NORTHROP

SUSTAINABILITY PLANNING REPORT

# Jardin - Seniors Living

5 Skyline Place, Frenchs Forest NSW 2086

**PREPARED FOR**
Platino Properties
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Neutral Bay
NSW 2089
Tel: 0413 819 447

Ref: SY210080-SER01
Rev: 2
Date: 24/02/2021

# Sustainability Planning Report

## Revision Schedule

| Date | Revision | Issue | Prepared By | Approved By |
|---|---|---|---|---|
| 29/01/2021 | 1 | Preliminary | E. Tan | I. Van Eerden |
| 24/02/2021 | 2 | Final | E. Tan | A. Girgis |
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# 1. Introduction

Northrop have been engaged by Platino properties to prepare a report to enhance the sustainability objectives of Lot 1, 5 Skyline Place, Development Application. Incorporating a number of these objectives will enhance the living environment of the residents in the community and foster the development vision of an innovative, leading edge intergenerational precinct. This document should be read in conjunction with the Social Impact report, prepared by Chris Faulks, Deputy Chancellor of the University of Canberra, which outlines the social benefits of the proposal (seniors housing, affordable housing & disability housing) which enhance further the sustainability objectives of the application.

## 1.1 Site Description

The site is located at Frenchs Forest, approximately 13km from Sydney's CBD, and along Frenchs Forest Road East.

The site is surrounded by industrial buildings and warehouse. Platino Properties intends to repurpose the land to facilitate three separate buildings, ranging in height from 6-12 storey, containing:

- A total of approximately 130 seniors living units including approximately 12 affordable dwellings for seniors.
- A mix of 1, 2, 2 bed + study and 3 bedroom dwellings
- Approximately 7 units to be operated by Project Independence
- Approximately 1000 $m^2$ commercial floorspace

## 1.2 Sustainability Objectives

The project will be targeting the following sustainability objectives to enhance the environmental performance of the site:

- BASIX Certification – compliance with the requirements of the NSW SEPP BASIX 2004;
- SEPP 5 – Compliance with the requirements of SEPP 5 – Housing for Seniors and People with a Disability Developments
- SEPP 65 – Compliance with the requirements of SEPP 65 – Design Quality of Residential Apartment Development and the related Apartment Design Guide.
- Warringah DCP 2011
- Additional sustainability initiatives to incorporate Australian Best Practice Sustainability principles within the project design, as listed in Section 1.

## 1.3 Referenced Documentation

The following documentation was referenced in the development of this report:

- Architectural Drawing dated 23.02.2021
- Pre DA Meeting with Northern Beaches Council January 2021

## 1.4 Limitations

Due care and skill has been exercised in the preparation of this report.

No responsibility or liability to any third party is accepted for any loss or damage arising out of the use of this report by any third party. Any third party wishing to act upon any material contained in this report should first contact Northrop for detailed advice, which will take into account that party's particular requirements.

# 2. Energy Efficiency

## 2.1 Passive Design

The building characteristics and orientations can have a large effect on the amount of energy that is required to heat, cool and ventilate a building.

Key considerations will include designing high performance facades including glazing selection and extent, external shading, daylight direction devices, insulation levels, surface properties and possible natural ventilation openings.

### 2.1.1 Natural Ventilation

Natural ventilation, unlike fan-forced ventilation, uses the natural forces of wind and buoyancy to deliver fresh air into buildings. Ventilating a building naturally can significantly reduce energy consumption of HVAC systems, whilst providing 100% outdoor air into the spaces it serves, creates a very clean environment for occupants.

