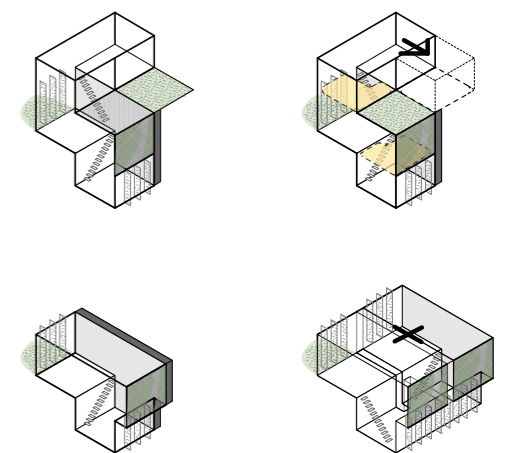


Architect: Philip Stejskal Architecture
Structural Engineer: Atelier JV
Services Engineer: Simon Tan & Associates
Landscape Architect: Place Laboratory
Geothermal Engineer: Allied Air & Peter Buck
Building Certifier: Schwanke Consulting
Quantity Surveyor: Altus Group
Energy Modelling / Life Cycle: Sustainability House
Planning Consultant: MW Urban



COVER PAGE



INTRODUCTION

THE PREMISE SO FAR:

As presented in previous stages of the competition, the central premise of our design proposal resides in something we recognise as a fundamental type of sustainability.

We believe all other conceptions of sustainability are summarised or encompassed by this one. That is, in order to facilitate this form of fundamental sustainability one must invariably have addressed the others.

We describe this critical sustainability as the notion of *Longevity*.

When a family decides to renovate their home instead of moving to another, we see this as an act of *deep conservation*. The family remains socially integrated; they conserve funds otherwise consumed by Stamp Duty or real estate agent fees; they drive less as their established relationships and routines are local; they avoid the emotional and physical upheaval that is invariably matched by financial and environmental toll.

A renovation allows an existing structure or property to remain relevant for longer, growing with its owners' changing needs, thereby avoiding the social, environmental and financial costs inherent in transitioning permanently elsewhere.

Having recognised the above efficiencies, our proposal has been conceived at every turn with longevity in mind. So that, foreseeably:

A single purchaser in their 20's could stay put as they enter a relationship (get a bigger bed), have a child (In-fill void for more space), then another (extend up), begin working from home (extend out, reconfigure spaces), and eventually become too old to use the stairs (replace stair with platform lift), no longer in need of the accumulated space (rent out ground floor on Air BnB).

In conjunction with the thriving micro-community envisaged by the project, the in-built adaptability of our proposal aims to make our building relevant to a wider public up front, and then, retain relevance for longer by adapting to their changing needs.

Sick of forever moving as needs change, many a client has approached their architect requesting they design them a "Forever House" -- a house in which to grow old. Our proposal is inspired by none other than this common request.

**** Late Notice: we have just (4.3.17) been advised that a project by Austin Maynard architects has the same name "Forever House". We will therefore look for an alternative name if successful.**



Overview from above

CAPITAL EXPENDITURE

For us the issue of affordability is multi-pronged. It is more than simply capital expenditure. It also goes beyond the affordability of ongoing costs. We believe affordability must equally address the social and environmental to be holistic and long-term.

However, the initial development cost invariably sets the tone and contributes to a project's viability. Our proposal seeks cost efficiencies in the following ways:

Timber Structure (Time and Cost Advantage)

Our proposal seeks to jump on board a world-wide revolution in building construction, namely the switch to timber.

This switch is largely premised on the advent of Cross Laminated Timber products, developed in Austria, and gaining rapid momentum.

Unfortunately its availability locally is still limited. Our proposal - whilst riding the wave of a predominantly timber structure - therefore proposes a more conventional interpretation, one that combines the efficiencies of off-site fabrication with the inherent familiarity and ease of timber-framed construction.

USG Boral have streamlined the timber-framed construction method for multi-storey Class 2 buildings with their system "Multi-frame".

This system provides pre-engineered and certified solutions for low-rise apartment construction, thereby speeding up the documentation and certification processes. By fabricating a large number of wall frames off site (due to the inherent repetition of an apartment building), the efficiencies of the system are also transferred to the construction phase.

Coupled with the PRYDA (or similar) floor cassette system, allowing floor modules also to be manufactured off site, the system offers time and cost efficiencies that can be passed onto future apartment owners.

Consolidated Services

A further efficiency is introduced by consolidating all services within defined linear zones within the building, stacking wet areas and reticulating services via risers at each end.

Alternative Solution

Regulatory frameworks take a long time to adapt to change. As such, it is difficult and costly to deliver a timber building of the nature being proposed.

An Engineered Fire Solution will be employed to deliver a safe and compliant building at a fraction of the "Deemed to Comply" cost.



Overview from SSW

+ ACCESSORISE

A further concept integral to our proposal is the ability to keep the initial construction cost lower by allowing residents to personalise their spaces over time.

We refer to this as the ability "Accessorise" the base building as funds permit, both on the individual and collective levels.

However, a building needs to be set up for this kind of future change. It needs to incorporate provisions now that permit a seamless process of adding-on later. Our proposal makes provisions in the following ways:

Kitchen:

The proposed kitchens have been designed with components from Bunnings' flat packed kitchen range. We chose Bunnings over IKEA as the former is more accessible and product lines don't change as frequently. Owners can accessorise with additional hardware (pull-out bins, etc) or opt for a mobile storage / bench unit (as described on page 8).

Lighting:

Artificial light is provided to apartments via a wall-to-wall track-lighting system. On day one each space is provided with two lamps. Owners can accessorise in future with additional lamps (either spot or pendant) to suit their needs.

Renewable Energy:

The Hybrid Photovoltaic + Battery Storage System has been designed to be expandable.

The number of panels on roofs as well as the amount of battery storage can both be augmented in future. The proposed embedded energy network means the additional infrastructure will have a direct benefit for owners. Refer page 11.



Overview from above (enlarged)



Overview from SE

+ ON GOING COST

A low on-going cost burden on owners is integral to the overall affordability concept.

Our proposal addresses this requirement in terms of the following strategies:

Low Maintenance:

Materials have been selected for their low level of reactivity within extreme coastal conditions, resulting in extended life-spans and general avoidance of ongoing maintenance. When the products do eventually expire, they are easily replaced and handled.

Examples of these materials and their credentials are offered below:

- _ Timber structure: not subject to corrosion.
- _ Timber cladding / battens: left to weather requiring no maintenance.
- _ Fibre glass cladding: integral finish; UV stable; ease of handling when needing replacement.
- _ Fibre cement (compressed): stable, moisture resistant material; left unfinished, eliminating need for maintenance.
- _ Anodised aluminium balustrades: 35 year warranty on anodising; recognised as the leader in coastal protective treatments and materials.
- _ Concrete: 40mPA for exposed elements prevents ingress of moisture.
- _ Gang-nailed truss frames (pivoting panels): LOSP treated.

Low Running Cost:

A major aspect of our proposal are the measures taken to reduce ongoing costs for owners. We have employed the following strategies:

- _ Low maintenance materials minimising strata costs.
- _ Passive design to maximise thermal performance within the parameters of a timber building.
- _ Ground-source technology to deliver highly efficient heating and cooling to apartments via a central plant.
- _ Hybrid renewable energy source (PV+batteries) that offsets electricity usage (with ability to expand).
- _ High efficiency (exceeding compliance) fixtures, fittings & appliances.
- _ Shared laundry facility to pool associated costs.
- _ Xeriscaping to ensure a low-cost landscape.

Environmental Cost (Carbon Footprint)

We feel committed to minimising the carbon footprint of our proposal. As such, we believe the building must be constructed primarily of timber due to its many green credentials.

Embedded Energy Concept

The concept of embedded energy offers multiple benefits to owners. The concept is premised on reducing the interface with Western Power to a single user account, being the Strata corporation.

On one level this is said to increase bargaining power, enabling the complex to secure better rates.

However, more importantly, it provides a necessary mechanism for the fair distribution of renewable energy collected on the property, namely the ability to calculate the proportion of renewable energy vs that supplied by the grid. The strata council is then able to mark-up the net rate and deposit takings into a renewable energy fund, which is used to purchase additional batteries over time.

+ LONGEVITY

The final component of holistic affordability is practically the most encompassing. Fleeting affordability is pointless, because it invariably points to a compromise in quality and liveability.

Our design therefore aims to offer purchasers a long-term affordability proposition.

As explained in the Introduction, our proposal has been designed around the ability to adapt to the changing needs of its owners.

Most apartments have been designed with the ability to grab more space within their original footprint, or to expand upwards and outwards into pre-defined airspace, giving owners the option to stay longer rather than moving on.

In a similar manner, those requiring more space than originally available, can chose to expand even before they take possession of their apartment. This allows the building to adapt to the prevailing profile of potential purchasers.

The parameters for expansion are explained in detail on Page 07.

EVALUATION CRITERIA

The below icons are used throughout the presentation to designate the relevance of a particular section with respect to the Evaluation Criteria.

-  DESIGN QUALITY
-  INNOVATION
-  AFFORDABILITY
-  SUSTAINABILITY



Overview from NW

ADAPTABILITY



FLEXIBLE SPACE

The project has been designed on the premise that a room is without function until one is ascribed to it by the occupant. Rather than being identified by the number of *bedrooms*, the apartments in our proposal are identified according to the number of *habitable rooms* or *flexible spaces*.

A two room apartment is therefore one that consists of two habitable spaces, supported by two wet areas, one being a bathroom, the other a kitchen.

The nature of the adjoining wet area therefore gives a flexible space it's likely use. For instance, a bathroom is more likely to adjoin a bedroom than a dining or living room.

This flexibility is made authentic on account of another innovation, namely, the consolidated "services wall".

SERVICES WALLS

The location of all services within designated, vertically-stacked zones with easily-accessible risers and bulkhead zones for reticulation, has the benefit of initial ease of construction and later ease of re-configuration.

This practicality gives the spaces of an apartment true flexibility, in that respective wet areas can be interchanged if desired. What is originally constructed as a bathroom, can be converted into a kitchen according to a pre-existing, costed and spatially interchangeable design solution.

EXPANDABILITY

In the same vein, the combination of the above concepts (*flexible space* + *services walls*) allows the apartments to expand into designated airspace with relative ease.

The proposed building will incorporate examples of such expansion in order to provide visible demonstration cases from day one. For instance, apartment number 4 extends upwards to the 4th floor, whilst apartment numbers 8 & 9 demonstrate expansion into terrace / roof space at 3rd level.

We have discussed the expandability concept with a Strata Specialist to ensure it is practically and legally supportable, which it has been confirmed to be. The necessary mechanism is a *Strata Management Plan*, which must precisely define respective air-space rights, the physical nature of such an extension, as well as the logistical process surrounding construction.

Incidentally, the proposed structural system, as well as structural load calculations, services capacities, etc have all taken into account a future expansion scenario of 100% (as depicted in the diagram on Page 07).

REAL LUXURIES

(VERSUS FAUX LUXURIES)



The marketability of our proposal lies in the provision of "real luxuries" (palpable, beneficial, practical) as opposed to the "luxuries" that are generally offered to attract potential buyers and which often mean little for liveability, such as stone tops, brand name appliances, applied feature elements, \$20,000 worth of extras, etc.

A few of the "real luxuries" promoted by this proposal are:

Natural Light

All apartments have access to northern light.

Cross Ventilation

All apartments are well cross-ventilated.

Hot Water Now

Apartments are fitted with instantaneous electric hot water systems at point of use. This eliminates litres of wastage while waiting for hot water. A 30kW PV Array + battery storage offsets electricity used by these units.

No Tiles

As part of the call for innovation, our proposal removes tiles completely from the project. Bathrooms will be fitted with high-quality proprietary shower bases, with walls and remaining floors lined in PAPEROCK, a moisture-resistant, cost-effective board that requires no maintenance, is visually attractive and durable. We conducted a full submersion test of the product sample, without any signs of deterioration after a full week of submersion. The same material is used as a kitchen benchtop and splashback material.

Personalisation

Our proposal allows occupants to personalise their spaces in the following ways:
 i) by "accessorising" as outlined on Page 1
 ii) by tailoring the shutters for privacy and environmental control.
 iii) by decorating the apartment with personal effects without having to put a nail in the wall. Refer item below.

Integrated Picture Hanging

The ability to hang pictures to personalise a space is often complicated by wall construction. Our proposal seeks to simplify this process in the following ways:
 a) a wall-to-wall picture rail is provided along one side of the apartment.
 b) selected surfaces of the opposite apartment wall (services wall) are lined with plywood, allowing occupants to affix personal effects with nails or screws as desired.
 c) yet other surfaces are lined with cork, to serve as a large scale pin up board.

High level adaptability

We consider the adaptability of the project - as described elsewhere - to be another practical luxury.



Shutter Prototype
Gang-nailed trusses



Cladding types



CLADDING: translucent fibre-glass



CLADDING: timber battens



timber batten detail

ACCESSIBILITY



The proposal addresses universal accessibility in three ways.

Apartment # 14

Day one of the completed project delivers one fully accessible apartment, complete with accessible car bay, compliant circulation clearances to entrance and bathroom doors, as well as a platform lift providing access between levels.

Apartment # 1

This apartment incorporates a universally accessible bathroom, however, is otherwise equipped as an able-bodied apartment from day one. A future wish to convert this into a fully accessible apartment would require the following to occur:

- i) A unversally accessible car bay would have to be created
- ii) An accessible entrance door would have to be installed off the circulation space of this car bay, breaking through the timber studwork wall that makes provision for the same.
- iii) Dismantling of stair and installation of platform lift.

Other Apartments

Several other apartments have the ability to convert to partially accessible dwellings, based on the following modifications:

- a) Dismantling of stair and installation of platform lift.
- b) Access from street directly into apartment.
- c) Alternative transport means.

PROTOTYPE



The competition has invited contestants to design a prototype for a new direction in affordable housing design. The design should offer clear replicability to allow incorporated innovations to be adopted within other developments, thereby bringing benefit to a wider range of the public.

The following list summarises characteristics of our proposal, which we believe are prototypical and have the potential to be widely applicable. Some of these are fundamental design strategies, which are by no means new, yet often forgotten.

Facade System

The facade system comprising operable shutters to regulate privacy and environment in front of proprietary double glazed windows / doors.

Environmentally Sustainable Systems

The combination of passive and active environmentally sustainable design principles and technology.

Adaptability (Ability to Grow)

The deep rooted integration of flexibility within the design, encompassing structure, material, planning, modularity.

Communal Life Focus

Integrated design measures to put communal life at the centre of the development without forcing it on those who value their privacy.

Street Engagement Focus

The idea that connection with context is important on many levels, including the practicality of running a business from home and needing to offer a public interface.

Ability to Accessorise

An approach to manage cost and enable personalisation by delivering a building that integrates provisions for growth and the ability for owners to tailor the apartment to their needs.

Structural System

The innovation of a largely timber structure combining proprietary construction systems (USG Boral Multiframe + PRYDA Floor Cassette System) in conjunction with a traditional carpark shell.

Materiality

The use of proprietary and cost-effective materials with high levels of durability and aesthetic interest and quality.

Prototype of a PROTOTYPE

In order to test one of the main elements of our proposal, we decided to build a prototype of the facade system.

The construction of the test panels was completed. However, unfortunately the builder was not able to mount them within their frame in time for submission.

The panels were prepared in the following way:

- a) Gang-nailed trusses were shop-drawn and fabricated
- b) Delivered to site
- c) Trusses would typically be painted at this point
- d) Trusses clad with two specified materials
- e) Trusses to be trimmed with protective angle edging
- f) Trusses to be installed within opening

Photos of this process are included below:



WHY NIGHTINGALE?

The competition brief calls for investigations into innovative procurement methods that seek to re-interpret the traditional developer involvement. Our exploration of opportunities in this area began with a conversation with our competition partner, the developer / builder. This entity has confirmed a commitment to the ethical investment concept which undergirds alternative delivery structures such as Nightingale.

In further investigating this area, we looked further into the Nightingale model, and realised that our project was aligned with many principles and aspirations inherent in the eastern states model. We therefore decided to have a chat with Jessie Hochberg, CEO of Nightingale, and soon realised that a potential opportunity existed to partner with Nightingale in the delivery of this project, should we be successful.

A letter from the Nightingale CEO has been included to the right, as evidence of our discussions.

Below we outline the reasons why we believe this established delivery model could work for this project / competition outcome.

LONGEVITY

The Nightingale model is focussed on quality outcomes and communal life. The inherent ability of our proposal to grow with its owners imparts a long-term view and the associated value placed on a location. If someone knows they can stay put for the long term, they are more likely to invest in a place, in a community.

AFFORDABILITY

The Nightingale model is focussed similarly on sustainable affordability, meaning one that considers long-terms costs, not simply the initial expenditure.

SUSTAINABILITY

In the area of sustainability, there is perfect alignment between the aspirations of Nightingale and LandCorp.

QUALITY

Our proposal imagines an affordable product that doesn't compromise on quality. This is similarly a Nightingale objective.

INFORMED BUYERS

Due to the popularity of the Nightingale model, a waiting list of interested purchasers has been established. This list is also starting to be established locally with the EHDO Knutsford Nightingale Project gaining momentum. By partnering with Nightingale, our project would have access to this register of people, who are already sold on the idea of living in a development built on principles of meaningful sustainability, community and longevity.

INNOVATIVE DELIVERY METHOD

By offering access to a pool of already interested buyers, the Nightingale model allows the project to save money on marketing and sales components, which typically account for around \$100k on a project of this size. Furthermore, the licensed model caps the developer's profit, thereby assuring an ethical investment. The establishing community is nurtured by the Nightingale model as it encourages owners to stay put for longer by restricting profits owners can make by selling within the first number of years.



LETTER OF CONFIRMATION:



Studio 2, 9 Florence Street Brunswick VIC 3056
Phone – 613 9381 2007
Email – admin@nightingalehousing.org
ABN – 93 609 876 879

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To Whom It May Concern,

Step Up Affordable Housing Design Competition

Following my recent discussion with [REDACTED] proponents of the "Forever House" project, I am pleased to confirm that - in principle - Nightingale would be happy to consider the project for a license, based on a review of the team's Stage 2 competition entry.

I understand that the project has been developed in response to a competition coordinated by LandCorp, and that a portion of the winning design will be used by LandCorp for demonstration purposes for an agreed period, post-completion.

