REDUCED SETBACKS HAVE BEEN DEEMED APPROPRIATE GIVEN THE PROXIMITY OF EXISTING ROAD WAYS AND DISTANCE FROM NEIGHBOURING BUILDINGS.

NOTE: DEVELOPMENT ABOVE A HEIGHT OF 25M IS NOT POSSIBLE CONSIDERING INCREASED SETBACKS FOR SIDE AND REAR BOUNDARIES FROM 6-12M. THIS RESULTS IN A DEVELOPMENT WHICH IS 7 STOREYS IN STEAD OF 10.

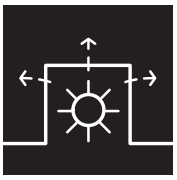
EXISTING SETBACKS:	STREET (NORTH) = 0M SIDE BOUNDARY (EAST) = 1M STREET (SOUTH) = 0M SIDE BOUNDARY (WEST) = 1M
PROPOSED SETBACKS: (BELOW 13.5M)	STREET (NORTH) = 6M SIDE BOUNDARY (EAST) = 6M STREET (SOUTH) = 6M SIDE BOUNDARY (WEST) = 1M
PROPOSED SETBACKS: (ABOVE 13.5M, BELOW 25M)	STREET (NORTH) = 9M SIDE BOUNDARY (EAST) = 9M STREET (SOUTH) = 9M SIDE BOUNDARY (WEST) = 9M



TITLE BOUNDARY

[redacted]

02_LIGHTWELLS



Aim:
The standard seeks to ensure that the size and design of light wells allow adequate daylight access to an apartment.

Adequate daylight levels to a habitable room is pivotal to apartment design. As a vital first principle all apartments should have direct access to plentiful natural light. Where this cannot be achieved from the main aspect, light wells are a compromise which allow for bedrooms to receive daylight access from a secondary source. These spaces should provide privacy between apartments within the same building and from adjoining neighbouring buildings.

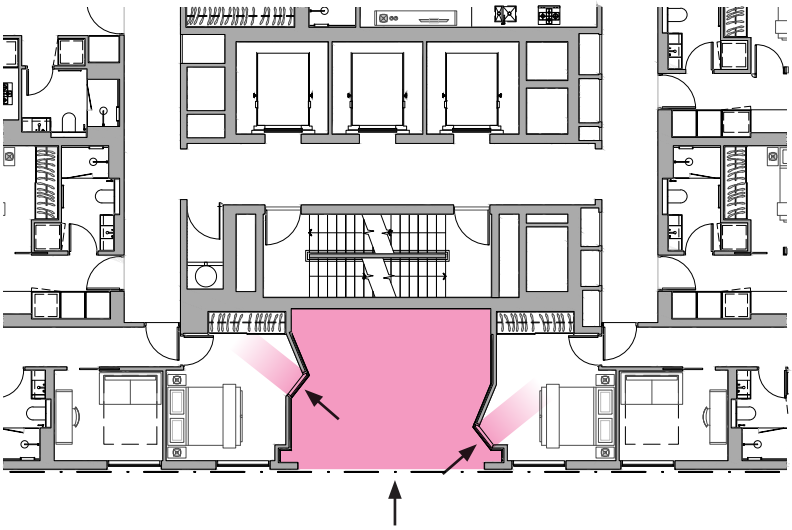
Where light wells are considered an appropriate design response these should remain clear to the sky and provide ventilation without compromised privacy to the rooms which they service. The dimensions, area and height of a light well is critical to the success of the amount of daylight access the affected rooms will receive. It is for this reason that land on an adjoining lot should not be included in calculating light well dimensions.

Prescriptive minimum areas and dimensions of light wells will provide certainty around the planning envelope and feasibility of floor plate designs.

First Principles
_ *All habitable rooms should have access to plentiful natural daylight.*
_ *Should the design response result in the requirement for a light well, the minimum dimension of that light well should allow the penetration of natural daylight and natural ventilation where possible.*

[redacted] [redacted] ADOPTS A LIGHT WELL ON THE BOUNDARY TO ENSURE BEDROOMS WITH IN THE DEEPER SECTION OF THE FLOOR PLATE MEET THE REQUIRED DAYLIGHT CONDITIONS. OVERLOOKING AND PRIVACY CONCERNS ARE MITIGATED BY THE STAGGERING OF BEDROOM WINDOWS TO RESTRICT VIEWS BETWEEN APARTMENTS.

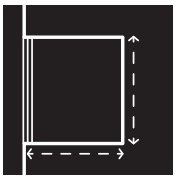
THE LIGHT WELL REMAINS CLEAR TO THE SKY TO ENSURE BEDROOMS RECEIVE ADEQUATE DAYLIGHT ACCESS.



TYPICAL RESIDENTIAL FLOOR PLAN DEMONSTRATING THE INTEGRATION OF A LIGHT WELL TO PROVIDE DAYLIGHT ACCESS TO BEDROOMS.

[redacted]

03_ROOM DEPTH



Aim:
The standard seeks to ensure that each apartment is able to receive an adequate amount of daylight, including south facing single aspect apartments.

Room depth is critical to good apartment design. As a vital first principle all habitable rooms should have direct access to plentiful natural light. This is not only essential for quality of life and wellbeing but also to combat energy costs of artificially lighting spaces.

Enhancing apartment depth does not equate to apartments receiving adequate daylight. The proportions of the apartment width and depth are integral to the success of the apartment design. Apartments with habitable rooms which are positioned more than 8m from the facade are often compromised resulting in habitable rooms with inadequate daylight levels.

A room depth to ceiling ratio ensures that the required daylight levels are met in all apartments at the master planning phase. Considering this, the daylight levels with in apartments, which differ from direct sunlight conditions, are similar for all dwellings irrespective of orientation and outlook. A 2.5:1 ratio should be considered for all apartments, including those which are south facing and single aspect in lieu of the proposed 2:1 ratio for these conditions.

Similarly, a base position for minimum internal ceiling heights of 2.7m will ensure that the internal amenity of the apartments provide for positive living spaces and achieve the aims set out in the above standard. To offset the effects of increased floor to floor heights discretion should be provided to the amount of floor area which is required to achieve this minimum ceiling height. In [redacted] a coffered detail allows for a reduced ceiling height around the perimeter of the central living spaces. This zone houses the building services whilst maximising the ceiling heights in the centre of the living zones.

First Principles
_ *All habitable rooms should have access to plentiful natural daylight*
_ *The proportions of apartment width and depth are integral to the success of apartment design.*
_ *Apartments with a depth to habitable rooms greater than 8m are a compromise and should be avoided with master planning.*
_ *A room depth to ceiling ratio for habitable rooms should be adopted*
_ *Minimum internal ceiling heights of 2.7m should be considered from master planning.*

Application considerations
_ *A 2.5:1 room depth to height ratio should be considered for all apartments, including those which are south facing and single aspect.*
_ *Discretion should be given to the amount of floor area required to achieve the minimum ceiling height to allow for the design of bulkheads and building services.*

[redacted] ADOPTS A COFFERED CEILING DETAIL IN THE MAIN LIVING AREA WITH A LOWERED CEILING HEIGHT AROUND THE PERIMETER TO ACCOMMODATE FOR BUILDING SERVICES. THIS STRATEGY HELPS OFFSET THE EFFECTS OF INCREASED FLOOR-TO-FLOOR HEIGHTS WHILST PRESERVING MAXIMUM CEILING HEIGHTS TO CENTRAL LIVING ZONES.

TYPICAL 1 BEDROOM APARTMENT

TYPICAL 2 BEDROOM APARTMENT

[redacted]

04_WINDOWS

Aim:
The standard seeks to ensure that all habitable rooms have direct access to daylight by requiring a window to be directly visible from any point in the room.