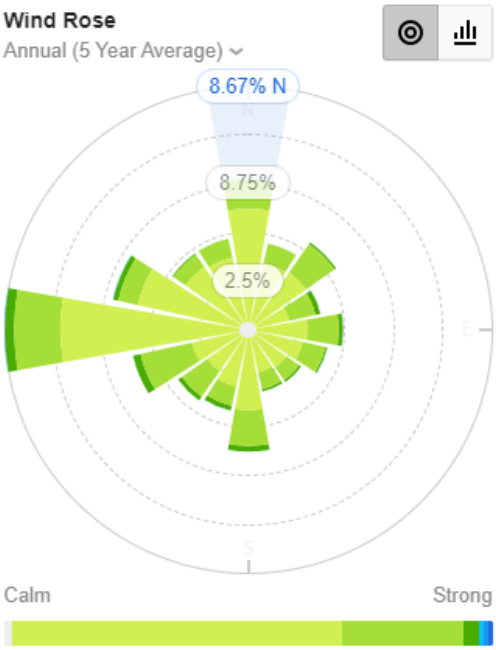



**Figure 1 of Wind Rose diagram**

In Frenchs Forest, the predominant wind directions occur from the west; this would be the governing factor when considering building orientation on the site as seen in the wind rose diagram in Figure 2. Natural ventilation will be maximised by implementing a precinct wide consideration of wind direction and speeds in preparation of building orientation design to optimise passive cooling opportunities across the site.

## 2.2 HVAC Systems

Typically apartment buildings in Sydney are served by individual reverse cycle split air conditioning systems for each dwelling. While split systems provide high flexibility for individual control and simplicity from a body corporate outgoings point of view, this is not always that best outcome from an energy, operational cost and aesthetic perspective.

Various options will be investigated to provide an improved energy efficient outcome system that provides a better level of control. This will include equipment selection (with priority for higher energy efficiency ratios), control strategies and day/night-time zoning.

Additionally, the feasibility of centralised heating and cooling systems will be explored to investigate the opportunities to provide the central production and distribution of thermal energy.

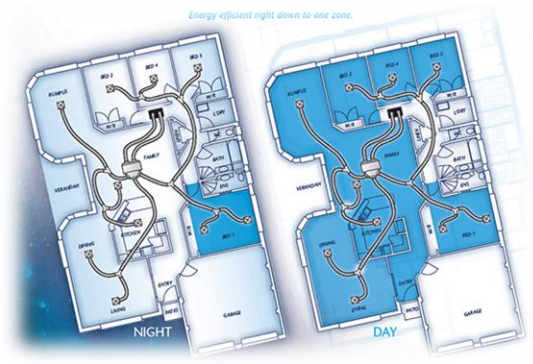



**Figure 2 Day/night zoning configuration**

## 2.3 Energy Efficient Appliances

Minimum Energy Performance Standards (MEPS) specify the minimum level of energy performance that appliances, lighting and electrical equipment must meet or exceed before they can be offered for sale or used for commercial purposes.

High MEPS rated appliances will be considered beyond mandatory product ranges in Australia and New Zealand. These products must be registered through an online database and meet a number of legal requirements before they can be sold in either of these countries.

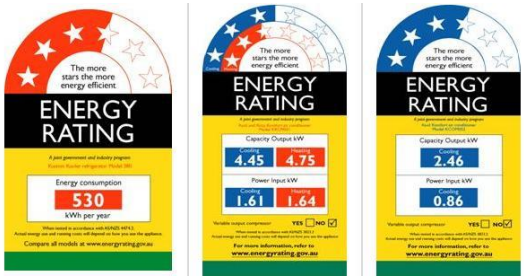



**Figure 3: Typical Energy rating labels**

One of the major energy consumptions in residential apartment is the refrigerator. By providing sufficient ventilation to the refrigerator compressor, it will allow free movement of air to extract the heat given off by the outside of the fridge and leads to higher refrigerator efficiency.

## 2.4 Private Outdoor Clothesline and Clothes Dryer Selection

Private outdoor clothesline can be provided for individual apartment to reduce the use of clothes dryer. Clothes dryer are generally provided for new apartments. As clothes dryer with energy star rating of 2 stars and below are able to be stacked (dryer on the wall), they are usually nominated to save laundry space. It is recommended to consider alternative laundry layout so a more efficient dryer can be installed. According to the Energy Rating website, every extra star will cut 15% off clothes dryer running costs. The operational cost will reduce further with the selection of models with auto-sensors that avoid over-drying or install heat pump dryers.