Nightingale Housing would be pleased to partner with LandCorp in the delivery of the project to utilise the Nightingale Model nightingalehousing.org/model, should it be successful both in the competition and also the Nightingale licensing process.

Jessie Hochberg

**Chief Executive Officer
Nightingale Housing**

p: [+61 0402414289](tel:+610402414289)
e: jessie@nightingalehousing.org



BALCONIES

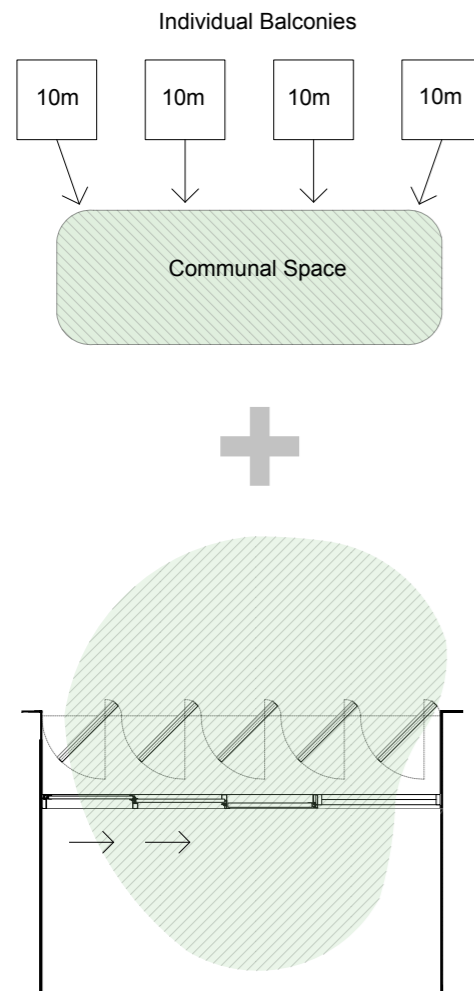


Requirement: R-Codes Clause - C1.2

"...Each multiple dwelling is provided with at least one balcony or the equivalent, opening directly from a habitable room and with a minimum area of 10m² and minimum dimension of 2.4m..."

Our innovation regarding the provision of balconies is based on the observation that balconies are often under-utilised due to poor placement or exposure to inclement weather. Yet the provision of 10sqm of under-utilised space nevertheless has substantial capital and ongoing costs.

Our proposal is therefore to pool the cost and area associated with the provision of individual balconies, for the collective benefit. Though this consolidation of funds and space, our proposal offers residents spatially generous communal areas with high levels of amenity.



INDOOR - OUTDOOR

Integral to our optimisation of the R-Codes minimum balcony provision, is the recognition that communal space -- no matter how good -- isn't always appropriate. Privacy is necessary.

This is where the facade shutters allow residents to regulate their public interface without sacrificing a connection to the outdoors. The facade is peeled open by way of stacking sliders, rendering previous interior spaces, exterior. Shutters enable admission or rejection of prevailing breezes, direct sun or passing gazes.

STORAGE



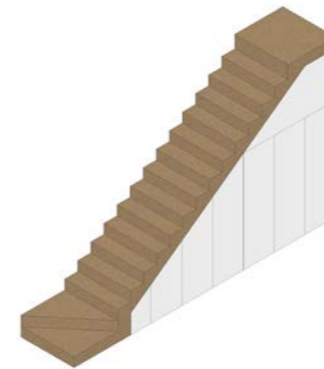
Requirement: R-Codes Clause - C6.1

"... An enclosed, lockable storage area, constructed in a design and material matching the building/dwelling where visible from the street, accessible from outside the dwelling, with a minimum dimension of 1.5m and an internal area of at least 4m² shall be provided for each multiple dwelling ..."

In pursuit of a holistic affordability solution, our proposal seeks to optimise the R-Codes requirement for individual storage, by providing the required 4sqm not in a single location, but in a more diversified manner delivering higher levels of practicality as explained below.

ENCLOSED UNDERSTAIR STORAGE

An under-stair cupboard provides the internal apartment storage solution. The NBN cabinet is located here, incorporating the apartment Distribution Board. Discrete and integrated, this storage solution offers day-to-day practicality.



OVER BONNET STORAGE

Bulk storage is provided external to the apartment in the form of a proprietary over-bonnet storage unit.

This unit offers a solution for suitcases and other larger articles, to which access is not required on a regular basis.

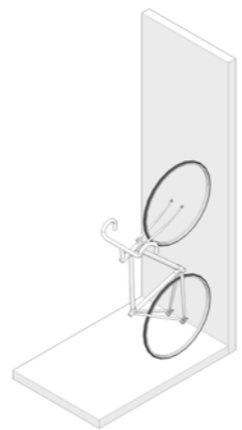
The unit utilises space above the car bonnet, otherwise under-utilised, is lockable and fabricated of powder-coated steel for durability.



COMMUNAL BIKE STORAGE

The final aspect of the proposed storage solution addresses the specific dilemma of bicycle storage.

By integrating a dedicated bicycle storage area near the main entrance of the building, we hope to provide a solution for the common scenario whereby expensive bikes end up sharing the living room of apartments because other storage options are either insufficiently secure or crammed with other personal effects.



PARKING



Requirement: R-Codes Clause - C3.1

Plot ratio area and type of multiple dwelling	Car parking spaces	
	Location A	Location B
Less than 110m ² and/or 1 or 2 bedrooms	1	1.25
110m ² or greater and/or 3 or more bedrooms	1.25	1.5
Visitors car parking spaces (per dwelling)	0.25	0.25

Refer Town Planning Report for detailed assessment.

Based on the pursuit of affordability and maximised opportunity for those seeking a high quality, communal, yet cost effective dwelling, our proposal adopts an optimistic viewpoint with respect to parking. According to the Structure Plan and general common sense, we believe a high frequency bus route is likely in the near future along Cockburn Road. As such, our design incorporates 1 car bay per apartment, with the inclusion of one universally accessible bay. Visitor parking is provided off-site, in light of ample street parking opportunities locally.

CITY OF COCKBURN - TRAVEL SMART

A further aspect of our optimism about the future of transportation is encompassed in our proposal that the Strata Company sign up for the City of Cockburn's Travel Smart initiative - promoting car-pooling and less reliance on the traditional quota of car-per-household.



VISITOR PARKING ON STREET

The Shorelines Development offers generous on-street parking along Anchorage Drive and generally in close proximity to the site. It is therefore envisaged that visitors park off-site, able to experience the communal entrance procession up the main stairs and through the collective space of the podium courtyard.



VISITORS ARRIVING BY BIKE / FUTURE LIGHTRAIL

Visitor bike parking is provided in the forecourt, with the alternate possibility of taking bikes up the bike ramp onto the podium level for more secure parking near the apartment being visited.



ENVIRONMENTAL STRATEGY

PASSIVE + ACTIVE + TIMBER

Our environmental strategy consists of both passive and active components.

Passive design elements are generally a given for any architecturally conceived project. Active strategies are generally more expensive, and have been considered carefully to optimise the cost vs benefit scenario.

Yet, we consider the most innovative part of our environmental strategy to be the predominantly timber structure.

PASSIVE SYSTEMS

Building Measures:

- _ Double-height entrance area acts as breezeway
- _ Cross-ventilation through courtyard
- _ Voids into carpark provide further breezeways
- _ Green spaces
- _ Operable shutters to common areas to protect
- _ Roof form admits northern sun in winter
- _ Predominant timber construction

Apartment Modules:

- _ Double-height apartment volumes aid air movement
- _ All apartments have dual orientation
- _ All apartments have access to north-light
- _ Absolute control of solar ingress via shutters
- _ Protection against inclement weather via shutters
- _ Traditional thermal mass to many apartments
- _ Innovative thermal mass (Phase Change Material) to all
- _ Air movement in the form of ceiling fans

https://www.netatmo.com/product/weather/weatherstation



MONITORING

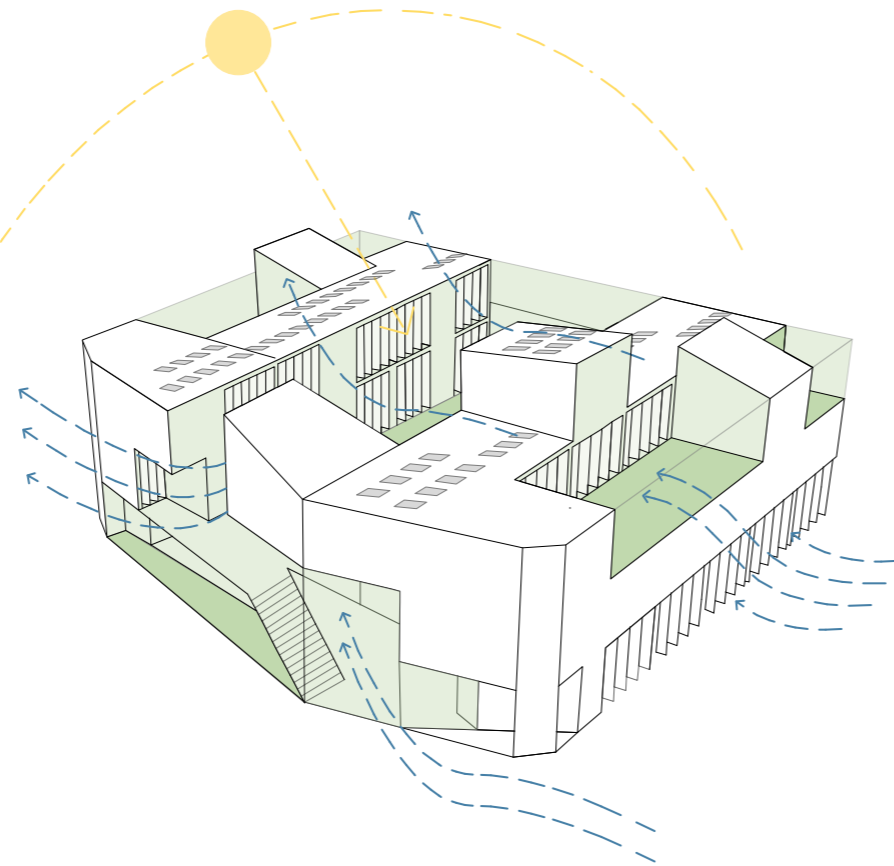


Weather Station

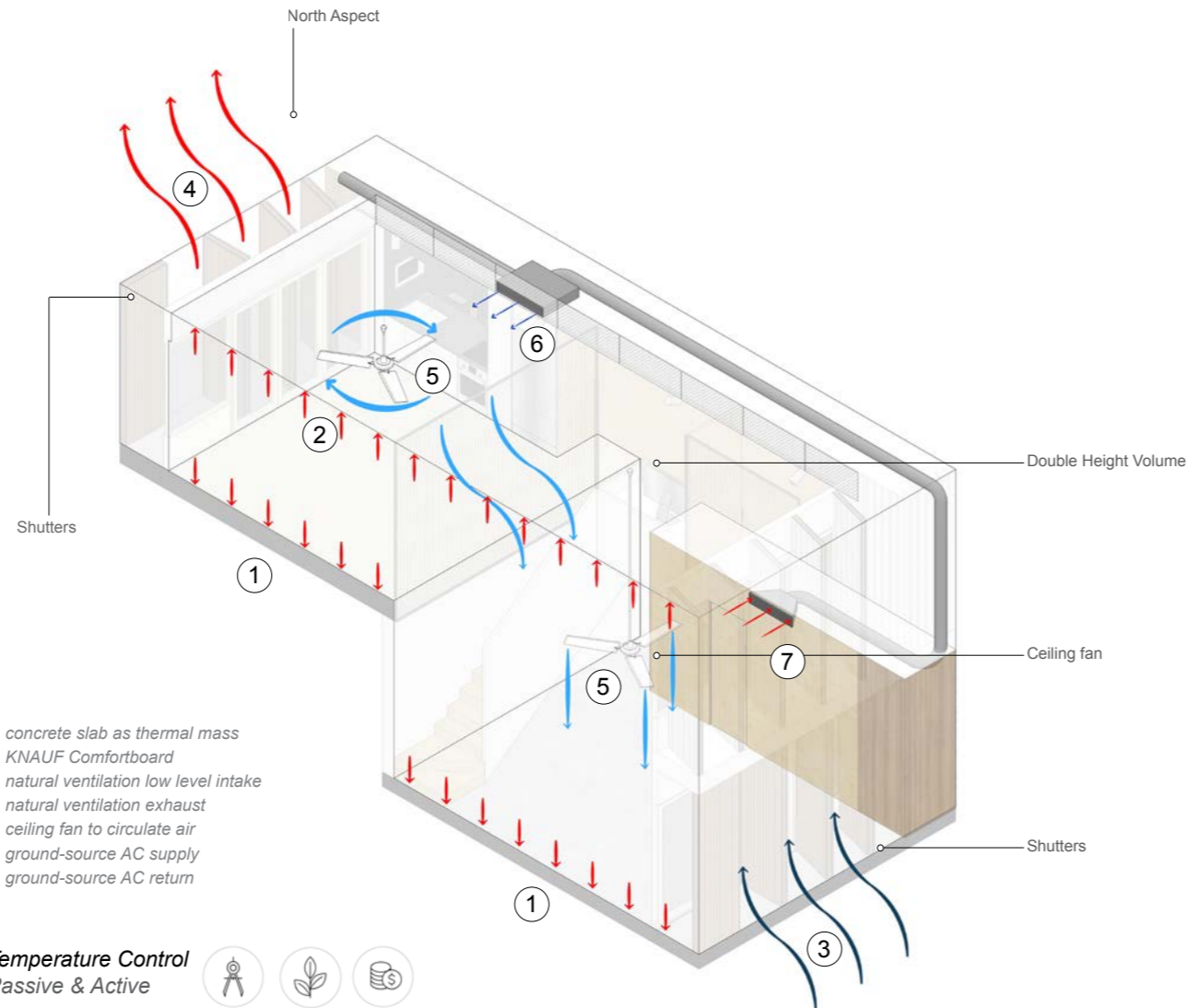
A communal weather station with mobile phone app capability will give people greater connection with local weather conditions and patterns. Another feature of the selected system allows owners to purchase individual indoor units to monitor air quality and temperature within their individual apartments.

Communal Monitoring Station

ESD technologies incorporated in the building will have data displayed on a display within the Common Room on the ground floor. Data such as Solar Power, Battery Storage, Volume of water harvested, etc. will be displayed.



- Increased Efficiency
 - Cost Savings
- Reduced CO2 Emissions
 - Quiet Operation
 - Increased Design
- Flexibility (roof, balconies and landscape are free of chillers, air handlers and other outdoor equipment)
- Increased Floor Space
- Increased Reliability and
- Reduced Maintenance
- Reduced Base and Peak Load Demand



ACTIVE SYSTEMS

WATER CONSERVATION

- A. Harvesting (Refer page 11)
- B. Landscaping (Refer page 13)
- C. Point of use Hot Water System (Refer page 11)

GEO - EXCHANGE SYSTEM

In order to deliver cost-effective and highly efficient heating and cooling to apartments, we have chosen an open-loop, centralised heat pump system, which reticulates refrigerant to ducted fan-coil units within apartments. The effectiveness is augmented by natural convective and assisted movement in the apartments as demonstrated by the diagram to the left.

PV CELLS

A hybrid photovoltaic system incorporating battery storage is included in our proposal. It has been sized with regard to roof space, heat load calculations, cost and benefit. The equipment -- panels, inverters, batteries -- has been chosen for longevity rather than lowest capital expenditure.

The system has been designed to couple with the Embedded Energy concept, allowing the benefit of collected renewable energy to be fairly distributed to apartment owners.

WASTE MANAGEMENT

Our proposed strategy for waste management consists of 4 stages. A composting bucket is located within each apartment (under the sink) to capture all food waste, preparing it for addition to the communal compost bin. General waste proceeds to the ground floor bin store, with recycling to yellow-top bin. E-waste (increasingly more common) is collected by the Strata and periodically taken to designated collection areas.



WHY TIMBER?

The benefits of timber are multi-fold, to an extent where its use becomes compelling. A summary of these benefits is provided below, courtesy of www.tastimber.tas.gov.au:

Natural

Timber is one of the few natural building materials. This has a lot of advantages. Generally, timber is not toxic, does not leak chemical vapour into the building and is safe to handle and touch. It also means that as timber ages, it does so naturally and doesn't break down into environmentally damaging materials.

Renewable

People have been building with timber for thousands of years. Timber is continually being grown in our forests and plantations. As long as new trees are planted to replace those harvested, timber will continue to be available.

Low in production energy

It takes very little energy to convert the wood in trees to the timber used in building. This means that the embodied energy in timber is very low, the lowest of almost all common building materials.

A store for carbon

Timber is made from carbon drawn from the atmosphere. This carbon would otherwise be adding to the greenhouse effect. Using timber in buildings stores the carbon for as long as the building stands or the timber is used.

A very good insulator

In reducing the amount of energy used to heat and operate a building, insulation is

very important. Timber is a natural insulator and can reduce energy needs especially when it is used in windows, doors and floors.

Readily available

Timber is milled all over Australia and is often used close to where it is produced. This promotes local economies and reduces the energy needed to transport materials long distances.

Easy to work

Timber is versatile and can be used in a wide variety of ways. Being light, it is easy to install and can be worked with simple equipment. This reduces the energy needed for construction.