All habitable rooms should have a window that is visible from any point in that room. Direct access to daylight provides a better internal amenity, a higher quality of life and wellbeing but also the ability to combat energy costs of artificially lighting spaces which do not meet this standard. This standard can be met if the ideal minimum apartment frontages are adopted and the correct internal planning principles applied.

The ideal minimum frontage for a one bedroom apartment is 7m and the ideal minimum frontage for a two bedroom apartment is 10m. If the frontages are less than these, then the design strategies for allowing light into these spaces begin to compromise the success of the apartment. For example, saddleback apartments setback a second bedroom from the frontage, offsetting it from the primary bedroom creating a light corridor.

Saddle back apartments result in a compromised bedroom environment with a light corridor that is an inefficient and poor use of space. A borrowed light bedroom is also a compromise that does not have any access to a primary frontage and borrows light from an area that does, such as a living room. A borrowed light apartment of 55m^2 with a frontage of 5m is less efficient in providing useable space and daylight to the owner than a 45m^2 apartment that provides three and four meter frontages to the living and bedrooms respectively.

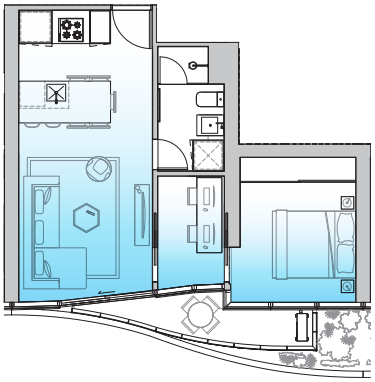
This standard will ensure that future apartments provide healthy and sustainable living environments with habitable rooms which have direct access to daylight.

First Principles
_ All habitable rooms should have access to direct natural daylight
_ All bedrooms should have at least 3m of glazed frontage
_ All living areas should have at least 4m of glazed frontage
_ Saddlebacks and borrowed light apartments are a compromise and should be avoided with master planning
_ All habitable rooms should have access to daylight from anypoint with in that room

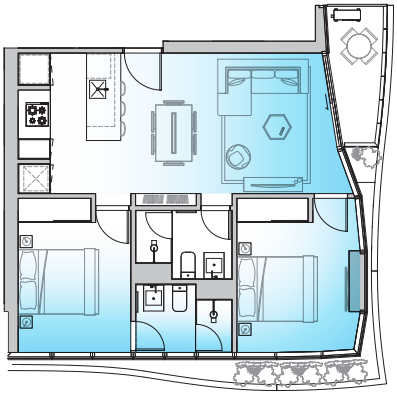
[redacted]

ALL APARTMENTS ARE PLANNED SO THAT WINDOWS IN HABITABLE ROOMS ARE DIRECTLY VISIBLE FROM ANY POINT IN THAT ROOM. IN SINGLE ASPECT APARTMENTS ALL HABITABLE ROOMS ARE POSITIONED AGAINST THE FACADE, DUAL ASPECT APARTMENTS HAVE HABITABLE ROOMS DISTRIBUTED AGAINST EITHER FACADE TO TAKE ADVANTAGE OF THE PREFERRED OUTLOOK.

SUITABLE APARTMENT FRONTAGES ENSURE THAT HABITABLE ROOMS HAVE DIRECT ACCESS TO DAYLIGHT WHICH DO NOT RELY ON SADDLE-BACK OR BORROWED LIGHT CONFIGURATIONS TO PROVIDE DAYLIGHT TO COMPROMISED BEDROOMS.



TYPICAL 1 BEDROOM APARTMENT

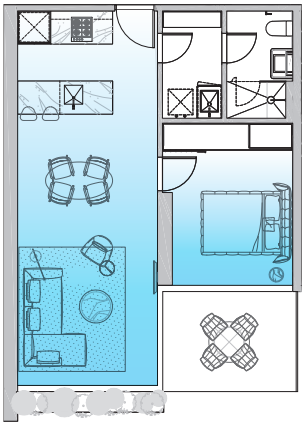


TYPICAL 2 BEDROOM APARTMENT

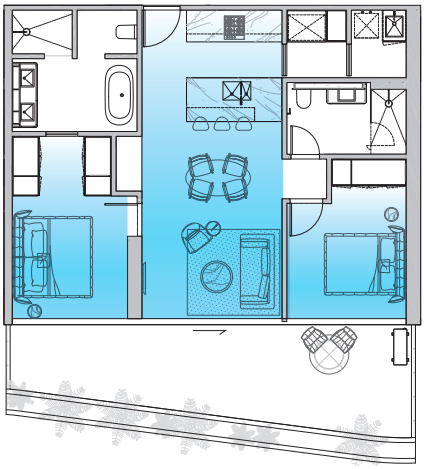
[redacted]

ALL APARTMENTS ARE PLANNED SO THAT WINDOWS IN HABITABLE ROOMS ARE DIRECTLY VISIBLE FROM ANY POINT IN THAT ROOM. IN SINGLE ASPECT APARTMENTS ALL HABITABLE ROOMS ARE POSITIONED AGAINST THE FACADE.

SUITABLE APARTMENT FRONTAGES ENSURE THAT HABITABLE ROOMS HAVE DIRECT ACCESS TO DAYLIGHT WHICH DO NOT RELY ON SADDLE-BACK OR BORROWED LIGHT CONFIGURATIONS TO PROVIDE DAYLIGHT TO COMPROMISED BEDROOMS.



TYPICAL 1 BEDROOM APARTMENT



TYPICAL 2 BEDROOM APARTMENT

[redacted]

05_STORAGE

Aim:
The standard seeks to ensure that each apartment has a reasonable amount of storage space to allow people to live comfortably and provide for different space requirements of different households.

Well considered storage spaces are integral to good apartment design and internal planning. This provides residents with conveniently accessible storage provisions and allows a greater efficiency in usable space. As a first principle all apartments should have adequate utility storage in the kitchen, bathroom and bedrooms to allow for the changing requirements of different households. Provision of additional storage facilities, outside of the apartment, should also be provided for longer term and seasonal adjustments.

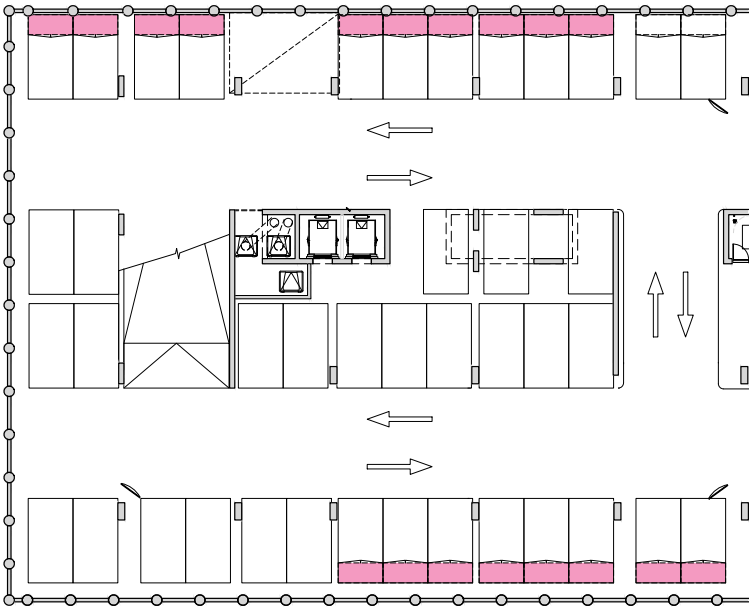
Due to the infrequent need for this space the latter can be provided by way of additional secure storage elsewhere in the building. The requirement for 6-10 cubic metres of storage for respective apartments does not allow for the use of most standard proprietary above bonnet storage systems. Where previously this was provided through the clever use of under utilised space, this will now require the provision of more floor area dedicated to storage .