## 2.5 Energy Efficient Artificial Lighting

The provision of highly energy efficient lighting is to be incorporated into the building design to minimise the lighting density. In particular, LED lighting provides the maximum efficiency and has become a robust cost effective lighting technology.

Control strategies are also vital to reduce excess energy use, including:

- Daylight sensor and motion sensor control for hallways, lobbies and shared spaces.
- Lift lighting connected to lift call buttons.
- Motion sensor for undercover car parking, switch rooms, service areas and common facilities room.
- Motion sensors (Chamaeleon lighting) in fire stairs to trigger between standby (dimmed) and full light outputs

## 2.6 Cooktops Selections

Induction cooktops should be installed to minimise the gas connection and future proofing the development. The use of electric cooktops also provides safety benefits to the senior occupants.

## 2.7 Pool Efficiency

A pool cover or liquid pool cover will be installed to and improve water cleanliness as it keeps debris such as dirt leaves and insects out of the pool. A pool cover also reduces the amount of water and pool chlorine lost to the sun's UV ray and heat, leading to lower pool chemical cost and reduced water consumption. Time switch will be installed for swimming pool pumps to reduce energy use.

## 2.8 Alternative Energy Sources

### 2.8.1 Solar Photovoltaic (PV)

Rooftop solar power within the development has the potential to provide a portion of the building energy use across the year. Using a system connected to the base building systems will offset energy used by the central services such as lifts and common area lighting. Rooftop solar will also provide a benefit to the projects BASIX compliance levels for the residential developments of the site and NABERS performance for the commercial office areas.

If there was a desire to maximise the amount of solar PV to be installed, this could be incorporated with an embedded network (detailed in section 2.10) to allow the use of the output electricity in the precinct for residential loads in addition to the base building systems.

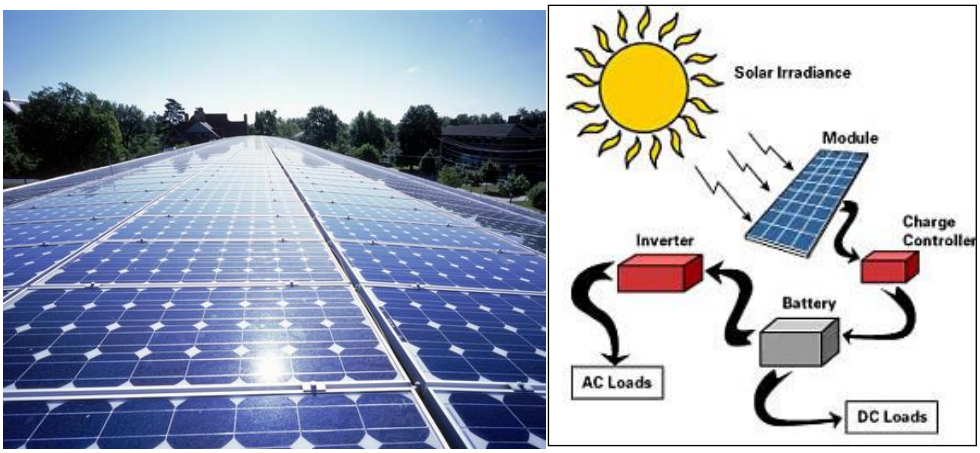



**Figure 4: Solar Photovoltaic**

## 2.9 Smart Energy Metering & Monitoring

Metering for each tenant will allow them to monitor their own energy use and result in behavioral or equipment changes. Real-time energy tracking will also raise occupant awareness of the potential excess energy in their everyday environment. Further reduction can be seen when home energy management system is installed in individual apartments and education program is introduced to guide occupants on efficient use of resources.