NATHERS

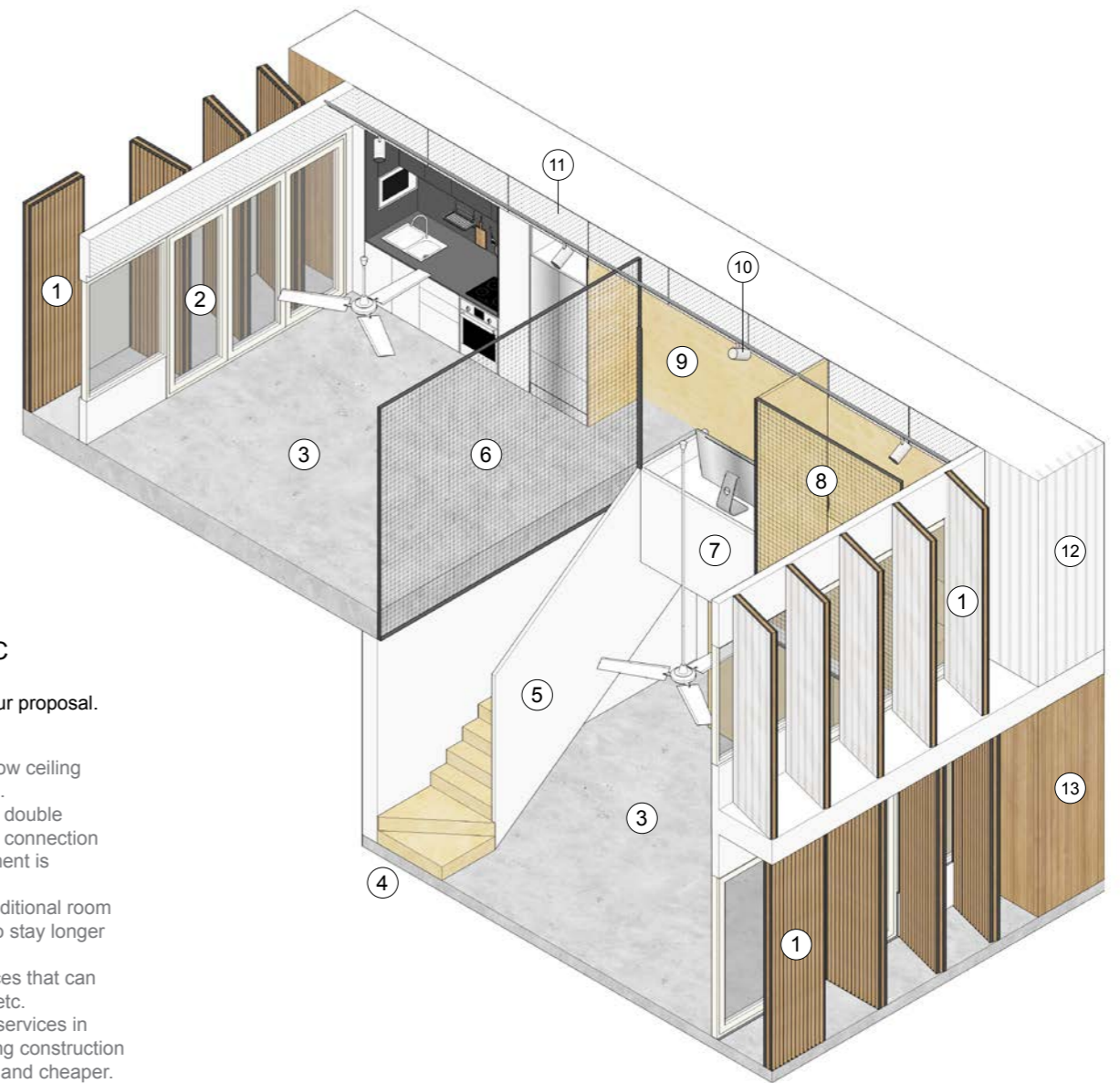
Despite the many benefits of timber, we encountered an unexpected dilemma in our NatHERS result, due to the lack of *thermal mass* in a predominantly timber building.

Thermal mass is effective in passively regulating ambient temperature. It is therefore heavily rewarded by the NatHERS rating tool. Conversely the lack of thermal mass is penalised.

As thermal mass is often introduced to buildings through construction materials with large carbon footprint, such as concrete or masonry, we have opted to limit these materials in favour of timber construction.

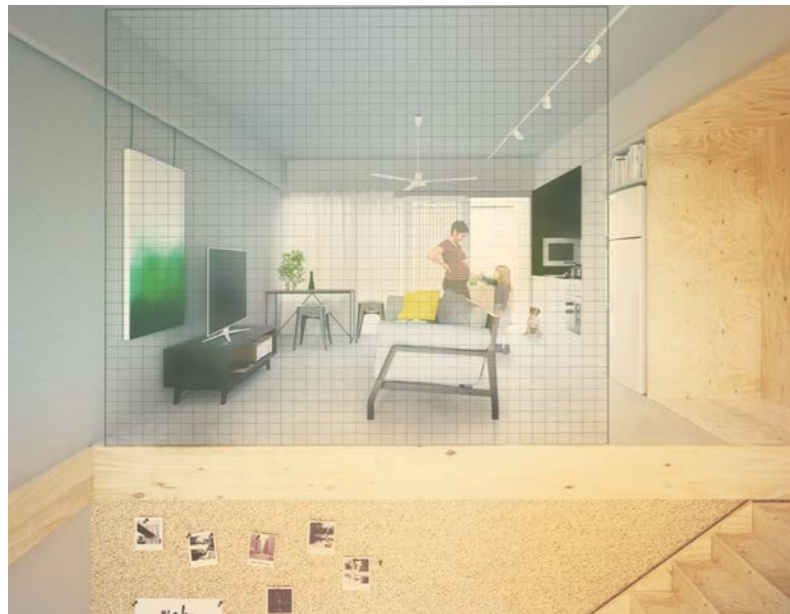
The result is a modest NatHERS result, which superficially points to an ineffective building. However, it is the provided Life Cycle Assessment that vindicates our commitment to timber.

1. privacy / sun control shutters
2. proprietary double glazed joinery
3. concrete floors over carpark + ground
4. timber stair module
5. lime-washed plywood balustrade
6. tensile mesh barrier
7. lime-washed plywood desk unit
8. day bed nook
9. plywood wall lining
10. track lighting
11. pegboard acoustic bulkhead
12. fibreglass opal cladding
13. "IronAsh" cladding



Base Apartment Module

Internal Apartment View - looking toward central courtyard

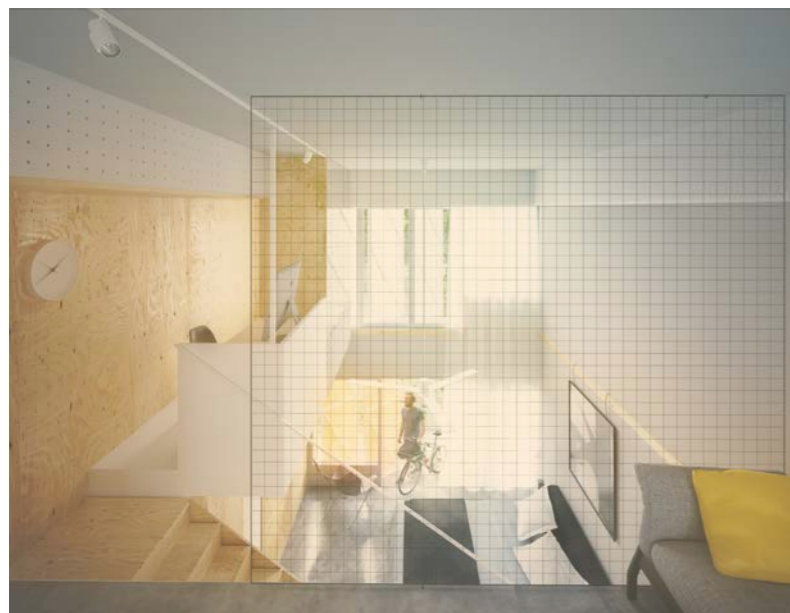


BASE APARTMENT MODULE LOGIC

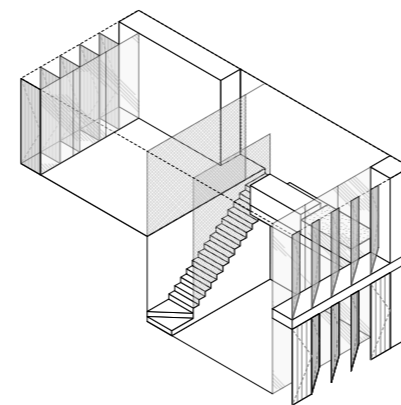
The base apartment module is at the core of our proposal. To quote from our Stage 1 Idea Statement:

- > A small unit over a single level with low ceiling heights and no outlook is oppressive.
- > A small unit split over two levels with double height volume, a view of the sky and connection with community, public and environment is empowering.
- > Enable this volume to become an additional room in future and residents can choose to stay longer (inherently sustainable).
- > Design apartments with flexible spaces that can be bedroom, living room or kitchen, etc.
- > Enable this flexibility by centralising services in 'consolidated service walls' simplifying construction and making future adaptation easier and cheaper.

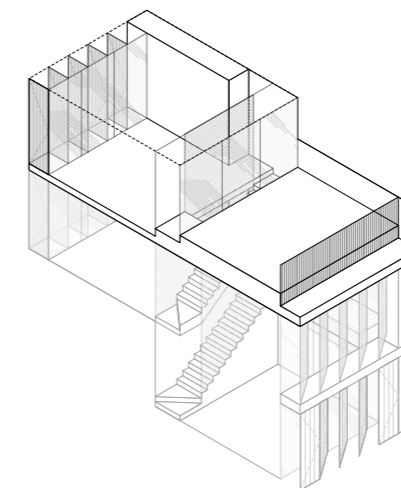
Expansion of Base Apartment Module



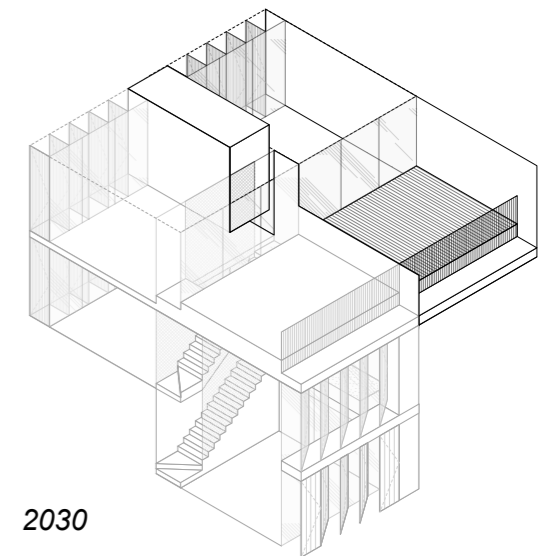
Internal Apartment View - looking toward double-height volume



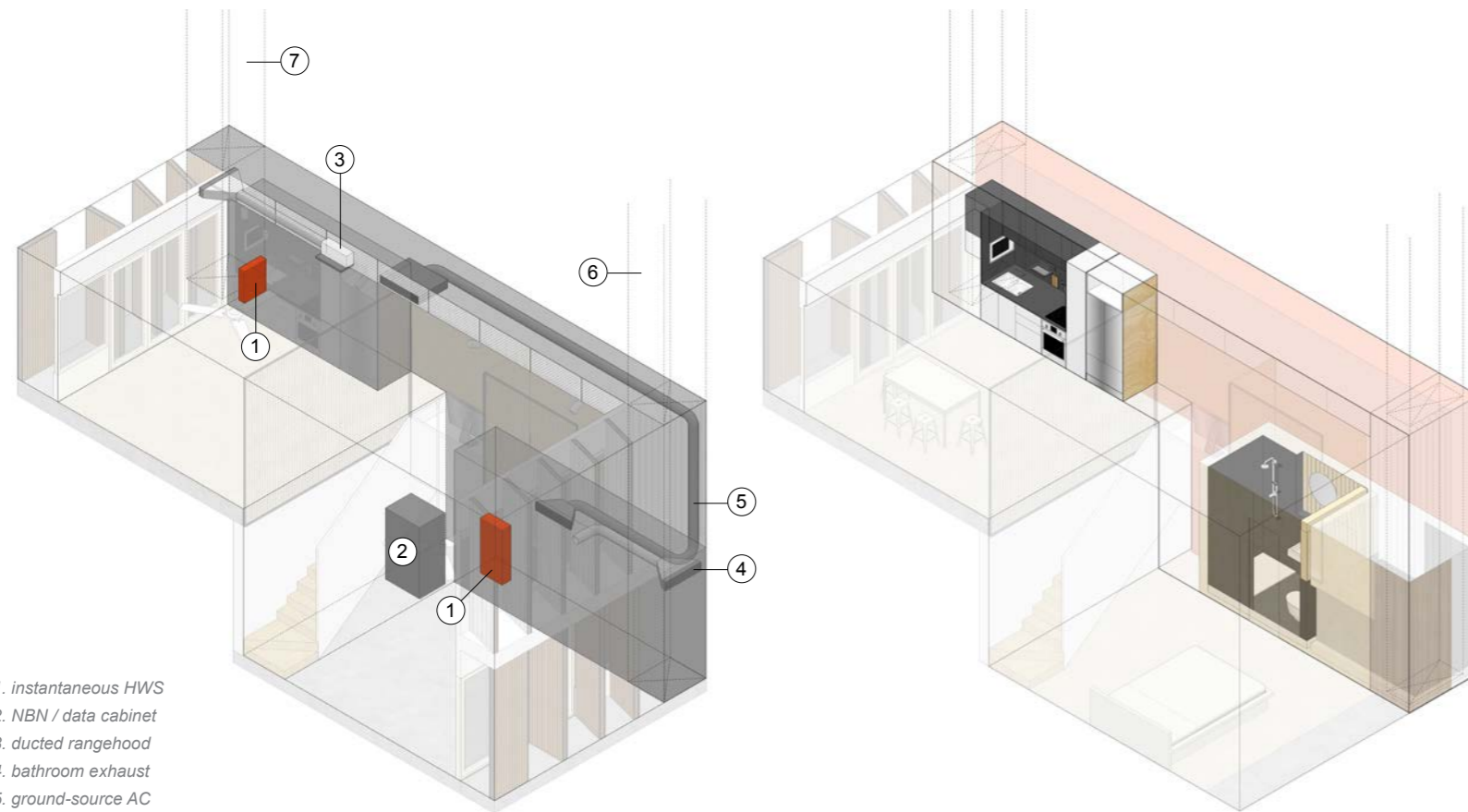
2017



2025



2030



- 1. instantaneous HWS
- 2. NBN / data cabinet
- 3. ducted rangehood
- 4. bathroom exhaust
- 5. ground-source AC
- 6. services risers

SERVICES WALL CONCEPT

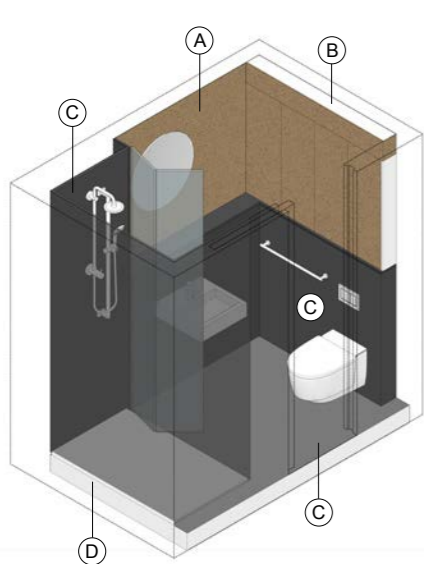


CONSOLIDATED SERVICES

Services are concentrated in a series of linear zones bound by risers at either end. These zones have dropped ceilings, floor set-downs, and are sized to incorporate items such as fan coil units. Wet areas are stacked, with horizontal reticulation via the services zone bulkhead or the open web floor beam construction.

FLEXIBLE WET AREAS

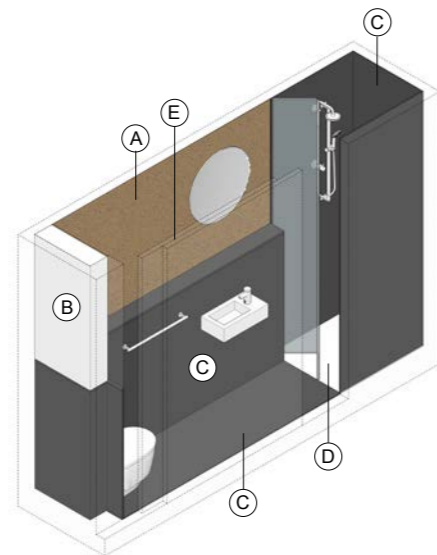
Due to the consolidated services zones, it is possible to amend / interchange the location of wet areas within the zone. Therefore, as needs change, a room can be converted into something else.



A) cork over plasterboard B) proprietary cabinet C) "PAPEROCK" D) proprietary shower base E) sliding door panels

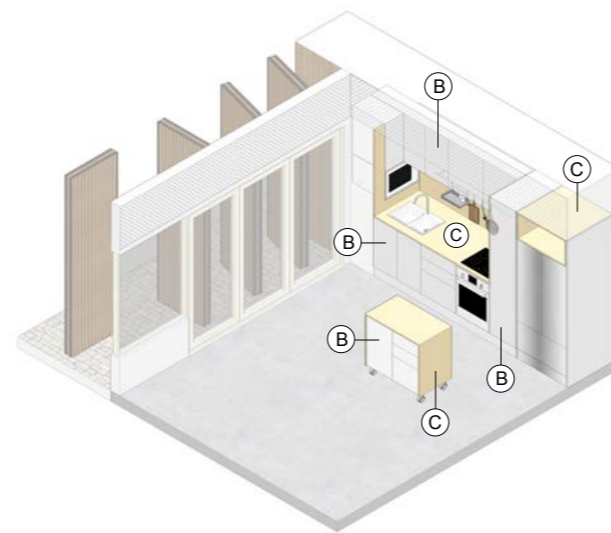
BATHROOM TYPE 1

Bathrooms are compact yet well equipped spaces. They seek to provide every-day practicalities (eg: grout free), and simultaneously push the envelope a little.



BATHROOM TYPE 2

The same principles govern the design of this bathroom module, which has been elongated to fit on one side of the services wall, as a retro-fittable unit or from day one.



KITCHEN

The kitchen module is a hybrid of proprietary flat-packed units and a customised benchtop and splashback using a cost-effective, durable product called PAPEROCK.

LIGHTING CONCEPT



The central premise of the artificial lighting concept remains adaptability. A wall-to-wall lighting track provides 90% of lighting to apartments. Residents start off with 2 track lights per room and are able to supplement as needs change. Track lights provide a high level of flexibility and are low-voltage, meaning that residents can tinker to their hearts' content. Furthermore, being surface mounted, this methodology maintains the integrity of the fire rated envelope.

All exterior lighting has been chosen for its ability to withstand a highly corrosive environment.