First Principles
_ *All apartments should have adequate storage provisions in the kitchen, bedrooms and bathroom spaces to allow for the day to day workings of a modern household.*
_ *Discretionary minimum volume sizes should address the size of the apartment.*
_ *Additional storage provisions should be provided for seasonal adjustments. This can be provided in a secure location elsewhere within the building due to the infrequent requirement for this space.*

Application considerations
_ *The total minimum volumes outlined in Table 1: Storage Space should be discretionary and allow for the use of proprietary storage systems such as above bonnet provisions.*

[redacted]

ADEQUATE STORAGE SPACES WITHIN THE APARTMENT PROVIDES RESIDENTS WITH A GREATER EFFICIENCY IN USABLE SPACE. THE PROVISION OF ADDITIONAL STORAGE FACILITIES, AS DEMONSTRATED HERE BY WAY OF ABOVE BONNET CAGES, OUTSIDE OF THE APARTMENT PROVIDE FOR LONGER TERM AND SEASONAL ADJUSTMENTS. THESE ZONES TAKE ADVANTAGE OF UNDER UTILISED SPACE WITHOUT THE REQUIREMENT FOR MORE FLOOR AREA TO BE DEDICATED TO STORAGE PROVISIONS.



ADDITIONAL APARTMENT STORAGE PROVIDED BY WAY OF ABOVE BONNET CAGES.

[redacted]

06_NOISE IMPACTS

Aim:
The standard seeks to ensure that new apartments achieve a reasonable standard of acoustic performance in relation to noise transmission.

The mitigation of noise from outside or between internal apartment spaces can be addressed at both a planning level and a building façade design level. In both instances site analysis is an important process designers must undertake to understand the sources of noise from both within and outside apartment buildings. This will help ensure that noise transmission within the site is minimised.

Façade design, particularly the selection of materials and their performance, can mitigate the degree of external noise entering apartments. Acoustic performance can be optimised at both a micro-level (for example, in the specific composition of double-glazed units) and at a macro level (for example, by utilising wintergarden spaces to provide a spatial acoustic buffer to spaces we intend to be quiet.

Having also considered the suitable location of mechanical plant and ancillary service zones, good internal planning can mitigate acoustic issues between apartments from a very early stage in the design process. The 'mirroring' of typical apartment configurations can allow similar uses (bedrooms, wet areas, balconies or living areas) with similar acoustic demands to back on to each other, in turn restricting instances of neighbouring apartments having spaces with differing acoustic demands. Similarly, the positioning of bathroom and kitchen zones within an apartment can act as a buffer to noise sensitive spaces from sources such as common area passageways , building service zones and lift cores.

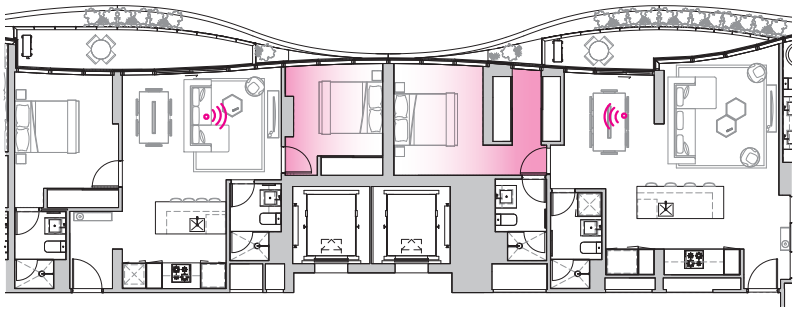
First Principles
_ *Conduct a thorough site analysis to understand the sources of noise on land.*
_ *Engage traffic and acoustic consultancies early in the design process.*
_ *Select and design the building envelope to mitigate against noise.*
_ *Typical apartment configurations can be arranged to allow similar uses to be positioned back-to-back to mitigate noise transfer between the two.*

[redacted]

THE TYPICAL APARTMENT FLOOR PLANS ARE DESIGNED WITH CONSIDERATION OF THE NOISE WHICH EMANATE FROM INTERNAL AND EXTERNAL SOURCES. EXTERNAL NOISE SOURCES ARE MANAGED THROUGH THE DESIGN OF THE BUILDING ENVELOPE AND SELECTION OF APPROPRIATE BUILDING MATERIALS.

MITIGATION OF INTERNAL NOISE IS ACHIEVED THROUGH THE POSITIONING OF BATHROOM AND KITCHEN ZONES WHICH CREATE A BUFFER TO NOISE SENSITIVE SPACES WITH IN THE APARTMENT. INTER-APARTMENT NOISE TRANSFER IS FURTHER MITIGATED BY THE MIRRORING OF SIMILAR USES WHICH ARE POSITIONED IN A BACK TO BACK MANNER.

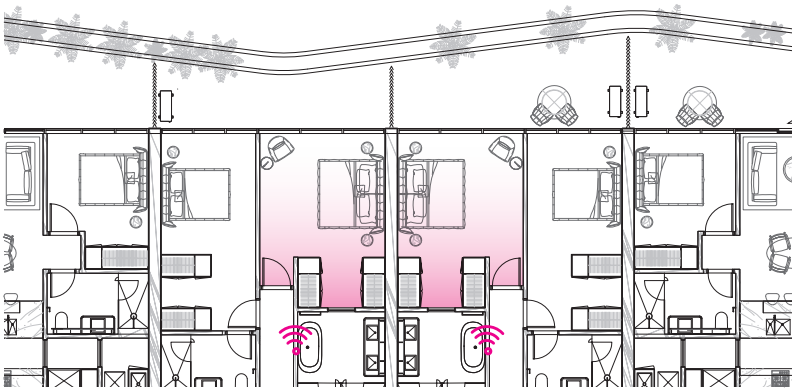
LARGE MECHANICAL PLANT AND SERVICE ZONES ARE LOCATED AWAY FROM SENSITIVE APARTMENT SPACES IN THE BASEMENT AND AT THE TOP OF THE BUILDING.



DETAIL A OF TYPICAL RESIDENTIAL FLOOR PLAN DEMONSTRATING APARTMENT PLANNING AND MITIGATION OF INTERNAL NOISE.

[redacted]

SIMILAR TO [redacted] THE MITIGATION OF INTERNAL NOISE SOURCES IS ACHIEVED THROUGH THE POSITIONING OF BATHROOM AND KITCHEN ZONES WHICH CREATE A BUFFER TO NOISE SENSITIVE SPACES WITH IN THE APARTMENT. INTER-APARTMENT NOISE TRANSFER IS FURTHER MITIGATED BY THE MIRRORING OF SIMILAR USES WHICH ARE POSITIONED IN A BACK TO BACK MANNER.



DETAIL OF A TYPICAL RESIDENTIAL FLOOR PLAN DEMONSTRATING APARTMENT PLANNING AND MITIGATION OF INTERNAL NOISE.

[redacted]

07_ENERGY EFFICIENCY

Aim:
The standard seeks to ensure that new apartments are energy efficient.

The consumption of energy and resources within the construction industry is becoming an increasingly relevant issue as awareness towards environmental sustainability expands. Energy and resources are consumed throughout the entire lifecycle of a building, from the initial stages of construction through to the on-going energy consumption of the occupants.

Key design decisions can be made during the early stages of master planning that will help the building to adequately perform under the relevant climatic conditions. Fundamental master planning principles such as managing solar gain and building orientation, can help to reduce on-going consumption of energy and resources, such as active forms of heating and cooling. The design of new apartments should aim to maximise a north facing aspect by planning internal spaces to take advantage of direct solar access.

The engagement of an Environmentally Sustainable Design consultant will ensure that adequate ESD advice is provided and that key initiatives can be put into place to manage the consumption of energy and resources and ensure that the maximum cooling loads in the schedule are addressed.