A user-friendly interface for monitoring will also increase interaction with the building and give the tenants a greater sense of control of their space. Display screens located in accessible common areas will be considered to display energy consumption in the building in effort to reduce the carbon footprint of the precinct.

## 2.10 Embedded Networks

A Micro grid is a private electricity network that uses local energy generation sources (e.g. rooftop solar) which can be connected to battery storage systems and supply loads within that network. An integrated micro grid would allow the precinct to manage the system within its borders and interact with the larger grid network as a single entity under an Embedded Network arrangement.

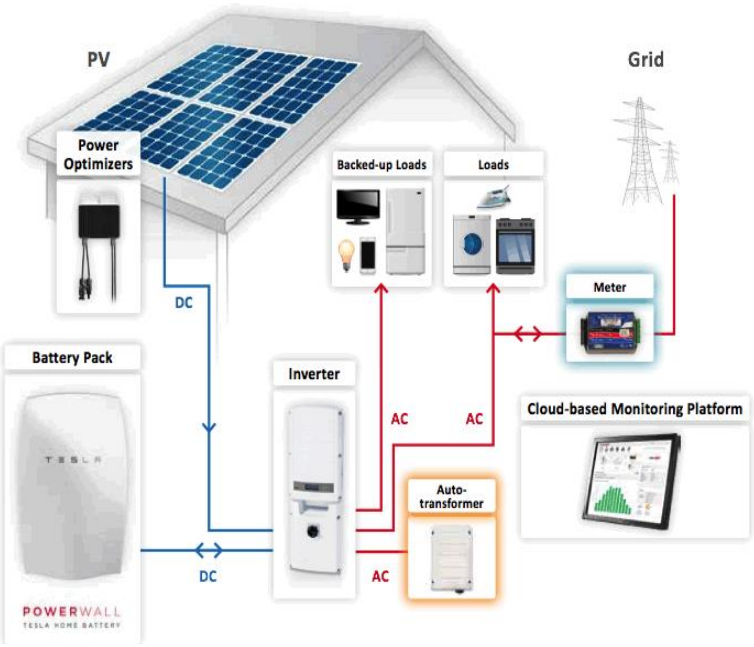



**Figure 5: Example of connectivity of an embedded network**

The embedded network would serve each of the dwellings within the building and connect these to a central connection point. Electricity can be purchased in bulk at a lower cost than is available to individual residents which could potentially provide revenue generation opportunities for Platino Properties if managed privately. Billing is then provided by either the building or through a third party (Origin, OC Energy, WIN Energy etc).

These systems are attractive as they can often provide reduced energy costs for residents and can assist in the distribution of onsite energy generation and storage.

Overall the use of an embedded network would allow further exploration of PV generation and the installation of battery storage to provide lower electricity bills for residents.