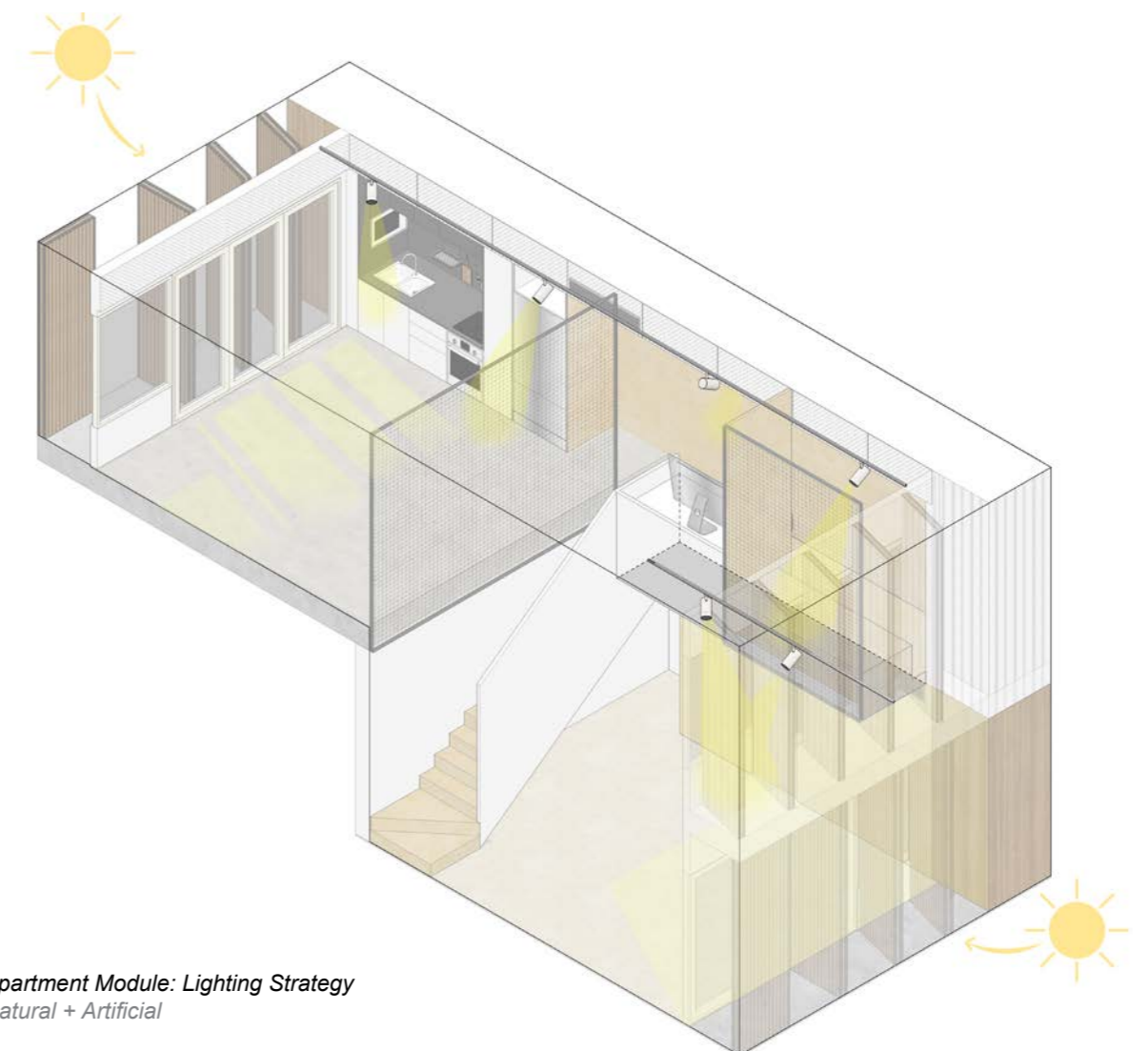
Low-voltage track lighting



Surface-mounted bathroom light



Strip LED kitchen light (concealed)

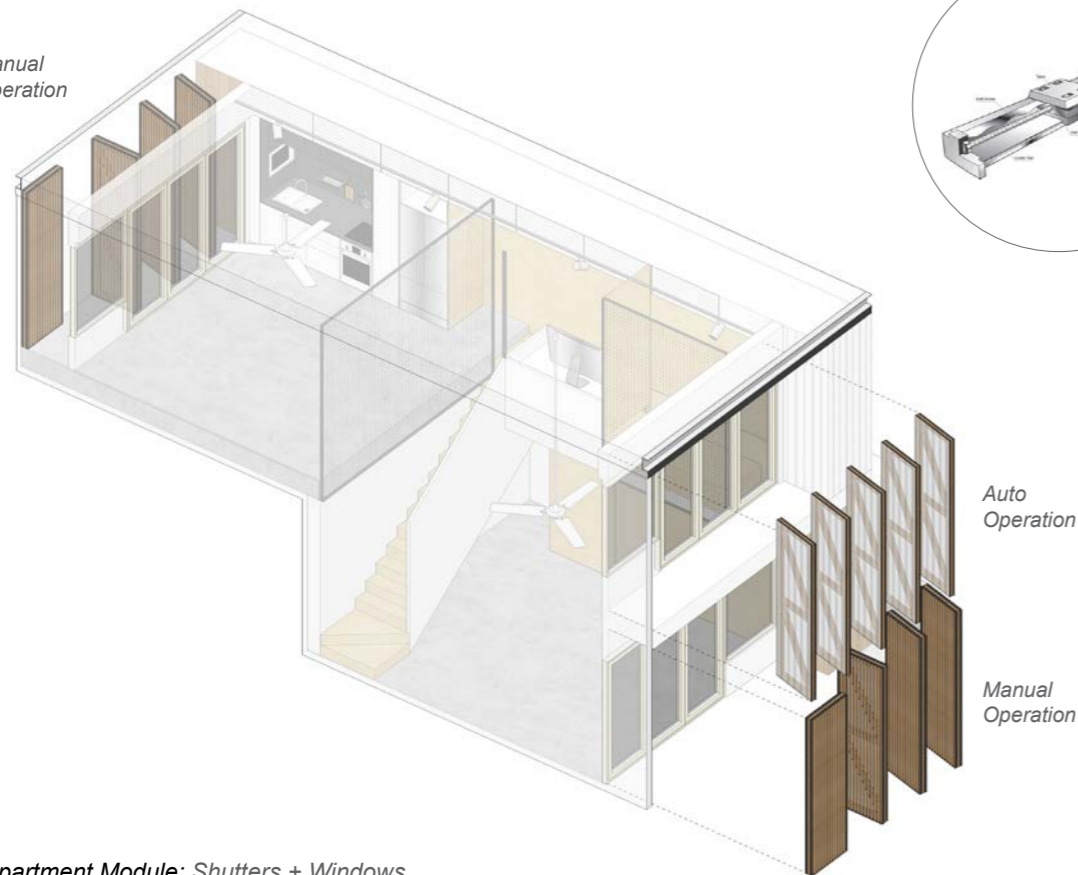


Apartment Module: Lighting Strategy
Natural + Artificial

Worldview:
Shutter + glazing system, providing access, privacy, diffusion of light, solar management, spatial quality;



Manual Operation



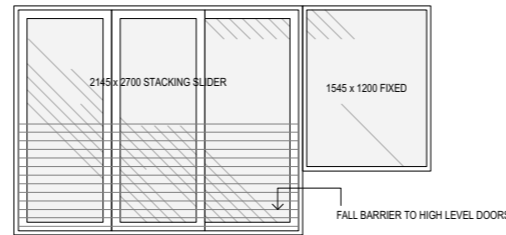
Apartment Module: Shutters + Windows

SHUTTERS + WINDOWS



POLAR WINDOWS

Eco-View Polar Windows have been supplied by Bunnings since 2008, are readily available, and offer significant cost benefits over alternative double-glazed units. Sections are robust and configurations are modular. Tensile stainless steel barrier cables will be retrofitted to frames where fitted to upper levels.



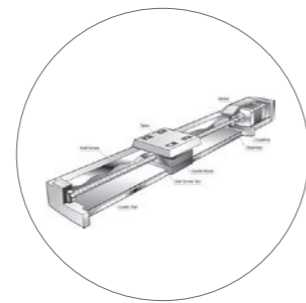
<http://www2.polarwindows.com.au/>



SHUTTERS

A major feature of our proposal - the operable facade shutter - is envisaged as a rudimentary and robust piece of hardware, put together using proven construction methods and materials to result in a hard-wearing, easily operable yet highly adaptable and delightful building element.

The backbone of the shutter is a LOSP treated gang-nailed truss, fabricated off-site. This is then painted before cladding is applied. Fibre glass cladding is edged with an anodised aluminium angle.



AUTO SHUTTER OPERATION

Linear Actuator
Push - Pull IP66 24V DC motor
Reliable, low-tech + low-cost

CLADDING OPTIONS



Fibreglass (Auto shutters)



IronAsh (Manual shutters)

STAIRS & PLATFORM LIFT

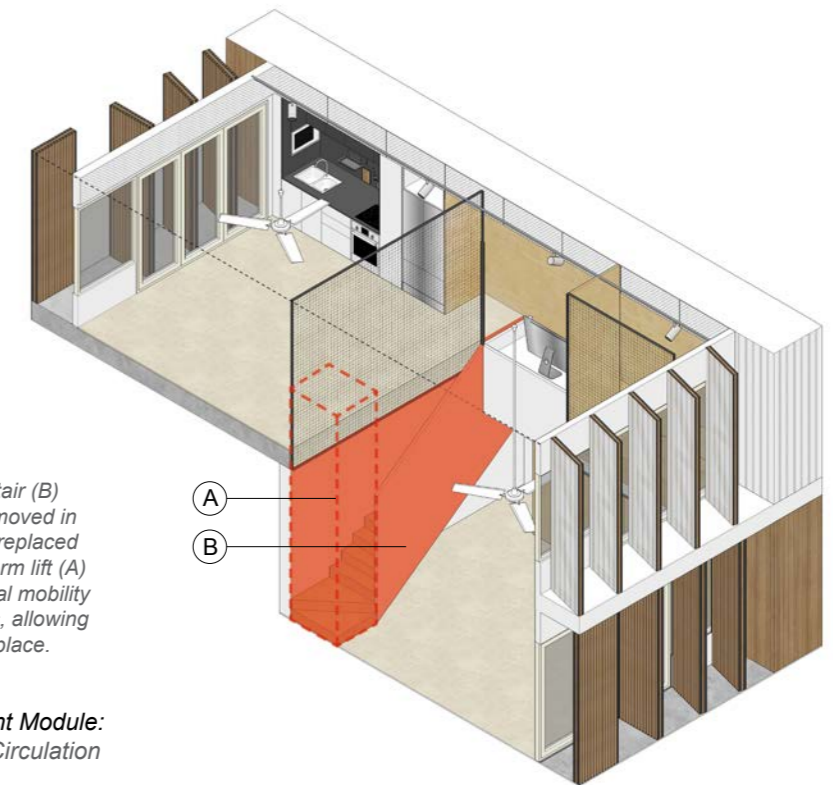


STAIR MODULE

The internal stair has been designed as a separate component, which can be dismantled easily in future to allow the installation of a platform lift. It consists of notched LVL stringers with solid plywood risers and treads. This type of stair construction can seamlessly transported and constructed for upward expansion in future, is self-supporting between ends and is fitted to the wall and floor plans on resilient mounts to isolate impact sound typically associated with stairs.

PLATFORM LIFT MODULE

By locating the lift within a sole occupancy unit, it need not comply with stringent legislation that governs the design of public-access lifts. A residential platform lift corresponds with a capital expenditure in the vicinity of \$25k versus the cost of a general-use lift in the order of \$120k.



Modular stair (B) can be removed in parts and replaced by a platform lift (A) as personal mobility decreases, allowing ageing in place.

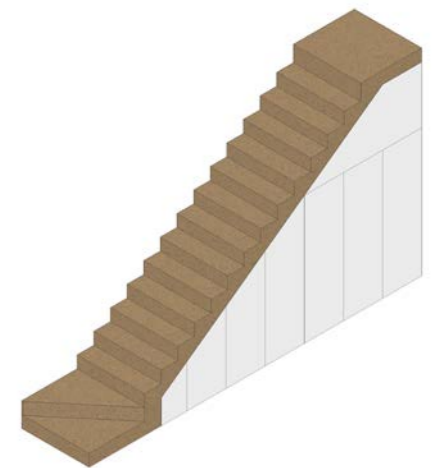
Apartment Module: Vertical Circulation



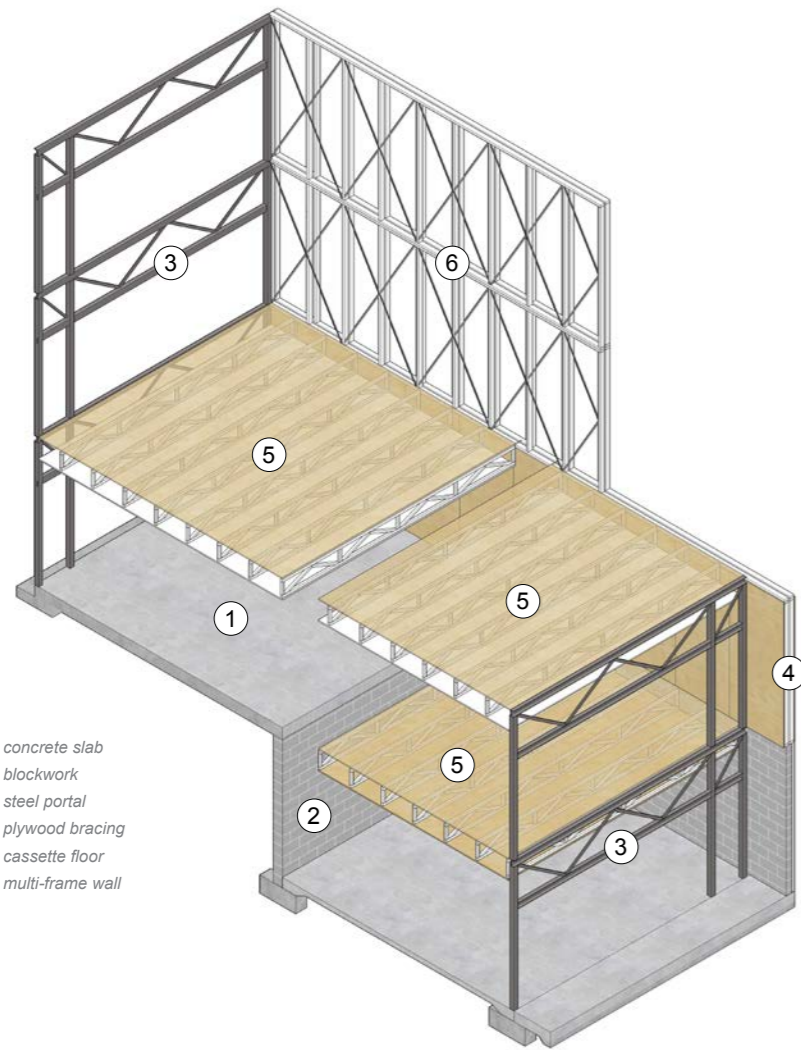
Platform Lift

Timber stair consisting > of notched LVL stringers with plywood treads & risers, screwed only for future demountability. Resilient mountings top and bottom for acoustic isolation

< Domestic type platform lift is inexpensive and able to be retrofitted. Can be positioned as desired.



Modular Stair



- 1. concrete slab
- 2. blockwork
- 3. steel portal
- 4. plywood bracing
- 5. cassette floor
- 6. multi-frame wall

Structural Methodology
(Not to scale)



STRUCTURAL SYSTEM

FUTURE PROOFING

The structural solution for the building is integral to its ability to adapt with owners' needs. The measures taken to imbue the structure with this flexibility are:

a) The structure has been designed to accept future 4th level construction as designated by the expansion schedule on Page 07.

b) The building has been 'primed' for seamless outward and upward expansion by using the same construction for roofs as well as floors, namely the PRYDA cassette system. In this way the roof build-up can be removed and the new room constructed seamlessly over the revealed floor.



MASS GROUND FLOOR

The carpark is enveloped in mass construction to address fire containment requirements and to simplify transfer of vertical loads through the podium to ground.

The concrete podium slab simplifies tanking and provides flexibility for the landscape design.

BRACING METHODOLOGY

The bracing methodology designed by the structural engineer is tailored to the level of construction. The ground level is braced with core-filled blockwork; first floor with plywood bracing; third and fourth with galvanised strap bracing. Lateral bracing is provided by light gauge steel portals at apartment openings.

FLOOR CASSETTE

The PRYDA floor cassette system brings the benefits of off-site manufacture, modular installation and subsequent speed of construction, as well as simplifying reticulation of services through the open web of the trusses.

The system enables large spans, allowing the apartments to remain free of internal walls, and therefore optimising flexibility.

"MULTI-FRAME"

USG Boral offers a proprietary timber construction system for Class 2 buildings called "Multi-frame". Pre-certified acoustic, structural, fire and thermal details are provided, with guaranteed results.

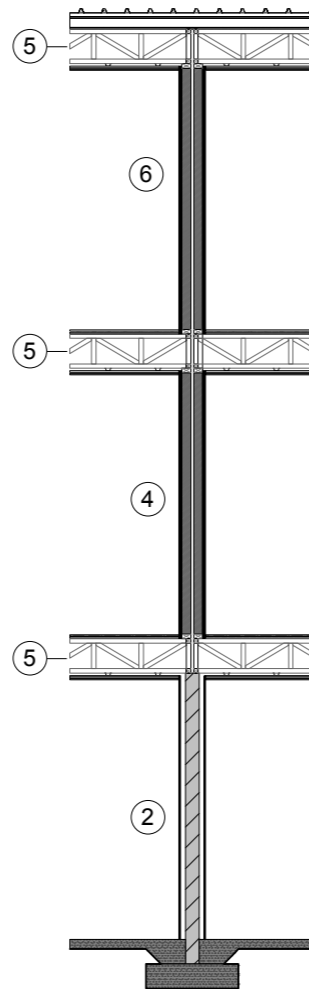
WHY TIMBER?

Timber has been selected not only for its green credentials as outlined on Page 05, but for its structural advantages of reducing overall weight, leading to cost and time savings.