ESD consultants can also help to measure the performance of a building against rating systems such as Green Star, that help to identify key initiatives throughout the lifecycle of a building. Energy and resource consumption can also be managed through the implementation of more innovative initiatives. Technologies such as energy monitoring systems allow residents to monitor their consumption and help to identify ways in which consumption can be minimised. Rating tools such as Green Star encourage the use of these monitoring systems, allocating points to innovative strategies and technologies.

Whilst these tools promote energy efficient design, architects should also look to standards which assess the impact our living conditions have on individual well being as well as our environment. The Well Building Standard aims to enhance human health through building design by measuring it against the following seven pillars: Air, Water, Nourishment, Light, Fitness, Comfort and Mind. These go beyond energy consumption and monitoring to promote environmentally conscious building practices which also elevate human health and comfort.

First Principles*
_ *Ensure key master planning decisions improve building performance under relevant climatic conditions*
_ *Engage an ESD consultant to provide adequate advice towards key sustainability initiatives*
_ *Use building standards which inform how living conditions impact human health and well being as well as our environment.*

*With thanks to [redacted]

DIAGRAM_01

EXCERPT FROM THE WELL BUILDING STANDARD V1 (MAY 2016) DEMONSTRATING FIVE OF THE SEVEN WELL BUILDING STANDARD PILLARS. THESE GO BEYOND ENERGY CONSUMPTION AND MONITORING TO PROMOTE ENVIRONMENTALLY CONSCIOUS BUILDING PRACTICES WHICH ALSO ELEVATE HUMAN HEALTH AND COMFORT.

		Core and Shell	New and Existing Interiors	New and Existing Buildings
Air				
01	Air quality standards	P	P	P
02	Smoking ban	P	P	P
03	Ventilation effectiveness	P	P	P
04	VOC reduction	P	P	P
05	Air filtration	P	P	P
06	Microbe and mold control	P	P	P
07	Construction pollution management	P	P	P
08	Healthy entrance	P	O	P
09	Cleaning protocol		P	P
10	Pesticide management	P		P
11	Fundamental material safety	P	P	P
12	Moisture management	P		P
13	Air flush		O	O
14	Air infiltration management	O	O	O
15	Increased ventilation	O	O	O
16	Humidity control		O	O
17	Direct source ventilation	O	O	O
18	Air quality monitoring and feedback		O	O
19	Operable windows	O	O	O
20	Outdoor air systems	O	O	O
21	Displacement ventilation		O	O
22	Pest control		O	O
23	Advanced air purification	O	O	O
24	Combustion minimization	O	O	O
25	Toxic material reduction		O	O
26	Enhanced material safety		O	O
27	Antimicrobial activity for surfaces		O	O
28	Cleanable environment		O	O
29	Cleaning equipment		O	O
Water				
30	Fundamental water quality	P	P	P
31	Inorganic contaminants	P	P	P
32	Organic contaminants	P	P	P
33	Agricultural contaminants	P	P	P
34	Public water additives	P	P	P
35	Periodic water quality testing		O	O
36	Water treatment	O	O	O
37	Drinking water promotion	O	O	O
Nourishment				
38	Fruits and vegetables		P	P
39	Processed foods	P	P	P
40	Food allergies	P	P	P
41	Hand washing		P	P
42	Food contamination		P	P
43	Artificial ingredients	O	P	P
44	Nutritional information	O	P	P
45	Food advertising	O	P	P
46	Safe food preparation materials		O	O
47	Serving sizes		O	O
48	Special diets		O	O
49	Responsible food production		O	O
50	Food storage		O	O
51	Food production	O	O	O
52	Mindful eating	O	O	O
Light				
53	Visual lighting design		P	P
54	Circadian lighting design		P	P
55	Electric light glare control	P	P	P
56	Solar glare control	O	P	P
57	Low-glare workstation design		O	O
58	Color quality		O	O
59	Surface design		O	O
60	Automated shading and dimming controls		O	O
61	Right to light	O	O	O
62	Daylight modeling	O	O	O
63	Daylighting fenestration	O	O	O
Fitness				
64	Interior fitness circulation	P	O	P
65	Activity incentive programs		P	P
66	Structured fitness opportunities		O	O
67	Exterior active design	O	O	O
68	Physical activity spaces	O	O	O
69	Active transportation support	O	O	O
70	Fitness equipment	O	O	O
71	Active furnishings		O	O

08_SOLAR ACCESS TO COMMUNAL OUTDOOR OPEN SPACE

Aim:
The standard seeks to ensure that any communal outdoor open space provided on site for residents achieves a specific amount of direct sunlight through good orientation.

Solar access can be optimised from an early stage in the design process, at the master planning stage, by way of the shaping, arrangement and separation of building masses on site. It is inherently linked to apartment outlook. It is important to note that the optimisation of direct (i.e. northern) solar gain may conflict with the optimisation of outlook. Sunlight can be gained in both direct and indirect form and designers must use their expertise to determine the best combination of outlook and solar access on a site-specific basis. Where possible, the open space should be located on the north side of a building to take advantage of direct solar access. The standard will provide a benchmark for future apartment buildings which will ensure that the use and placement of communal outdoor spaces offers residents open space which is functional and utilised year round.

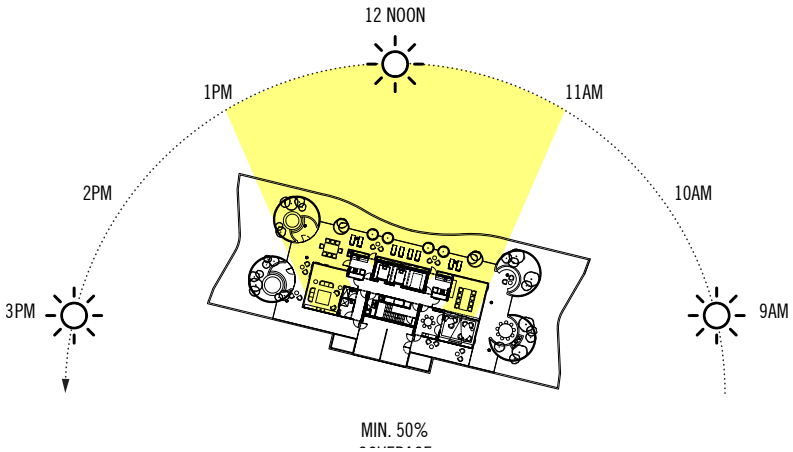
The design, placement and dimensions of communal outdoor open space should allow for a window of direct sunlight. This is also dependant on the existing built form context of adjoining sites. As a result of this, or where sunlight access is compromised, external elements can be introduced into the design of the building envelope to encourage and influence the quality and volume of solar gain in these areas. The geometry and orientation of these elements should be designed to best suit the orientation of the building axis. Identifying the best location for the communal open space should be determined early in the master planning process as rooftop, podium and ground floor communal spaces will provide different opportunities.

First Principles
_ *Master plan to optimise building shape and separation*
_ *Solar access to outdoor communal spaces should be considered from the beginning of a project and consider existing neighbouring or future built form.*

Application considerations
_ *Direct sunlight and ambient daylight are different conditions. Achieving the minimum 2 hour window for direct solar access between 9am and 3pm on 21 June will depend on adjoining sites and neighbouring built form.*

[redacted]

THE COMMUNAL OUTDOOR OPEN SPACE IS SITUATED ON THE ROOFTOP AND MAXIMISES DIRECT SOLAR GAIN THROUGH APPROPRIATE SITING AND ORIENTATION WHICH PROVIDES A FUNCTIONAL SPACE WHICH IS UTILISED YEAR ROUND.



VIEWS FROM THE COMMUNAL ROOFTOP SPACE AT [redacted] WHICH MAXIMISES DIRECT SUNLIGHT THROUGH GOOD PLACEMENT AND ORIENTATION.

[redacted]

09_NATURAL VENTILATION

Aim:
The standard seeks to ensure that a significant proportion of apartments in a new development have adequate natural ventilation.