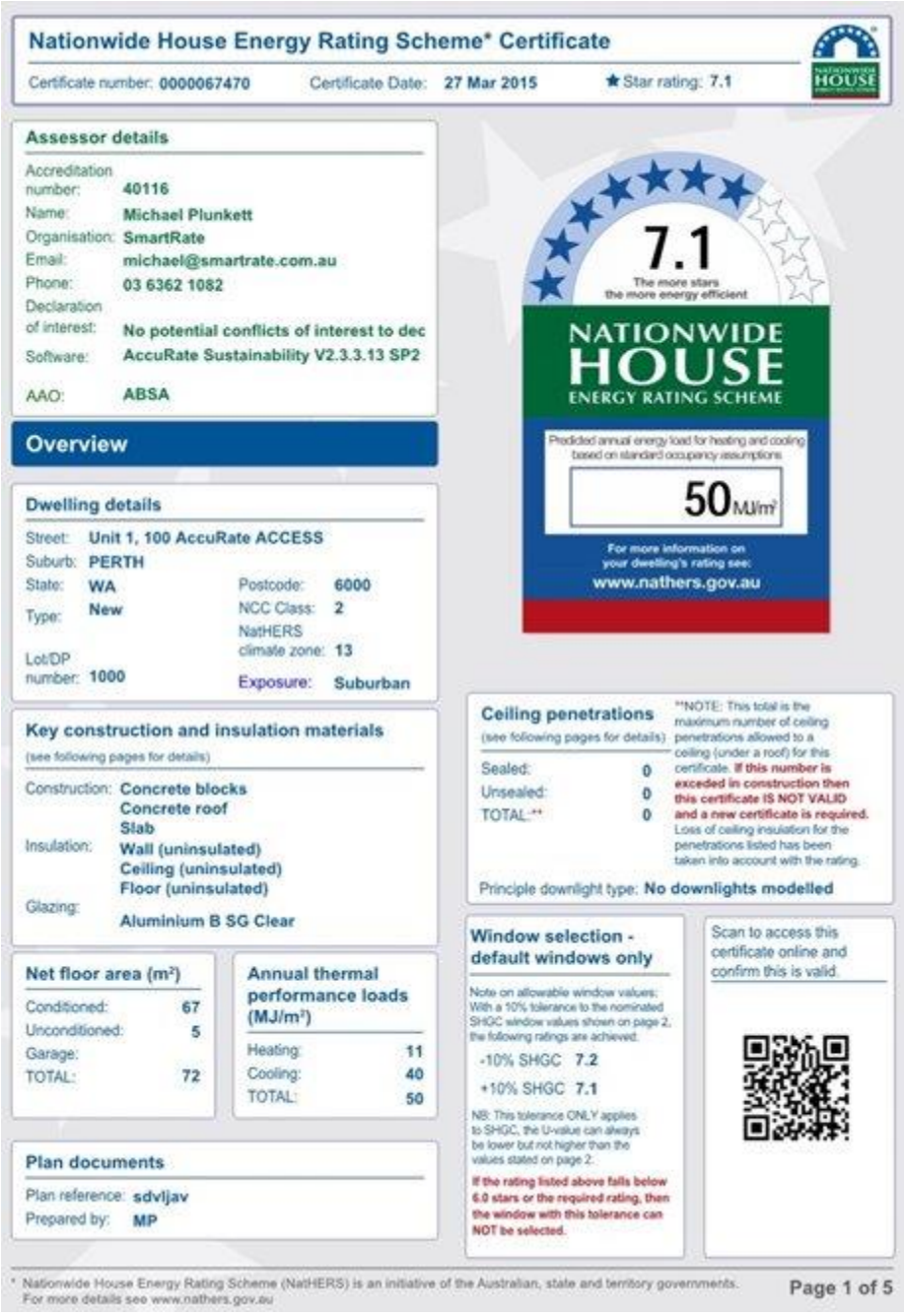
# 3. Occupant Comfort

## 3.1 Thermal Comfort

### 3.1.1 Thermal Comfort modelling

Thermal comfort is typically dictated by the building fabric selections, façade performance, air-conditioning system design & selection and individual controls.

The residential portion of the project will consider targeting an average NatHERS rating of 6 stars. The commercial components will target designing systems with optimised air distribution and individual level of control.



Nationwide House Energy Rating Scheme* Certificate

Certificate number: 0000067470 Certificate Date: 27 Mar 2015 ★Star rating: 7.1

**Assessor details**

Accreditation number: 40116
Name: Michael Plunkett
Organisation: SmartRate
Email: michael@smartrate.com.au
Phone: 03 6362 1082
Declaration of interest: No potential conflicts of interest to dec
Software: AccuRate Sustainability V2.3.3.13 SP2
AAO: ABSA

**Overview**

**Dwelling details**

Street: Unit 1, 100 AccuRate ACCESS
Suburb: PERTH
State: WA Postcode: 6000
Type: New NCC Class: 2
NatHERS climate zone: 13
Lot/DP number: 1000 Exposure: Suburban

**Key construction and insulation materials**

(see following pages for details)