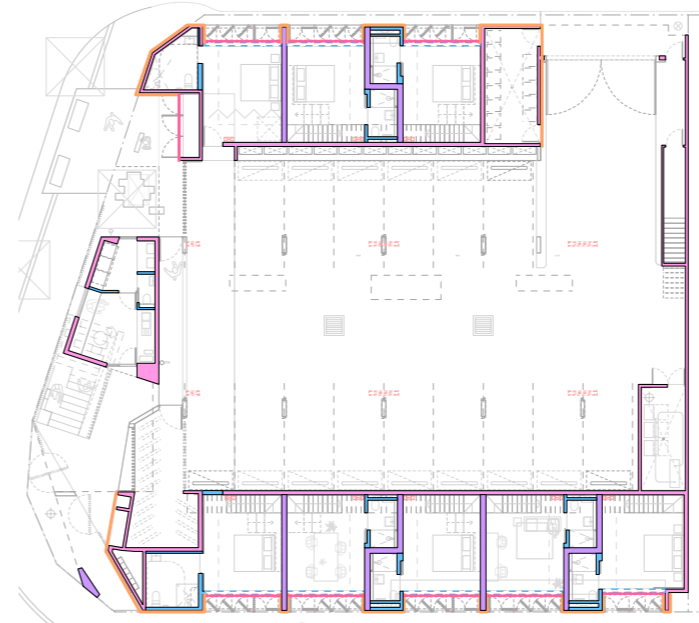
Furthermore, timber is a forgiving material, offering flexibility during construction and in future when adaptation is required.

The chosen proprietary systems combine the benefits of timber with off-site fabrication and ease of transportation.

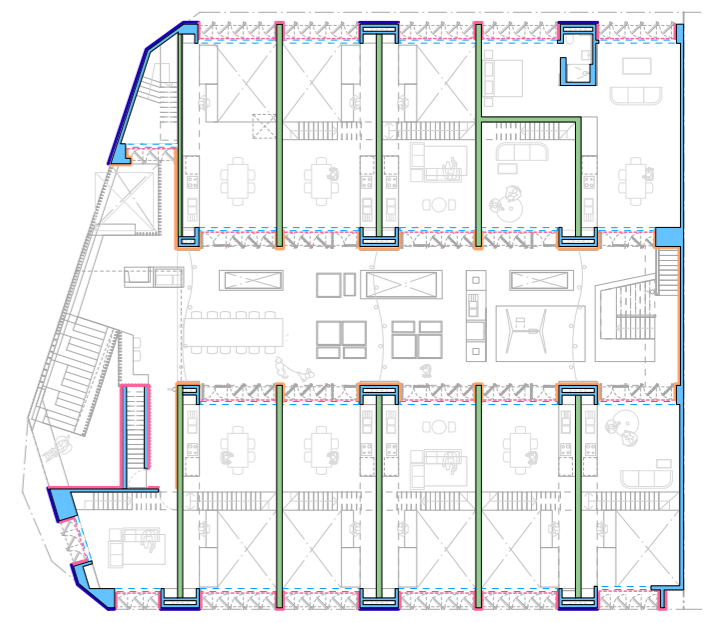
Finally, choosing timber eliminates trade shortage issues often associated with other forms of construction such as brickwork. This increases the likelihood of securing quality trades people.



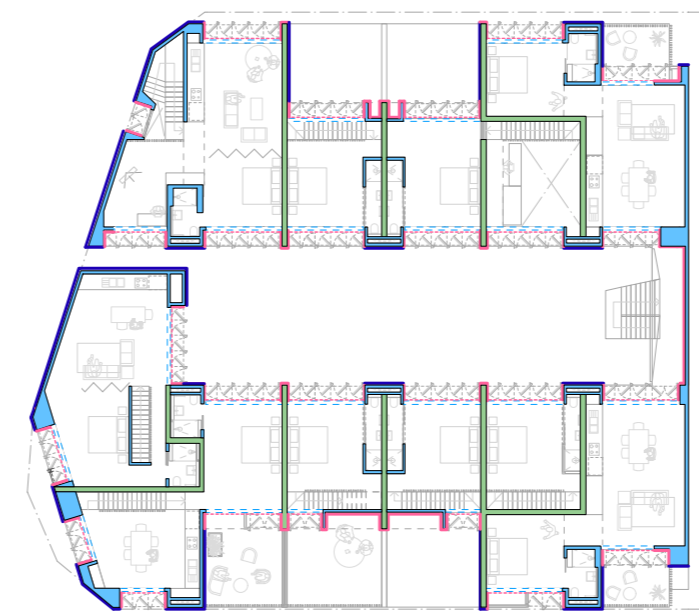
Parti-wall Section



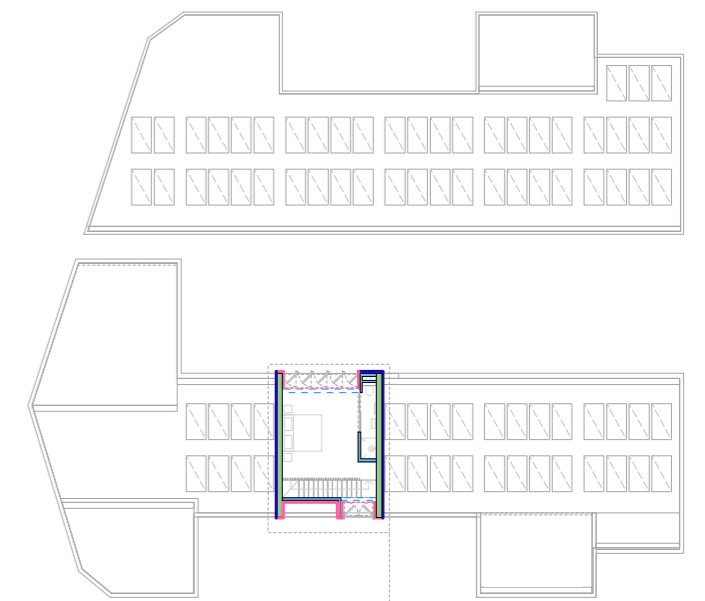
Ground Floor



First Floor



Second Floor



Third Floor

LEGEND

	140mm BLOCKWORK		TIMBER CLADDING 19mm IRON ASH ASPECT CLADDING http://www.austim.com.au/goodwood-victorian-ash/
	TIMBER FRAMING (PARTY WALL)		FIBRE GLASS CLADDING (AMPELITE)
	TIMBER FRAMING		FIBRE CEMENT CLADDING
	TIMBER FRAMING OVER WINDOW/ DOOR (TYPE 1)		
	TIMBER FRAMING OVER WINDOW (TYPE 2)		

WALL TYPES / STRUCTURAL DIAGRAM

IN-BUILT ADAPTABILITY



An integral part of our aim to deliver intelligently designed, dignified and affordable apartments is the ability for these dwellings to respond to change. Over the past two competition stages, this idea of adaptability has continued to be central to our scheme, and with the help of the following mechanisms, we are confident that such dynamic flexibility can be provided within the context of an apartment building.

It's simple really:

STRUCTURAL SYSTEM

Firstly you need a construction system that allows you to cost-effectively build in the extra allowance for dead and live loads, to which the base of the structure will be subjected once apartment expansions are realised.

Please refer Page 10 for a summary of this structural proposition.



SERVICES PROVISIONS

Secondly, you need a logical starting point, which has already anticipated future changes and the practicalities of reticulating services, managing privacy, etc.

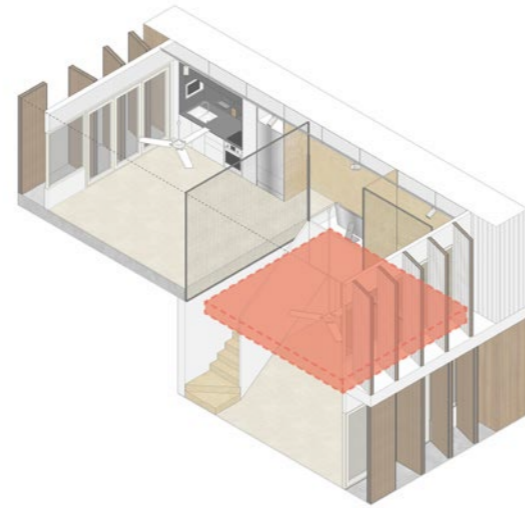
Please refer Page 08 for an outline of the 'Services Wall' concept.



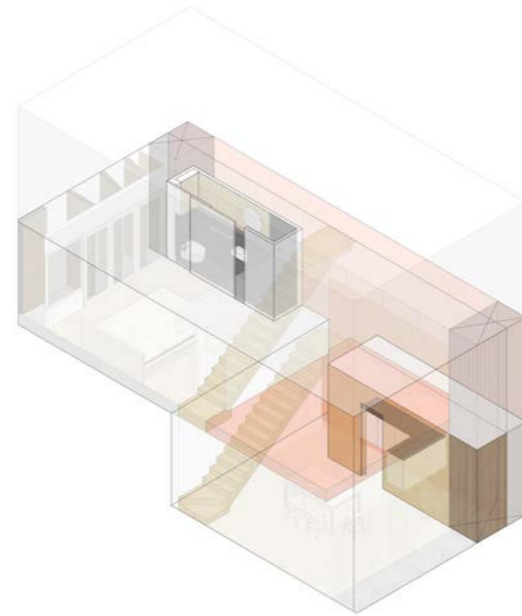
STRATA MANAGEMENT PLAN

Finally, the expansion of apartments must be regulated and foreseen, in order to preserve collective amenity and manage impacts beyond the site. The project therefore proposes very defined opportunities for expansion, even prescribes the construction details for the additional space.

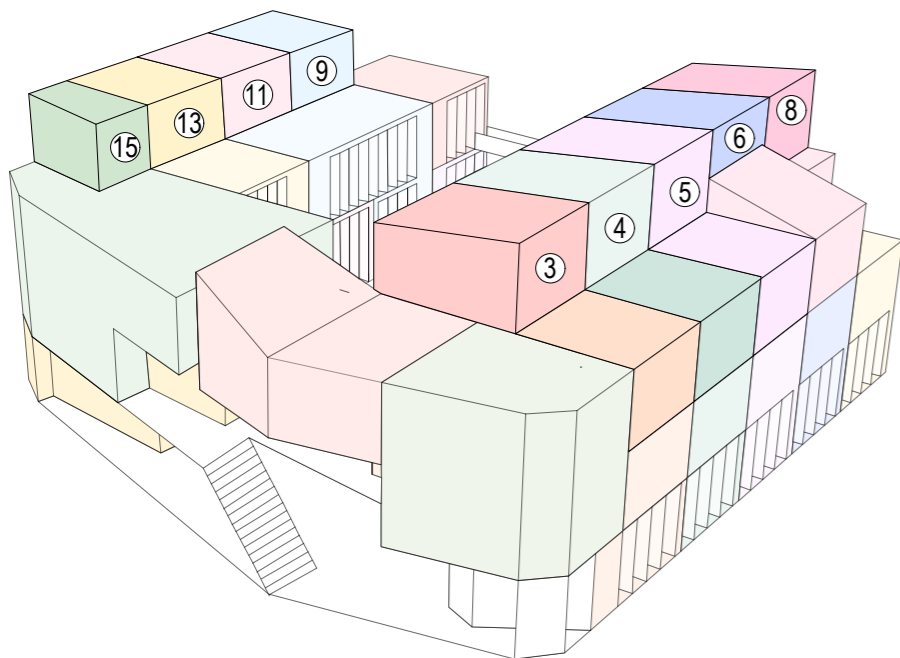
The legal instrument required to manage the expansion process as above is a Strata Management Plan, which forms part of the relevant By-Laws.



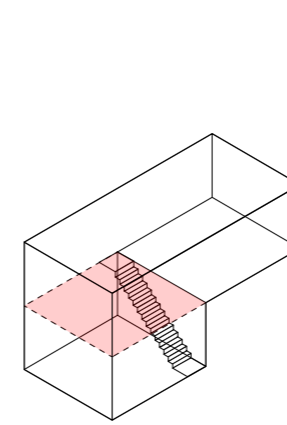
Apartment Expansion (void infill)



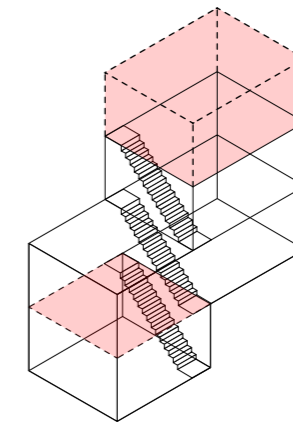
Apartment Expansion (upward)



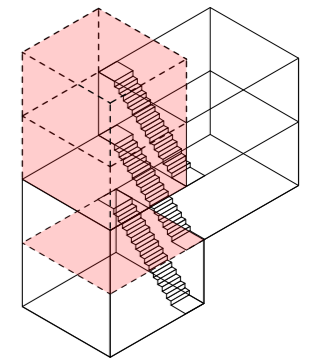
Apartment Expansion (at 100%)



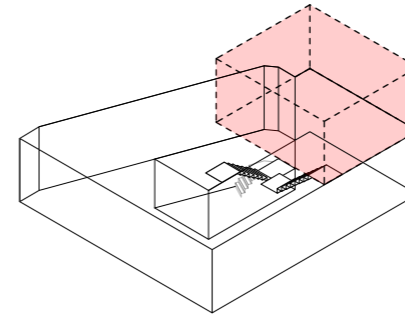
Apartment 1, 14, 12, 7



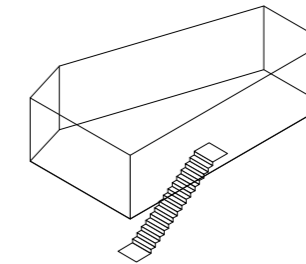
Apartment 6



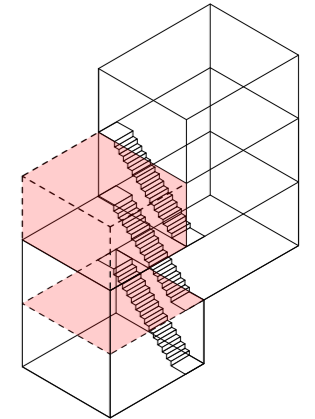
Apartment 5



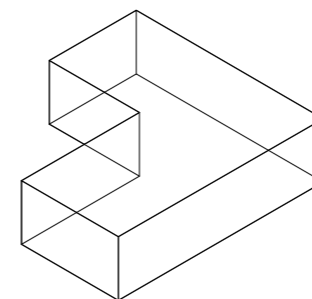
Apartment 15



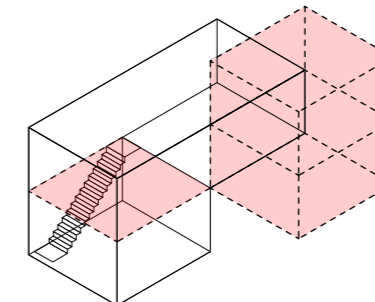
Apartment 2



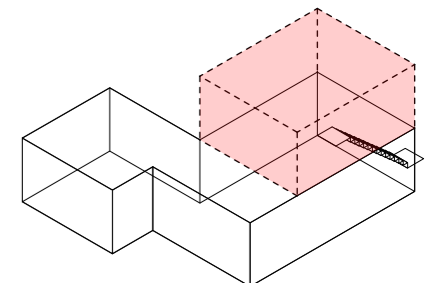
Apartment 4



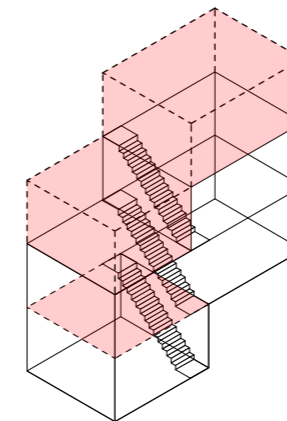
Apartment 10



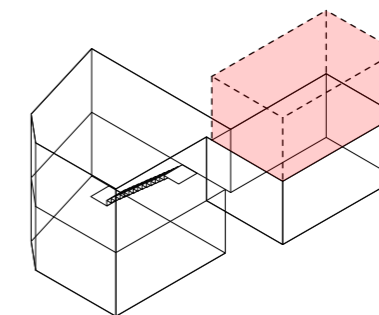
Apartment 11



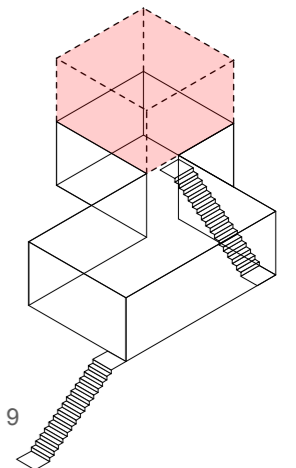
Apartment 8



Apartment 13



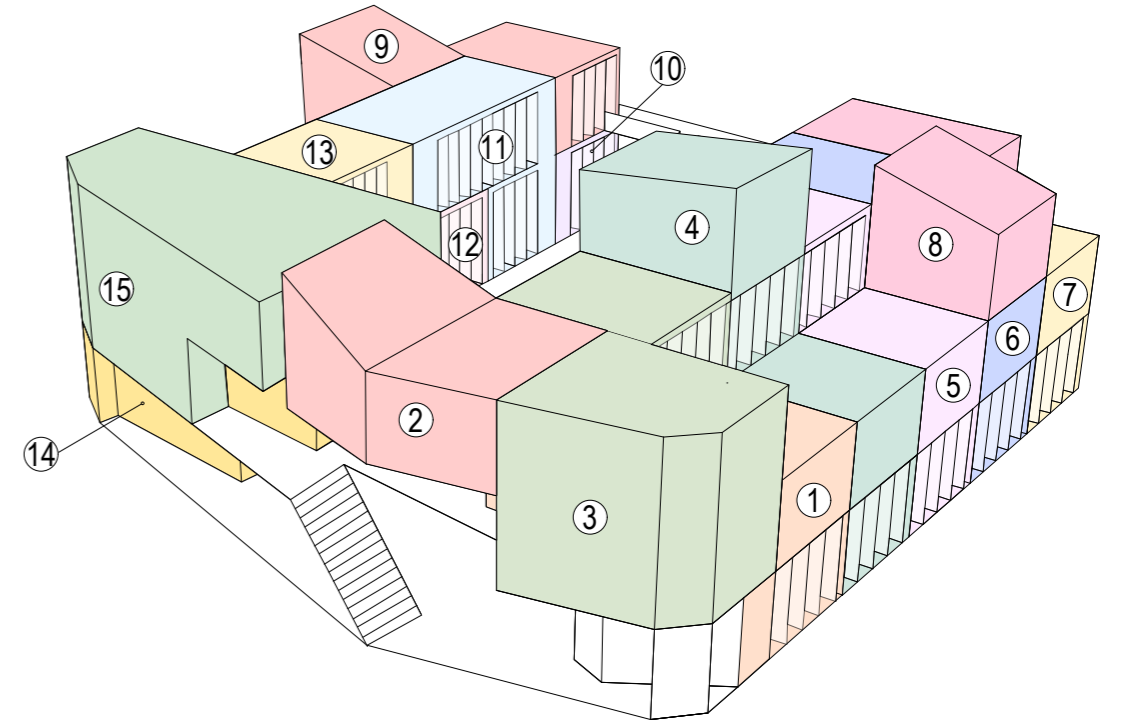
Apartment 3



Apartment 9

APARTMENT SCHEDULE:

UNIT TYPE	QTY	APTS	COST	SIZE (2018)	AVAILABLE EXPANSION	TRANSPORT	TOTAL SALES
A1 (2 rooms, 1 bath)	1	2	\$300,000.00	60sqm	0sqm	1 bay, 1 bike	\$300,000.00
A2 (2 rooms, 1 bath)	4	1,7,12,14 (accessible)	\$325,000.00	60sqm	13sqm	1 bay, 1 bike	\$1,300,000.00
A3 (2 rooms, 1 bath)	1	11	\$350,000.00	58sqm	58sqm	1 bay, 1 bike	\$350,000.00
A4 (2 rooms, 1 bath)	2	8,9	\$350,000.00	60sqm	26sqm	1 bay, 1 bike	\$700,000.00
B1 (3 rooms, 1 bath)	1	10	\$325,000.00	65sqm	0sqm	1 bay, 1 bike	\$325,000.00
B2 (3 rooms, 1 bath)	1	3	\$400,000.00	76sqm	26sqm	1 bay, 1 bike	\$400,000.00
B2 (3 rooms, 1 bath)	1	15	\$430,000.00	72sqm	26sqm	1 bay, 1 bikes	\$430,000.00
C1 (3 rooms, 2 baths)	1	6	\$450,000.00	80sqm	37sqm	1 bay, 1 bike	\$450,000.00
C2 (3 rooms, 2 baths)	2	5,13	\$480,000.00	80sqm	63sqm	1 bay, 1 bikes	\$960,000.00
D1 (4 rooms, 3 baths)	1	4	\$590,000.00	105sqm	35sqm	1 bay, 2 bikes	\$590,000.00
TOTAL	15						\$5,805,000.00

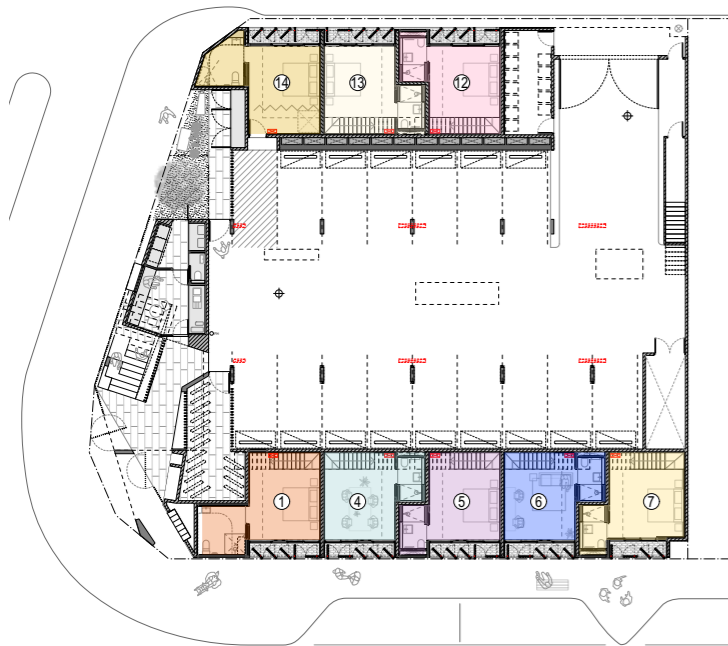


ESTIMATED CONSTRUCTION COST:

DESCRIPTION	AMOUNT
Base Building Cost	\$3,584,772.00
Geothermal AC	\$206,952.00
Photovoltaics	\$100,000.00
Headworks	\$150,000.00
TOTAL BUILDING COST (EXCL GST)	\$4,041,724.00



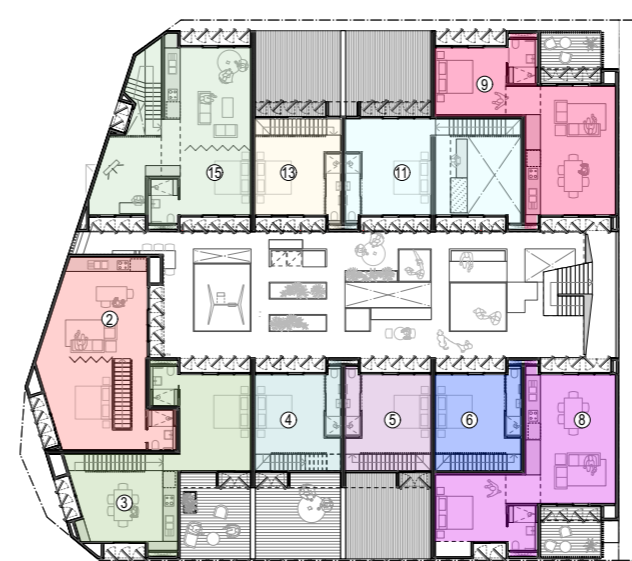
Axonometric -- Apartment Distribution



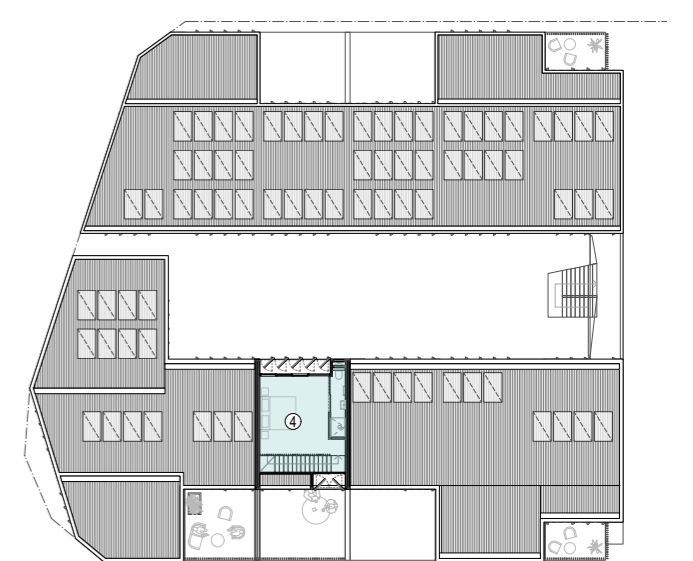
Ground Floor



First Floor



Second Floor



Third Floor

Apartment Distribution



Courtyard - looking SW

Communal Areas
Incidental encounter

All access to apartments is via the communal podium, multiplying opportunities for incidental encounter and thereby promoting interaction that leads to community.

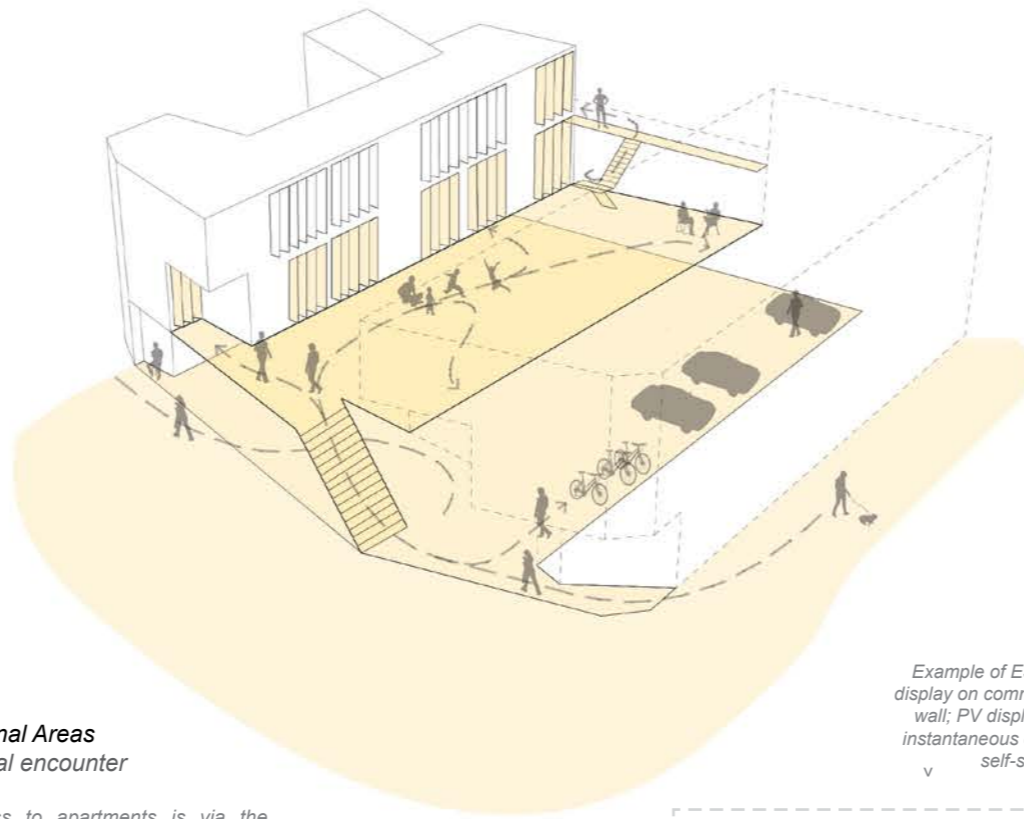
Communal areas have been designed to support the communal life that is anticipated.

A large table to dine together; vegetable garden allotments that will be allocated according to a ballot to ensure they are looked after; a central station for composting, planting, hobbies and conversation; places to sit and read, others to be together; the outdoor fireplace (communal hearth); the ubiquitous Australian BBQ.

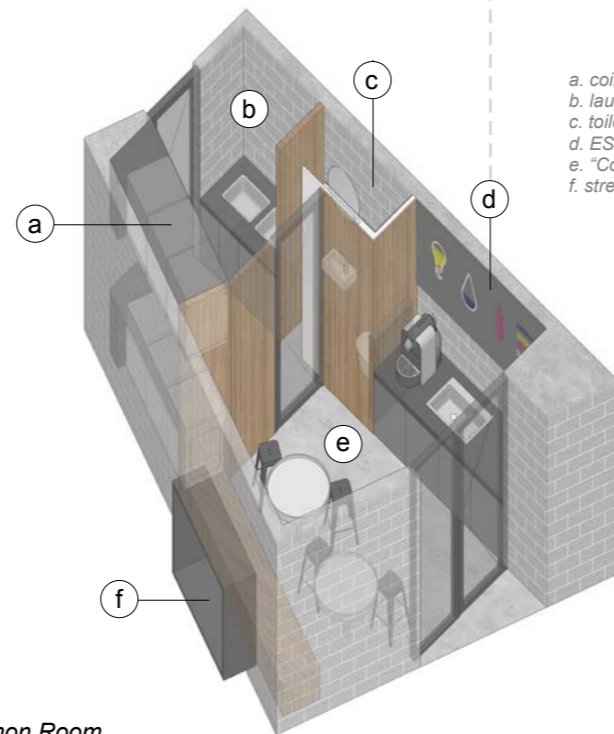
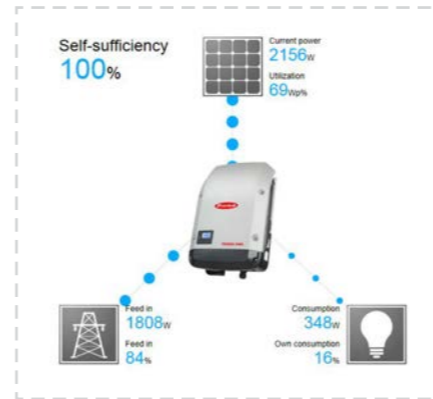
Water for the garden is supplied from underground tanks; sub-surface irrigation promote conservation.

< The main access stair incorporates seating opportunities, planting, pram ramp and is wide enough to stop for a chat whilst not obstructing access.

> The common room consisting of communal laundry facilities and social area for use by residents. An active display above the teaprep provides live updates on Active ESD Technologies incorporated in the building.



Example of ESD active display on common room wall; PV display shows instantaneous degree of self-sufficiency



a. coin-operated laundry
b. laundry troughs
c. toilet
d. ESD display wall
e. "Common Room"
f. street interface

The Common Room



Entrance Stair - looking North

COMMUNAL AREAS



The project incorporates a number of communal areas that offer residents high levels of amenity. However, it is acknowledged that people don't want to socialise all the time.

All apartments are therefore fitted with simple operable facades, consisting of pivoting panels that can be adjusted to suit privacy and environmental needs. When closed completely they still allow through-ventilation either through or above (spaced off facade). Panels are either battened or clad in translucent material. Panels can be used to funnel breeze or shut out winter gales.

Communal areas are intensified around a wide access stair, to the western end of the building where in-built seating, an outdoor fireplace and tables are suited to gatherings and incidental encounters. This is the communal heart of the building and has purposefully been located around the main point of vertical communication (coming and going).

The courtyard seeks to offer a variety of spaces, from grassed plinths for picnics and swings to vegetable beds and gardening stations incorporating composting bins and potting benches. Voids to the carpark eliminate the costly need for mechanical extraction and provide opportunities for cross-ventilation. They are in-filled with trafficable netting and offer a fun place for kids (or a nap for a weary parent).

The communal table has been enlarged as part of our Stage 3 entry, anticipating the friendship and community that we hope will establish here.

The act of coming and going is celebrated in the design. All apartments are accessed via the first level podium courtyard, with secondary access at street level for certain apartments.

Access from the carpark to apartments is similarly via the courtyard.

Communal laundry / coffee and bike storage facilities are located around the entrance at street level.

Street interface is valued and enhanced by a landscaped space at the NW corner. This offers a place to sit and gaze outwards, a place for bike repairs or lemonade stalls. A tree grows through a double-height volume and provides shade for rest.

The main entrance is screened and gates close after hours. It is an external yet fully covered space, admitting breeze and offering street surveillance.

Passage up and down the main stair, encounters in the communal laundry and passing chats between those coming and going will enliven this facade and provide a daily theatre to passers-by.

The Communal Stair

ACTIVE GROUND

LANDSCAPE CONCEPT DESIGN

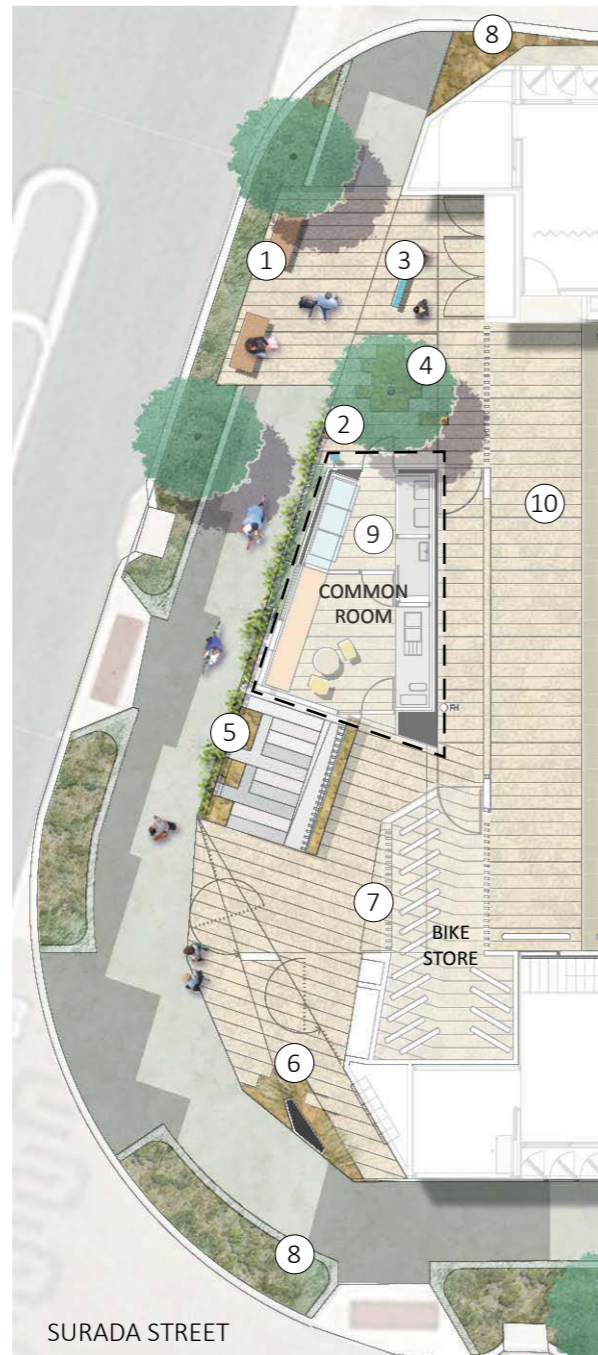
_Active Ground Floor

Nodes of landscape - shade trees, communal seating, wash-up with bike repair stations and outdoor shower. Coastal planting to verge, minimises hardscape surfaces and grounds the building within the extended site. Continuous paving throughout to blend the out with in.

_Podium Level

Defined as three unique spaces; communal dining area, allotment raised garden plots and flexible lounge / event space. Areas to relax, to gather and to work together.