Designing apartments to be naturally ventilated can occur through careful planning at the master planning stage and through innovations in façade design. While dual aspect apartments provide cross-ventilation, natural ventilation can still be achieved in single aspect apartments. This requires careful consideration of placement of openings to create pressure differentials, variations in the façade to maximise width, and the use of operable openings to provide greater control over airflow.

Openings can be placed along opposing ends of a single aspect apartment to create a pressure differential and thereby generate airflow within a room. In such cases, windows and side hung casement windows can be designed to work in conjunction to ventilate a single aspect space. All habitable rooms should have an operable window for ventilation where external conditions allow it.

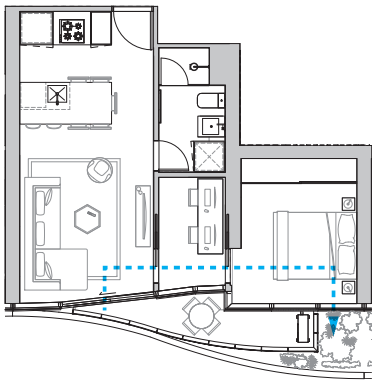
The use of innovative and flexible operable windows can further promote natural ventilation. Operable windows can work in conjunction with vents placed at the pelmet and floor to allow greater control over the extent of opening and airflow. This provides occupants with an opportunity to mediate the space, and control airflow in response to external conditions.

First principles
_ *Master plan to maximise façade width*
_ *Vary the depth in a single aspect apartment to provide opportunities for cross-ventilation*
_ *Place openings strategically to create pressure differentials which generate airflow*
_ *Mediate the space through flexible operable windows*
_ *Provide control of airflow in response to external conditions*

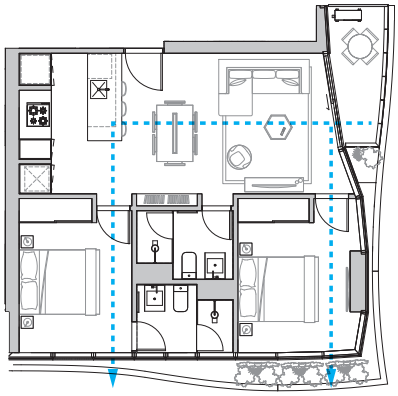
Application considerations
_ *The standard nominates that 60% of all apartments above 35m should be naturally cross ventilated and all apartments less than 80m height should be provided with operable windows. All apartments should be provided with operable windows in an external wall or through a winter garden arrangement should external conditions allow it.*

[redacted]

ALL APARTMENTS ARE DESIGNED TO PROMOTE NATURAL VENTILATION THROUGH THE CONSIDERATION OF OPENINGS IN THE FACADE AND APARTMENT WIDTH TO DEPTH RATIOS.



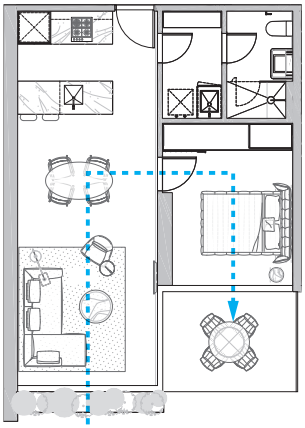
1 BEDROOM APARTMENT DEMONSTRATING NATURAL VENTILATION BREEZE PATH THROUGH A SINGLE ASPECT APARTMENT



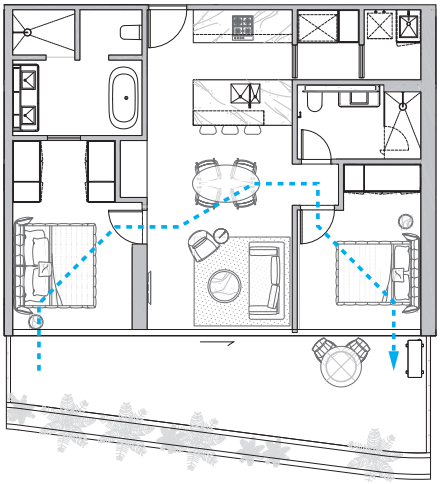
2 BEDROOM APARTMENT DEMONSTRATING NATURAL VENTILATION BREEZE PATH THROUGH A DUAL ASPECT APARTMENT

[redacted]

ALL APARTMENTS ARE DESIGNED TO PROMOTE NATURAL VENTILATION THROUGH THE CONSIDERATION OF OPENINGS IN THE FACADE AND APARTMENT WIDTH TO DEPTH RATIOS.



1 BEDROOM APARTMENT DEMONSTRATING NATURAL VENTILATION BREEZE PATH THROUGH A SINGLE ASPECT APARTMENT



2 BEDROOM APARTMENT DEMONSTRATING NATURAL VENTILATION BREEZE PATH THROUGH A SINGLE ASPECT APARTMENT

[redacted]

10_PRIVATE OPEN SPACE

Aim:
The standard seeks to ensure that each apartment is provided with an area of private open space that will meet the reasonable recreation and service needs of residents.

Apartment dwellers benefit from balconies as a form of private outdoor space, however with the increasing building heights designers should be aware of site-specific conditions such as noise, wind and air quality that may negatively impact the amenity of these spaces. Condenser units on balconies are not favourable and can be managed through the use of integrated, centralised design that places the condenser units within dedicated plant spaces throughout the building. Alternatively, should a condenser unit be placed on a balcony the space which is occupied by the unit should be subtracted from the overall area of the balcony.

The overall dimensions and configuration of a balcony should not be the defining factor. Rather, the usability and amenity of the space should govern good balcony design. By providing prescriptive rules which govern the minimum dimensions and areas of these spaces there is less flexibility afforded to the design and layout of these zones. It can also often be the case that a balcony which does not meet the prescribed controls outlined in the standard provides a more efficient use of space and functionality than the prescribed controls.

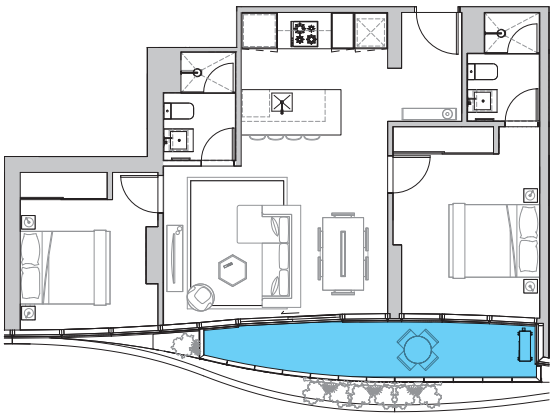
For the provision of private open space above a certain height wintergardens are an effective way to manage this provision without compromising the amenity, particularly in windy climates like Melbourne that can be cold in winter. Adaptability should govern the provision of wintergarden spaces and end users should be offered the option of integrating this within their internal space should it suit their needs. If this is the case, the original provision of private open space should be consolidated into communal space which is located elsewhere within the building.