ANCHORAGE DRIVE



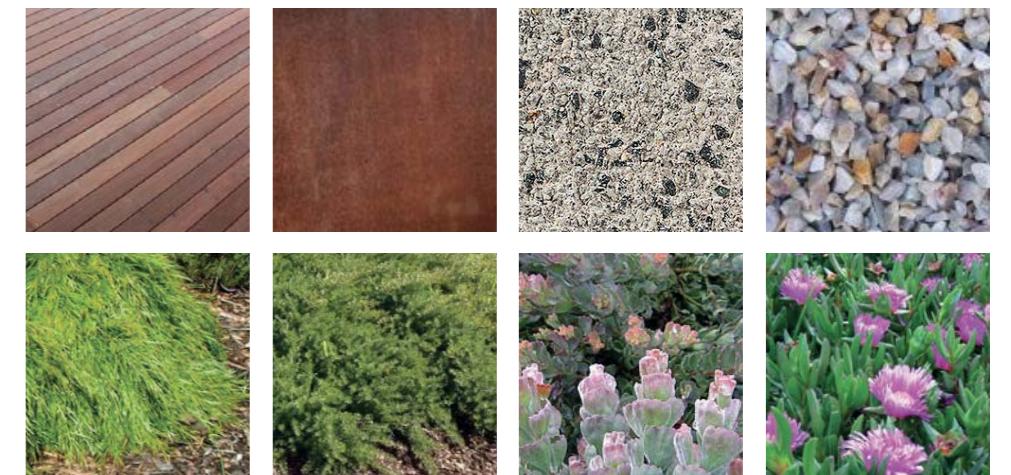
1. Change of paving type to define street common area
Bench seating elements with coastal verge planting
2. Outdoor Rinse shower with low screen and planting
3. Communal bike repair station
4. Feature tree in garden bed
5. Climbing external planting cladding
6. Feature paving to entry with intermittent coastal planting to soften building edge
7. Community notice board to entry
8. Low verge planting to soften pavement edge and define communal housing lot
9. Common Room - seating elements with book exchange, pavement to continue throughout from entry to provide a seamless transition.
10. Entry paving to carpark to create shared space feel.

PODIUM LEVEL



11. Inbuilt timber seat around outdoor fireplace
12. Timber breakfast bar / work station with power outlets
13. Outdoor barbecue to column
14. Stone unit paving to define podium level entry
15. Catenary lighting and climbers to service spines
16. Communal long-table with inbuilt fruit trees in pots
17. Natural ventilation void with net seating
18. Communal garden plots (raised planters)
19. Timber clad outdoor kitchen wash-up with inbuilt trees, sink and compost bin
20. Removable umbrellas with lounge chairs
21. Artificial turf to event / relaxing space
22. Feature furniture wall with interchanging seating
23. Timber decking to podium level
24. Occupied staircase with seating and planting

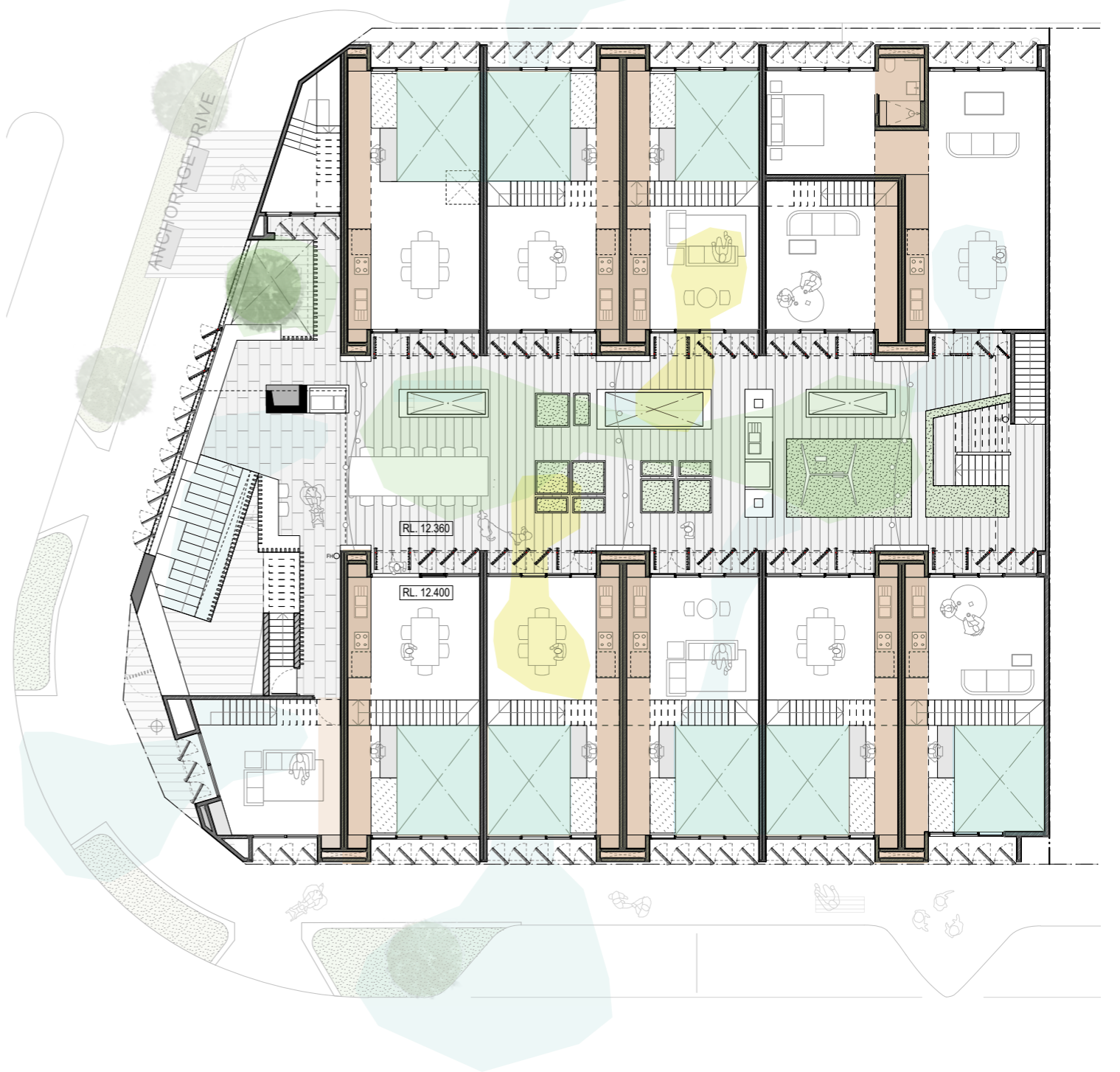
materials



LANDSCAPE PROPOSITION | 1:100

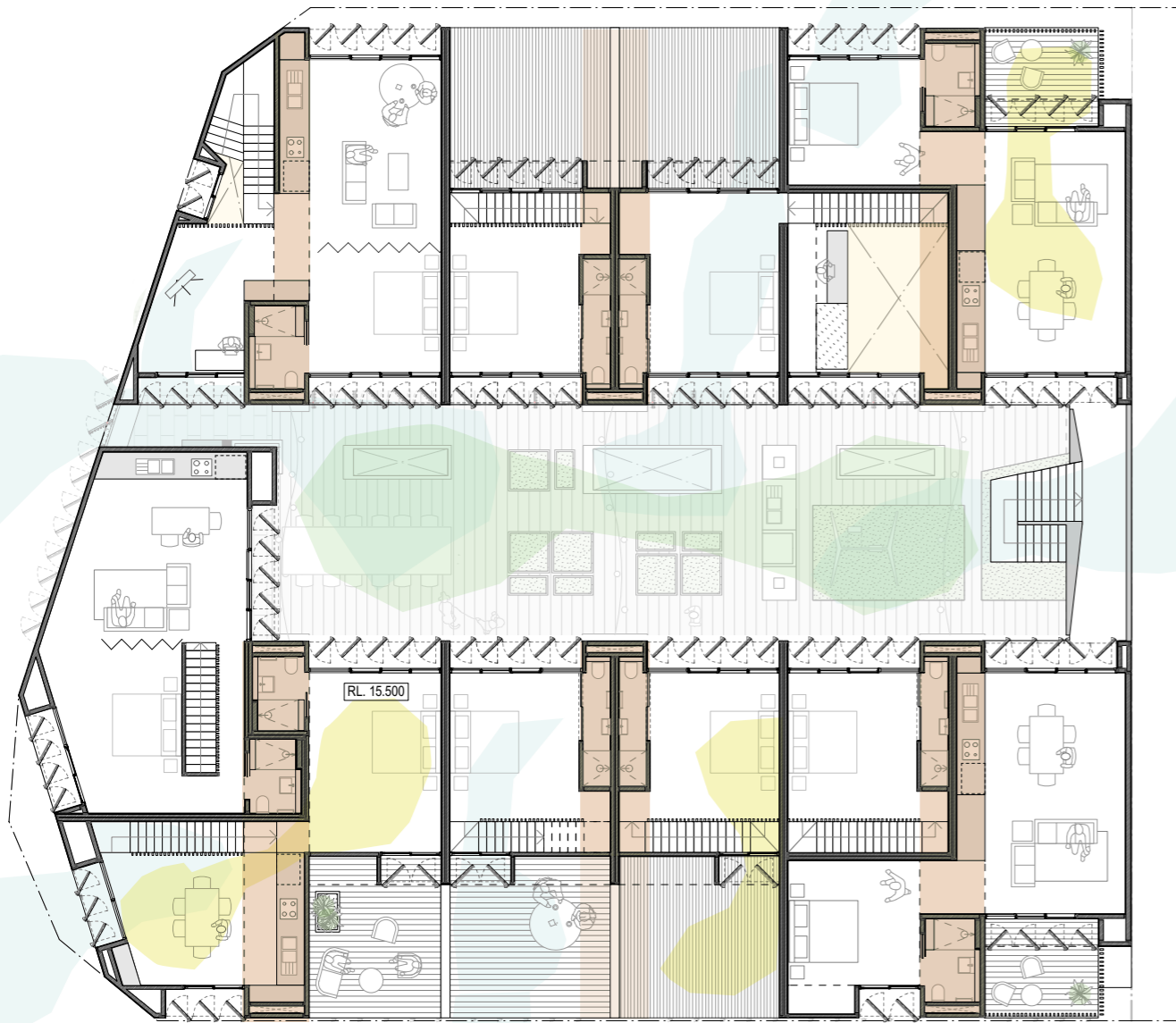


GROUND FLOOR PLAN | 1:200

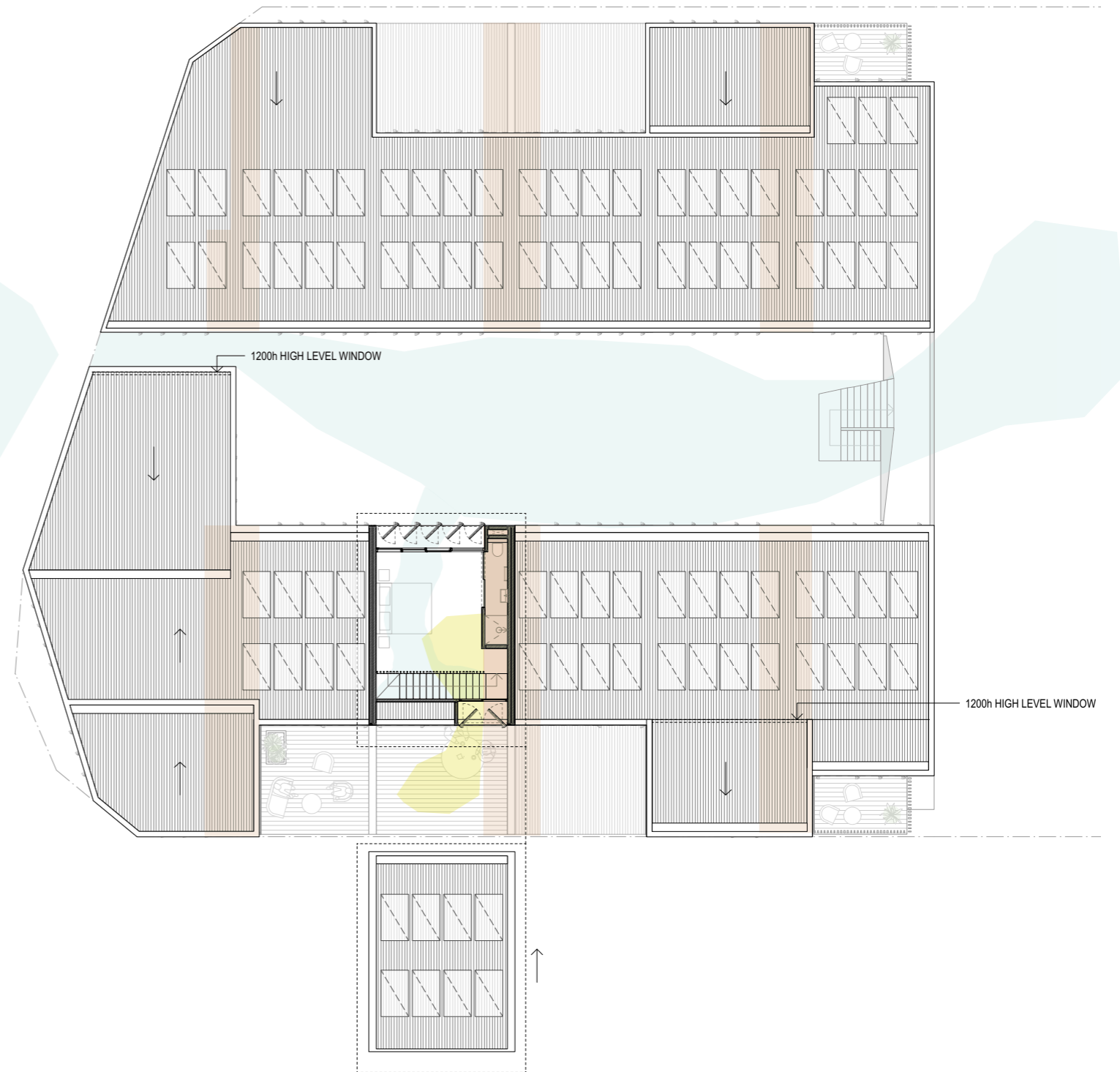


FIRST FLOOR PLAN | 1:200

- CONNECTION
- SERVICES SPINES
- CROSS-VENTILATION

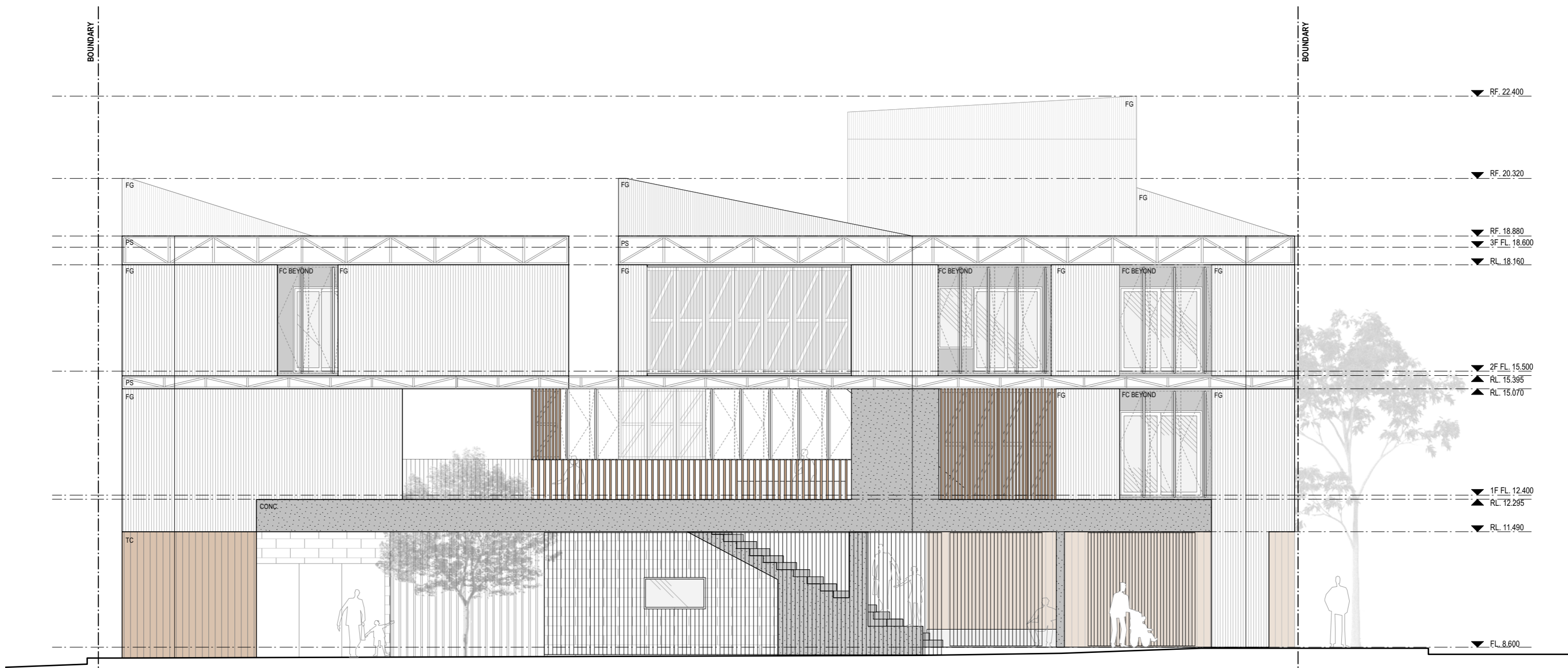


SECOND FLOOR PLAN | 1:200

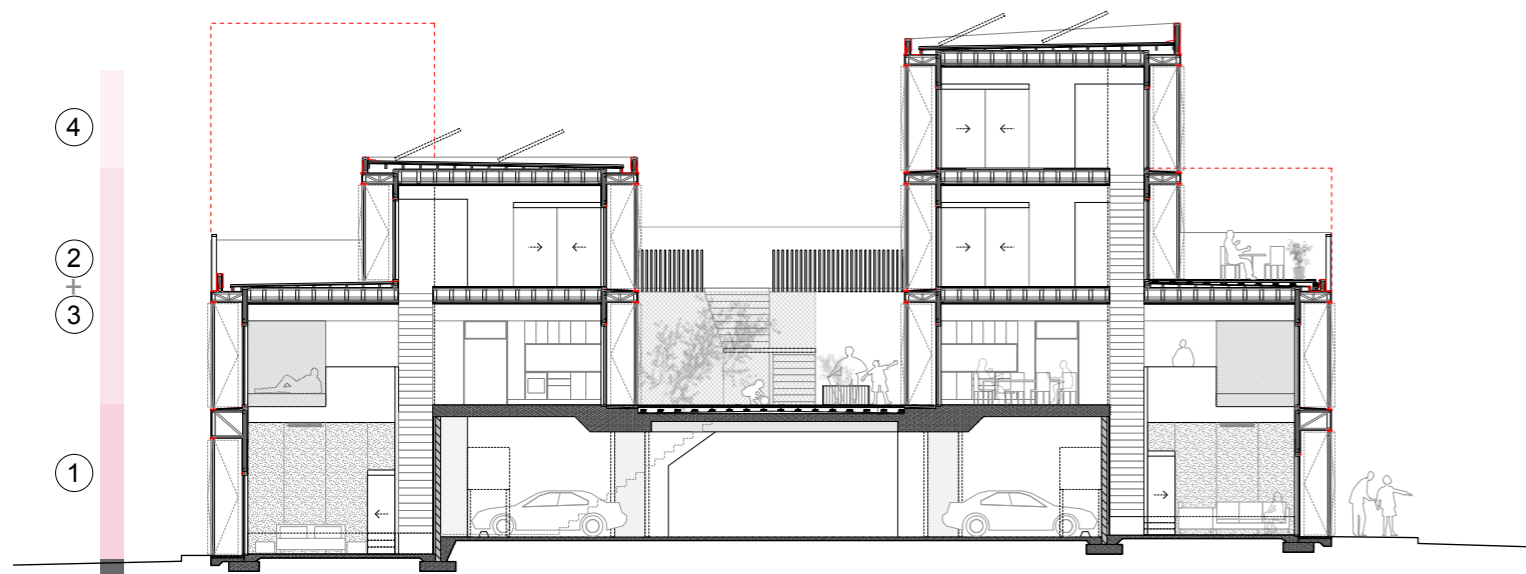


THIRD FLOOR PLAN (ROOF) | 1:200

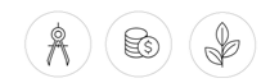
- CONNECTION
- SERVICES SPINES
- CROSS-VENTILATION



WEST ELEVATION 1:100



CROSS SECTION A-A 1:200

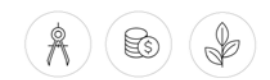




SOUTH ELEVATION 1:100



NORTH ELEVATION 1:200





Street View - looking North East

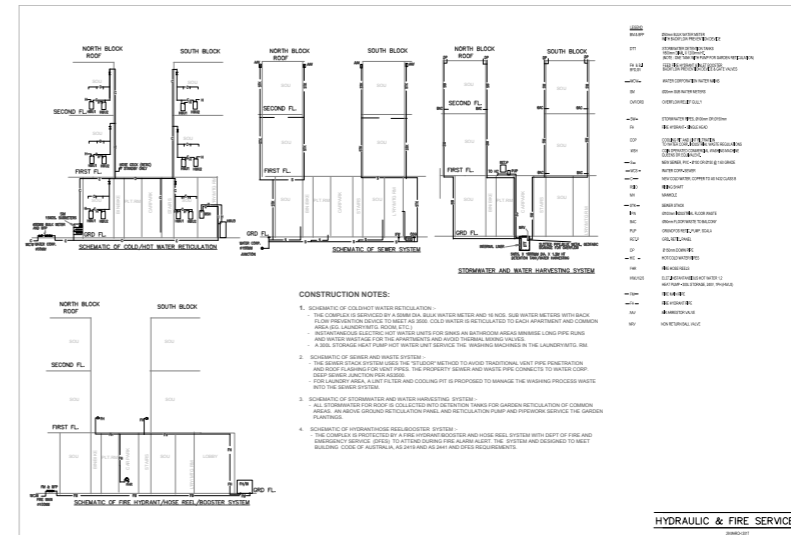
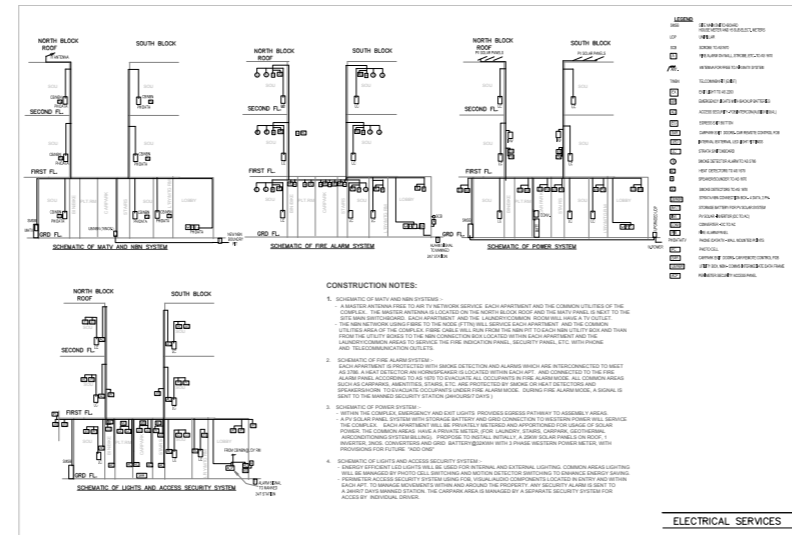
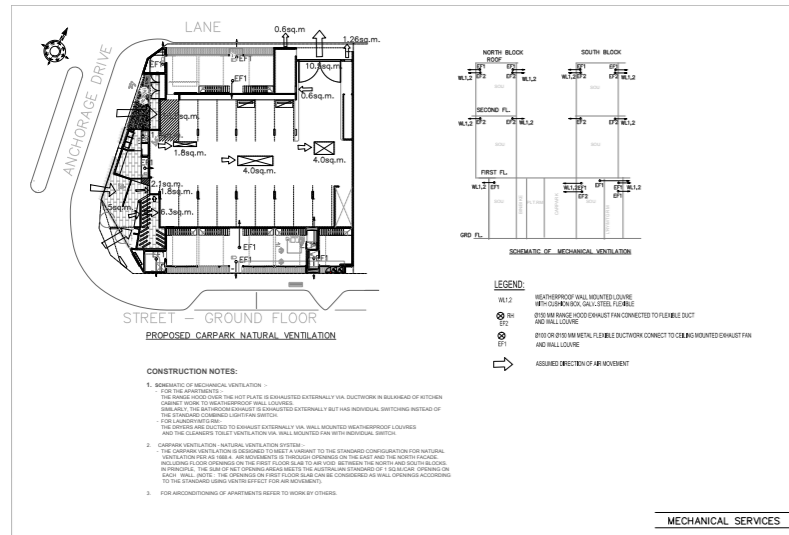
The aesthetic of the project has been crafted through the use of materials, textures and forms to appear casual and carefree. The beach-side setting, sandy feet returning home, the smell of sea and port, the prevailing doctor each afternoon.....these are familiarities which want to feel at home in a place like this.

The aesthetic is intentionally sandy, light and natural.

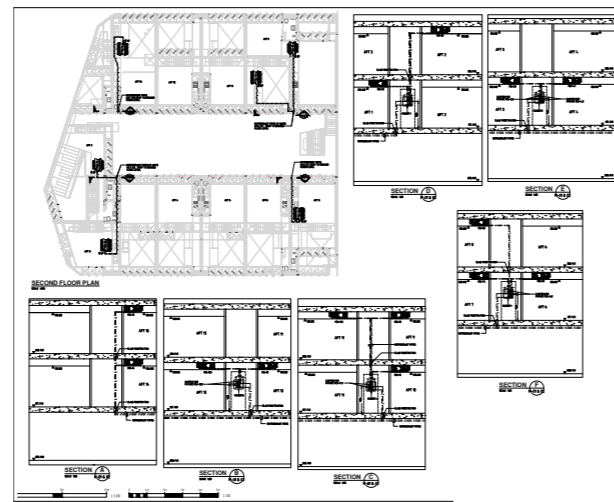
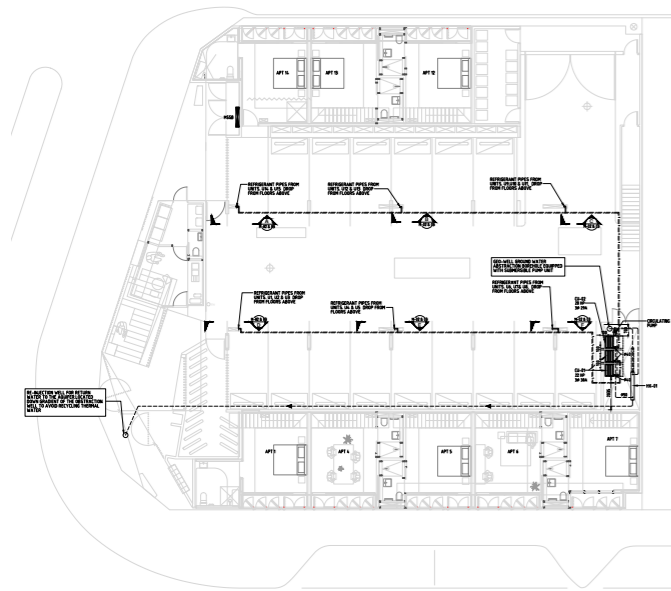
The timber will silver off... Fibreglass cladding will take on the changing light of the day... Foliage will begin to climb the friendly walls... Shutters will constantly assume new positions and the building will glow by night...

Come on over...





BUILDING SERVICES DESIGN



CENTRALISED GROUND-SOURCE HEAT PUMP SCHEMATIC

GROUND SOURCE HEAT PUMP
(Water cooled VRF Heat Pump System)

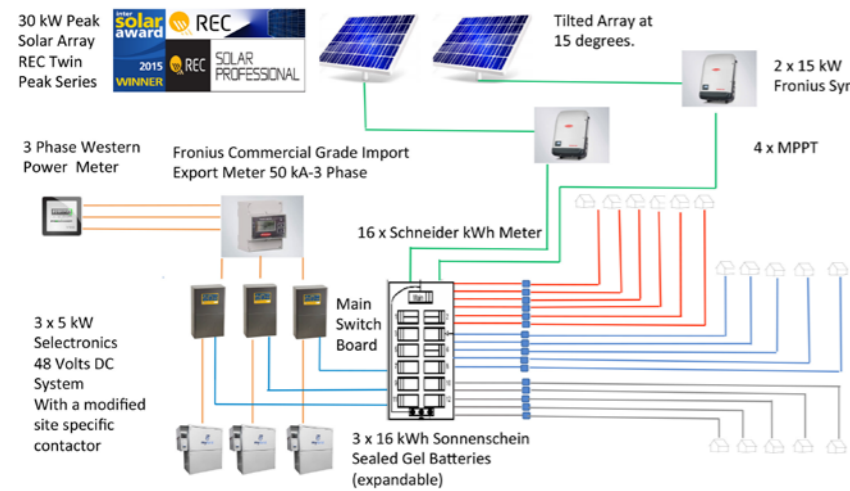
Temperature control within apartments is provided by a ground-source centralised heat pump with refrigerant piped to ducted fan coil units within individual units.

The ground component consists of an open-loop system, comprising 2 vertical bores, the first to extract water out of the in-ground aquifer and the other to re-inject the water back into the ground.

The 2 bores would connect to the water cooled heat pumps via a shell and tube heat exchanger.

The advantage of using ground water over ambient air heat rejection lies in the consistent water temperature of 21 degrees Celsius, year round. In contrast, ambient air fluctuates, rising to a mean summer condition of 37degrees Celsius and a mean winter condition of 6 degrees Celsius. Therefore, with a standard room condition of 23degrees Celsius, the equipment doesn't have to work very hard to exchange the ground temperature heat of 21degrees Celsius to room condition. Hence this geothermal equipment is much more efficient than traditional air-cooled refrigerated equipment.

PHOTOVOLTAIC + BATTERY STORAGE SCHEMATIC



Description	Model Number	Qty	L (mm)	W (mm)	D (mm)	Weight (kg)
3 Phase Smart Meter	Fronius 50KA-3	1				
30kW REC Solar Modules	REC290TP2 BLK	104	1675	1000	38	18.5
15 kW Fronius Inverter	SYMO 15.0-3-M	2	725	510	225	43.4
7.5 kW Selectronics SP Pro c/w Contactor Upgrades to Selectronics SP Pro	SPMC482-AU	3	690	375	220	42
My Grid Battery Kit c/w Sonnenschein Solar Block Sealed Gel Lead Acid 16kWh	MG016048-56	6	960	500	470	213

HYBRID MICRO-GRID PHOTO-VOLTAIC SYSTEM

Our building proposal incorporates an expandable and monitorable hybrid system comprising the equipment noted in the table to the left.

The system has been designed in conjunction with the concept of an Embedded Energy Network, which enables a Strata body to bill owners at an agreed rate for electricity. This internal billing structure allows the rate to be periodically / seasonally adjusted (every 3 months) in recognition of varying degrees of PV efficiency. As efficiency decreases and batteries are depleted, the shortfall of power is obtained from the grid.

The proposed system is initially delivered with 6 x 32kWh batteries, with the ability to expand this capacity over time.

Importantly the system is monitorable, with a central display located in the common room at ground level.

ELECTRICAL UPGRADE

The site is currently supplied with electrical capacity for up to 6 residential units @ 4.4kva/unit = 26.4kva for the site as designed by the original subdivision engineers. Given our proposal is for an additional 9 units, an electrical upgrade will be required.

We have begun to investigate the opportunity to supply this electricity shortfall entirely with renewable energy via an expansion of the proposed Photovoltaic + Battery Storage Hybrid System.

Initial advice from Western Power suggest this is theoretically possible, however, detailed electrical services design would be required to confirm this. Our intention, if successful, would be to finalise this investigation in pursuit of our preference for upscaling the renewable energy capacity of the project.

SERVICES OVERVIEW

Hydraulic Services:
Rainwater is proposed to be harvested in 5 off lined soakwells (detention tanks) 1.8m x 1.2m diameter offering a total 15.6 cubic metres of storage.

This offers economical storage as opposed to proprietary plastic tanks, which are expensive.

Lined with overflow to an agricultural drain. Capacity for water storage based on sub-surface drip irrigation (2.5 cu.m/year) and tap usage (11.7 cu.m/year)

Point of use HWS minimising pipework. Heat pump storage HWS for communal laundry.

Electrical Services:
_Embedded Energy System as framework for Hybrid Renewable Energy Model.
_Electrical appliances including:
i) Induction hotpates
ii) Electric point-of-use instantaneous hot water systems

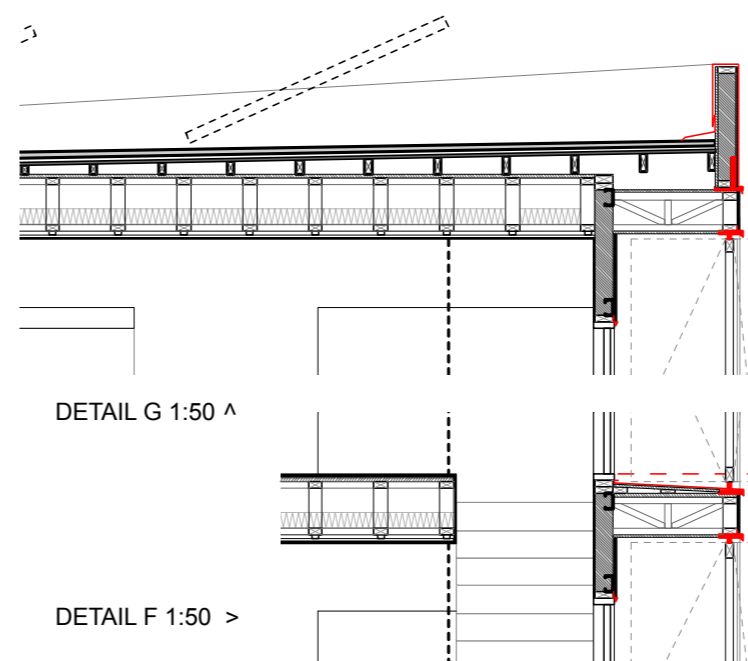
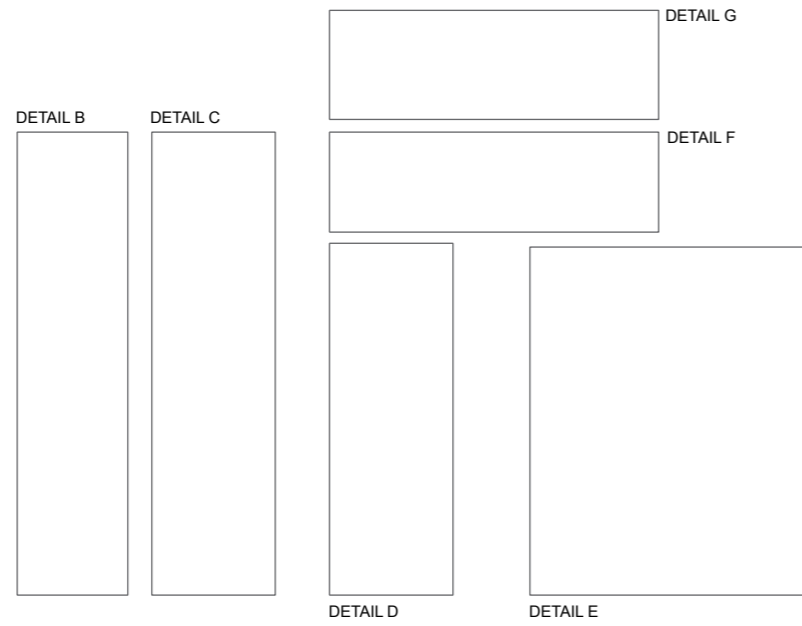
Mechanical Services:
_Natural ventilation of carpark eliminates need for mechanical extraction. Refer schematic drawing.

_Extraction to apartments via bulkhead and risers in services wall areas.

_Ground-source centralised heat-pump with reticulation of refrigerant to individual ducted fan coil units within apartments. Capacity and number of indoor units tailored to apartment design.

ALTERNATIVE SOLUTION + BCA COMPLIANCE

An engineered fire solution will be provided to eliminate the need for costly protection measures as per the Deemed to Comply provisions of the National Construction Code. The proposed alternative solution is outlined by the Building Certifier in a report appended to the Specification.



- FUTURE EXPANSION
As R-Codes amended to allow larger apartments with no further on-site parking. Facilitated by hybrid construction method below.
- USG BORAL MULTI-FRAME + PRYDA FLOOR CASSETTES
Proprietary multi-residential timber construction system. Pre-rated for fire and acoustic separation.
- BLOCKWORK / CONCRETE STRUCTURE
Future-proofs by enabling construction of 4th floor over time. Facilitates ease of fire separation to carpark.