First Principles
_ *Maximise exposed vertical planes, such as podium tops and roof tops for outdoor spaces and terraces*
_ *Understand and respond to the building height above which environmental conditions negatively impact the amenity of traditional balconies.*
_ *Usability and amenity, rather than size, defines good design of private outdoor spaces*
_ *Where feasible, design to conceal A/C units or provide remote condensers to balconies*
_ *The provision of private open space is dependant on dwelling type. I.e single, 2 bedroom or 3 bedroom dwellings have different requirements for private open space.*

Application considerations
_ *The usability and amenity of private open space should be the defining factor, not prescriptive controls to minimum areas and dimensions.*

[redacted]

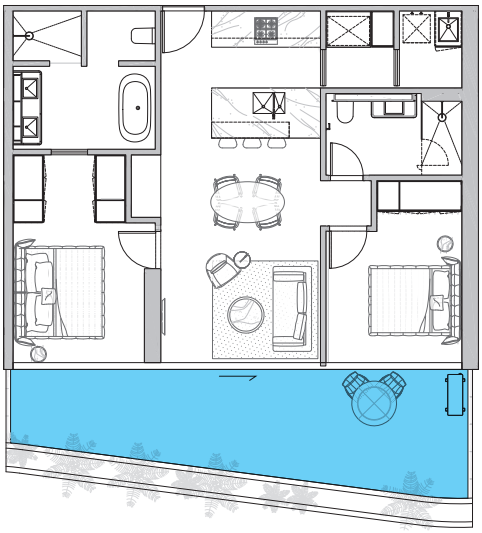
APARTMENTS ARE DESIGNED WITH PRIVATE OPEN SPACE WHICH IS USABLE AND PROVIDES GOOD AMENITY TO USERS OFFERING A FLEXIBILITY WITHOUT THE ADOPTION OF MINIMUM DIMENSIONS. THIS ALLOWS FLEXIBILITY IN THE DESIGN OF THE BUILDING AND CONFIGURATION OF BALCONY ZONES.



2 BEDROOM APARTMENT WITH PRIVATE OPEN SPACE WHICH IS ACCESSIBLE FROM BOTH THE MAIN BEDROOM AND LIVING ZONE BUT DOES NOT MEET THE PRESCRIPTIVE CONTROLS FOR MINIMUM DIMENSIONS

[redacted]

APARTMENTS ARE DESIGNED WITH PRIVATE OPEN SPACE WHICH IS USABLE AND PROVIDES GOOD AMENITY TO USERS OFFERING A FLEXIBILITY WITHOUT THE ADOPTION OF MINIMUM DIMENSIONS. THIS ALLOWS FLEXIBILITY IN THE DESIGN OF THE BUILDING AND CONFIGURATION OF BALCONY ZONES.



2 BEDROOM APARTMENT WITH PRIVATE OPEN SPACE WHICH IS ACCESSIBLE FROM BOTH THE MAIN BEDROOM AND LIVING ZONE BUT DOES NOT MEET THE PRESCRIPTIVE CONTROLS FOR MINIMUM DIMENSIONS

[redacted]

11_COMMUNAL OPEN SPACE

Aim:
The standard seeks to ensure that an area of communal open space is included in new apartment buildings for the benefit of residents

Shared communal spaces are a good opportunity for residents of the building to foster a community environment. Larger components of built area such as podium tops and roof tops can be an effective way to introduce communal outdoor space into the development in the form of roof terraces with outdoor seating, BBQ areas, pools and outdoor exercise spaces. These can allow residents the same benefits as someone who lives in a detached house.

The design, placement and dimensions of these zones should allow for a range of activities which cannot typically be conducted within the individual apartments. This means that there should be a provision of both indoor and outdoor spaces in communal areas. A minimum provision of communal open space should be considered for all developments with 20 or more dwellings to cater for Melbourne's diverse population.

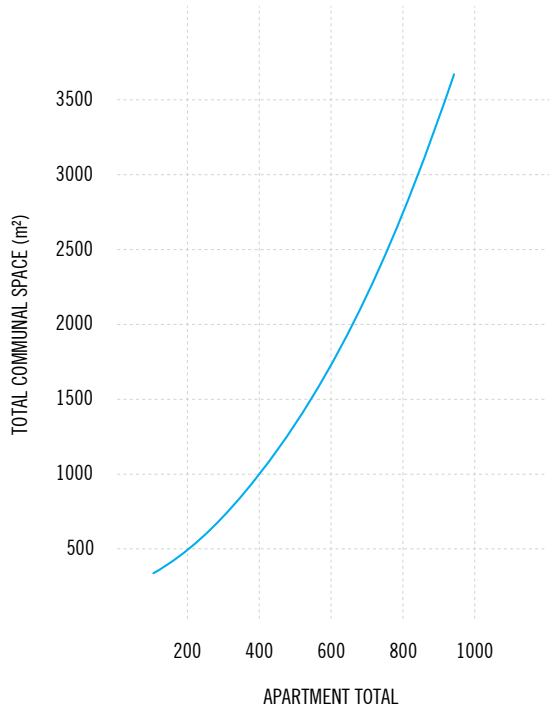
The appropriate level of communal space can be determined by applying a sliding scale which outlines the area of space required based on the number of apartments. By adopting a prescriptive minimum model there is no incentive nor requirement to provide the amount of communal space which is required to cater for larger developments.

First Principles
_ *The provision of communal space should be resolved during master planning which provides residents the flexibility of using indoor and outdoor areas.*
_ *Usability and amenity, rather than size, defines good design of communal space, a prescriptive minimum area removes the requirement to provide adequate communal space on larger projects*

Application considerations
_ *The amount of communal open space should be considered based on a sliding scale which is dependant on the number of apartments with in a development.*

DIAGRAM_01

THE APPROPRIATE LEVEL OF COMMUNAL SPACE CAN BE DETERMINED BY APPLYING A SLIDING SCALE WHICH OUTLINES THE AREA OF COMMUNAL SPACE REQUIRED BASED ON THE NUMBER OF APARTMENTS IN A DEVELOPMENT. THE FOLLOWING GRAPH DEMONSTRATES THE AMOUNT OF COMMUNAL SPACE PROVISION FROM PAS[redacted] PROJECTS AND IS USED AS A BENCH MARK FOR NEW PROJECTS.



[redacted]

TOTAL FLOORS: 88
APARTMENTS 941
SERVICED APARTMENTS 210
TOTAL COMMUNAL AREAS 3429M²

3.6M² / APT

[redacted]

TOTAL FLOORS: 64
APARTMENTS 460
TOTAL COMMUNAL AREAS 1134M²

2.9M² / APT

[redacted]

TOTAL FLOORS: 30
APARTMENTS 283
TOTAL COMMUNAL AREAS 716M²

2.5M² / APT

[redacted]

12_LANDSCAPING

Aim:
The standard seeks to ensure that new development is responsive to its landscape context, retains significant vegetation, maintains habitat and provides for canopy trees.

Melbourne has a sophisticated residential market and buyers' expectations for landscaped areas differ when considering, for example, CBD developments against outer suburban developments. The types of landscaping in and around a building should reflect this and the general character of the existing neighbourhood and look to protect any predominant landscape features.

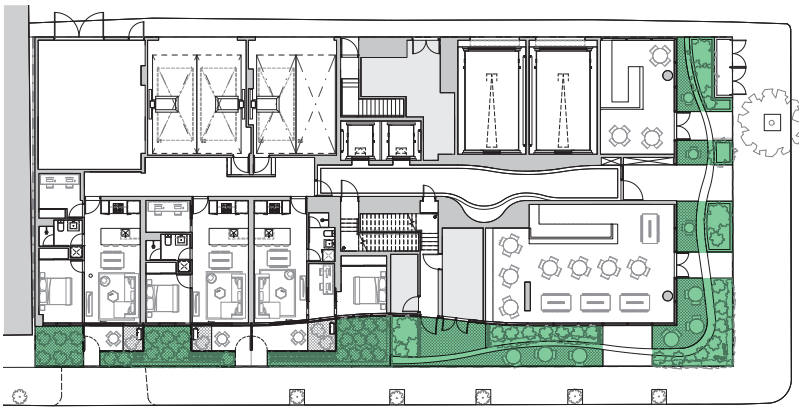
Landscaping is an item that is often linked with outdoor space. All developments should be able to provide a form of landscaped area which is not limited to Ground level. New forms of landscaped outdoor space can be created at podium tops and rooftops which provide elevated views and introduce tactile, softened edges to the building. The quality or merit of landscaped area should be considered of more importance than the overall size or percentage of site area. Considering this, the existing landscape context should be addressed and inform the building design early on in the master planning process so that significant vegetation is maintained and the provision of canopy trees maximised. Where this is not possible, or where deep soil areas are limited, alternative landscaping opportunities such as green walls and roof top gardens should be integrated into the building design.

When considering suitable landscape provisions consideration should be given to the scale of a development. Equally, each development should be assessed in regards to context and location. Developments neighbouring parks or large expanses of green areas would require fewer landscaped areas within the development itself as access to these spcaes is more readily available to residents.

First Principles
_ *Integrate landscaping and greenery into rooftop and podium top spaces where possible to avoid overuse of hardscaping*
_ *Provide landscaped areas where greater public benefit can be gained*
_ *Landscape design should be in response to an existing neighbourhood character*
_ *Optimise opportunities to borrow from existing landscaped areas or parks to both protect amenity and provide outlook.*

[redacted]

INTEGRATED LANDSCAPING AND GREENERY ON THE GROUND FLOOR AND BALCONIES PROVIDE ALTERNATIVE LANDSCAPE PROVISIONS WHICH INTRODUCE TACTILE, SOFTENED EDGES TO THE BUILDING. THIS ALSO PROVIDES RESIDENTS ACCESS TO LANDSCAPED ZONES FROM THEIR RESPECTIVE APARTMENTS.



GROUND FLOOR PLAN

VIEW OF BUILDING FACADE AND LANDSCAPING TO BALCONIES

[redacted]

13_ACCESSIBILITY

Aim:
The standard seeks to ensure that apartment developments cater to the needs of people with limited mobility by introducing minimum dimensions and design requirements for entrances corridors, bedrooms and bathroom spaces.

The needs of purchasers including those with limited mobility are market dependent and should not underline the requirement for increased bedrooms, bathrooms and access widths under the proposed standard. If considered at the early stages of apartment planning, universal design objectives are able to be achieved for end users in a large proportion of apartment housing. It is essential that these considerations are made at the early planning level to ensure that apartments are able to be adapted without affecting a building's service risers, structure, and integral design elements. This then allows apartments to be adapted to an individual user's requirements through minor changes in apartment layout, which can be offered to purchasers during an apartment building's sales and marketing phase.

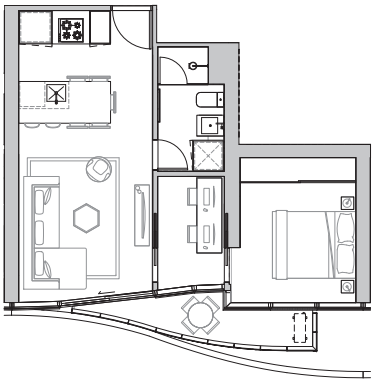
The key to achieving amenity within apartments lies in the implementation of efficient space planning and good design when accommodating required functions. Designing for universal access should not create the need for additional apartment area if done well and result only in the re configuration of internal spaces.

Current trends have shown that purchasers prefer to prioritise the size of living spaces over bedrooms and bathrooms to benefit from the flexibility of a larger living zone. Increasing minimum bedroom and bathroom sizes under this standard can result in limited flexibility with respect to the integration of study nooks and laundry joinery units when requirements for limited mobility can be achieved through adapted apartment layouts where required.

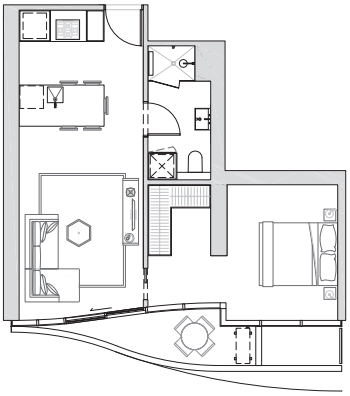
First Principles
_ *Incorporate universal design principles at the early stages of apartment planning*
_ *For accessible apartment options, plan floorplates to ensure that the locations of building services are able to accommodate flexibility in apartment layouts*
_ *To ensure apartment developments align with market demands, offer accessible layouts to buyers during the sales and marketing phase of a building rather than having enforced minimum quotas*

[redacted]

IF CONSIDERED AT THE EARLY STAGES OF DESIGN, APARTMENT LAYOUTS ARE ABLE TO BE EASILY ADAPTED TO SUIT ACCESSIBILITY REQUIREMENTS WITHOUT IMPACTING THE LOCATION OF BUILDING SERVICES, STRUCTURE OR ENVELOPE. AT 74 EASTERN ROAD THE PROVISION OF APARTMENTS WHICH MEET THE ACCESSIBILITY STANDARD CAN BE MET THROUGH THE RECONFIGURING OF INTERNAL SPACES ALLOWING THE REQUIREMENT FOR THESE APARTMENTS TO REMAIN MARKET DRIVEN



STANDARD 1 BEDROOM APARTMENT



SAME APARTMENT WHICH MEETS THE PROPOSED ACCESSIBILITY STANDARD

[redacted]

14_DWELLING ENTRY AND INTERNAL CIRCULATION

Aim:
The standard seeks to ensure that entries and internal common spaces are designed to provide high quality spaces that contribute to the overall amenity and functionality of the building

The impact of a building's entrance and street address is key when designing for a liveable city. Apartment buildings should be designed to engage with the street, with a clear visual language incorporated between the street and entrance areas to ensure both passive surveillance and ease of navigation for visitors. In inner urban areas with high pedestrian traffic, integrated retail tenancies at ground level can also be useful to create engagement between a building, the surrounding street, and the local community.

Well-designed circulation spaces are also important for residential amenity. Ideally, the floor plan of a building should be laid out to ensure that internal corridors on residential levels are as short as possible. This can be achieved by locating a building's lift core near the centre of a corridor's length to ensure that travel distances are kept to a minimum.

Amenity can also be increased for residents through the provision of natural light and ventilation to corridors, however providing this level of amenity in the corridor space can compromise the amenity of the apartments. Considering this, the ability to naturally ventilate corridor spaces above a height of 25m has a limited capacity due to the requirement for these zones to be pressurised for building services.

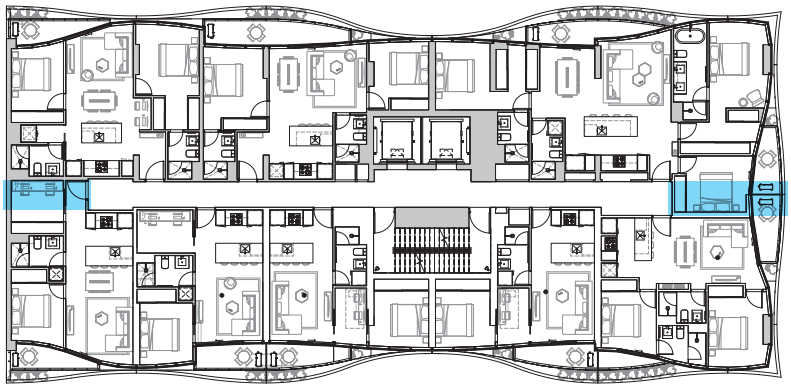
Allowing corridors access to the building facade reduces the facade area available to all apartments where the amenity of the corridor space must be considered secondary to the amenity of the apartments. The affordability of apartments is also dependant on the commercial feasibility of the overall development. Providing access to the facade for corridor spaces reduces saleable area, this reduced apartment area is then compensated by higher apartment prices.

First Principles
_ *Provide active streetscapes and passive security through the integration of shared uses at street level*
_ *Provide clear visual links to residential lobbies*
_ *Avoid conflict between pedestrian and vehicular traffic*
_ *Minimise internal corridor lengths and travel distances by centrally locating lift and stair cores*
_ *Amenity to apartments takes precedence over amenity to corridors*
_ *For medium and high rise buildings, ventilation to corridors must be closely managed to avoid external wind pressures creating problems with essential building services.*

[redacted]

THE TYPICAL APARTMENT FLOOR PLANS ARE DESIGNED TO ENSURE THAT THE INTERNAL CORRIDOR LENGTHS ARE AS SHORT AS POSSIBLE. BY INTRODUCING NATURAL VENTILATION TO CORRIDOR SPACES THE AMENITY OF THE APARTMENTS ARE COMPROMISED ALONG WITH THE DEVELOPABLE EFFICIENCY OF THE FLOOR PLATE.

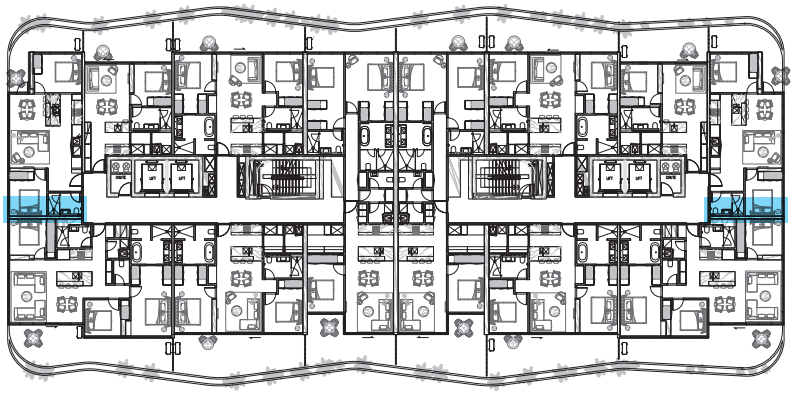
NATURAL VENTILATION SHOULD BE PROVIDED TO HABITABLE AREAS WITH IN APARTMENTS WHICH EXPERIENCE A HIGH FREQUENCY OF USE. CORRIDOR ZONES ARE USED INFREQUENTLY AND FOR SMALL PERIODS OF TIME. BY ALLOWING CORRIDORS ACCESS TO THE FACADE THIS RESULTS IN A REDUCED AMENITY TO APARTMENTS AND A REDUCTION IN THE DEVELOPMENT EFFICIENCY OF THE FLOOR PLATE BY 3%.



TYPICAL RESIDENTIAL FLOOR PLAN

[redacted]

NATURAL VENTILATION SHOULD BE PROVIDED TO HABITABLE AREAS WITH IN APARTMENTS WHICH EXPERIENCE A HIGH FREQUENCY OF USE. CORRIDOR ZONES ARE USED INFREQUENTLY AND FOR SMALL PERIODS OF TIME. BY ALLOWING CORRIDORS ACCESS TO THE FACADE THIS RESULTS IN A REDUCED AMENITY TO APARTMENTS AND A REDUCTION IN THE DEVELOPMENT EFFICIENCY OF THE FLOOR PLATE BY 2%.



TYPICAL RESIDENTIAL FLOOR PLAN

[redacted]

15_WASTE

Aim:
The standard seeks to ensure that waste management facilities are well designed and enable residents to manage their own waste easily.

The introduction of Waste Compactors to large residential developments has placed a spatial demand on apartment building design, but also many logistical benefits. Among them are fewer visits for waste collection, reducing noise disturbances and demand for human resources. Good design ensures the proximity of Building Management to waste areas for both safety and the regulation of litter and incorrect bin placement to the public realm. New technologies such as loading bay turntables for trucks can assist in counteracting the logistical spatial requirement for waste on the Ground Floor, which is often space at a commercial premium.

Residents should be afforded the opportunity to separate their forms of waste, and good design should allow for space for the storage of Hard Rubbish in addition to twin chutes for waste and commingled recycling. Commingled recycling is preferred in inner-city developments not just from a spatial perspective but to mitigate the number of separate collections to be made and the demands they place on infrastructure.

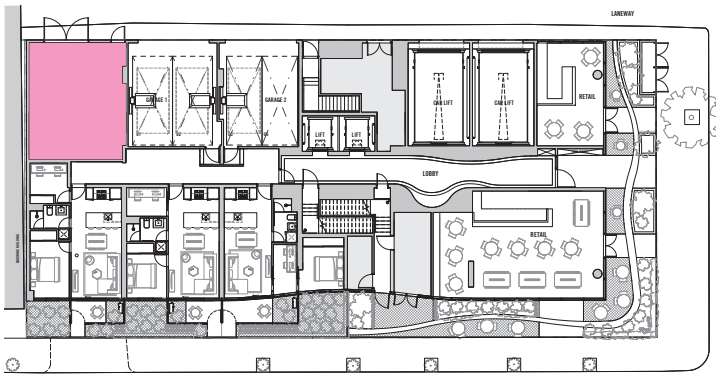
Green waste should be assessed on a case-by-case basis from an ESD consultancy, with a fundamental parameter being the capacity for the reuse of organic or composite waste within the landscape provisions of the design. Generally, smaller, inner city sites attain less real benefit from Green waste when compared to larger sites with a greater scope for landscaping.

First Principles*
_ Provide visual and spatial connection between Building Management and waste areas
_ Optimise spatial demand of Waste areas to best utilise new technology
_ Provide twin chutes and hard rubbish to allow for the separation of waste types
_ Assess Green Waste on a site-specific basis

*With thanks to Leigh Design and ARK Resources.

CASE STUDY_[redacted]

THE WASTE ROOM AND COLLECTION AREA IS LOCATED PROXIMATE TO BACK OF HOUSE SERVICE AREAS AND THE STREET. CHUTE TRANSFER, HARD RUBBISH AND BIN STORAGE IS DESIGNED TO TAKE PLACE AT GROUND FLOOD AND MAXIMISE SPACE FOR OTHER ACTIVE USES



[redacted]

THE WASTE ROOM AND COLLECTION AREAS ARE LOCATED PROXIMATE TO BACK OF HOUSE SERVICE AREAS WITH IN THE BASEMENT LEVELS. CHUTE TRANSFER, HARD RUBBISH AND BIN STORAGE IS DESIGNED TO TAKE PLACE AT THESE LEVELS TO MAXIMISE SPACE ON GROUND FLOOR FOR OTHER ACTIVE USES.

[redacted]

16_WATER MANAGEMENT

Aim:
The standard seeks to ensure that opportunities to collect and reuse rainwater and grey water are identified and implemented in new developments.

Where possible new developments should collect rainwater for non-drinking purposes. Depending on the scale of the development and where practicable this can be reticulated to provide a sustainable model for secondary water use within the building and for landscaping maintenance. Along with the management of storm water systems, measures should be adopted to allow for the water and drainage of permeable surfaces and treatment areas.

Grey water and rain water use should be assessed on a case-by-case basis from an ESD consultancy, with a fundamental parameter being the capacity for reuse within the landscape provisions of the design. Water sustainable urban design measures can be integrated into the building design to allow for the on site store and collection of water, through the use of rainwater tanks, for secondary reticulation.

Generally, smaller, inner city sites may have a reduced incentive for grey water use when compared to larger sites with a greater scope for landscaping, however all new developments should aim to provide a more sustainable model for future buildings.

First Principles
_ *Where practicable propose grey water opportunities to service building requirements such as landscaping and permeable surfaces.*
_ *Optimise demand of grey water and rainwater to best utilise new technology*

[redacted]

WATER SUSTAINABLE URBAN DESIGN MEASURES WHICH INTEGRATE THE ON SITE STORE AND COLLECTION OF WATER THROUGH THE USE OF RAIN WATER TANKS PROVIDES WATER FOR SECONDARY RETICULATION. THE TANKS WHICH ARE LOCATED IN THE BASEMENT LEVELS PROVIDE SECONDARY WATER USE FOR LANDSCAPING AND MAINTENANCE, AT 74 EASTERN ROAD THESE ARE USED TO MAINTAIN THE LANDSCAPED AREAS AT GROUND AND ON THE BALCONY ZONES.

[redacted]