Construction: Concrete blocks, Concrete roof, Slab
Insulation: Wall (uninsulated), Ceiling (uninsulated), Floor (uninsulated)
Glazing: Aluminium B SG Clear

**Net floor area (m²)**

Conditioned: 67
Unconditioned: 5
Garage:
TOTAL: 72

**Annual thermal performance loads (MJ/m²)**

Heating: 11
Cooling: 40
TOTAL: 50

**Plan documents**

Plan reference: sdvljav
Prepared by: MP

7.1
The more stars the more energy efficient
NATIONWIDE HOUSE ENERGY RATING SCHEME
Predicted annual energy load for heating and cooling based on standard occupancy assumptions
50 MJ/m²
For more information on your dwelling's rating see:
www.nathers.gov.au

**Ceiling penetrations**

(see following pages for details)

Sealed: 0
Unsealed: 0
TOTAL:** 0

**NOTE: This total is the maximum number of ceiling penetrations allowed to a ceiling (under a roof) for this certificate. **If this number is exceded in construction then this certificate IS NOT VALID and a new certificate is required.** Loss of ceiling insulation for the penetrations listed has been taken into account with the rating.

Principle downlight type: **No downlights modelled**

**Window selection - default windows only**

Note on allowable window values: With a 10% tolerance to the nominated SHGC window values shown on page 2, the following ratings are achieved:

-10% SHGC 7.2
+10% SHGC 7.1

NB: This tolerance ONLY applies to SHGC, the U-value can always be lower but not higher than the values stated on page 2.

**If the rating listed above falls below 6.0 stars or the required rating, then the window with this tolerance can NOT be selected.**

Scan to access this certificate online and confirm this is valid.

* Nationwide House Energy Rating Scheme (NatHERS) is an initiative of the Australian, state and territory governments. For more details see www.nathers.gov.au

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**Figure 6: NatHERS certificate**

### 3.1.2 Trickle Ventilation

A trickle vent is a very small opening within a buildings fabric that allows a small amount of ventilation into spaces when major elements of the ventilation systems, such as windows and doors, are closed. Trickle ventilators can also provide a greater level of control over the provision of outside air to inside spaces. A number of products are available that control ventilation flow based on temperature and pressure, allowing outside air into spaces when it would be beneficial to the internal conditions and automatically shutting this off when it would result in increased heating or cooling costs.

A well-controlled trickle vent will also reduce condensation risk, avoid over ventilation (reducing air-conditioning energy and improve comfort through minimising drafts. The provision of trickle ventilators would not remove the requirements for openable windows but could assist with acoustic and ventilation controls while providing a continuous source of fresh outside air.

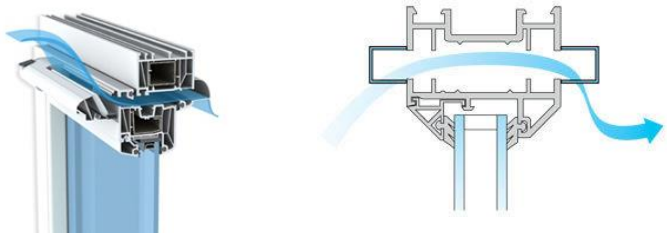

**Figure 7: Example of trickle ventilation systems**

### 3.1.3 Provision of Insect Screens

To enhance natural ventilation to the apartments, providing insect screens to the windows will encourage occupants to open the window during summer without the fear of insects flying in. Occupants also tend to be less likely to utilise the HVAC system to maintain comfort with effective cross ventilation.

**Figure 8: Example of insect screens**

### 3.1.4 Ceiling Fans

The provision of reversible ceiling fans to promote circulation of air throughout living and bedroom spaces should be considered on all developments. This should include the provision of sufficient ceiling heights to support their installation (minimum of 2.4m floor to ceiling). Ceiling fans provide a low energy alternative to the use of air-conditioning systems throughout summer and increases the efficacy of heating through winter by reducing the stratification of air throughout living spaces.

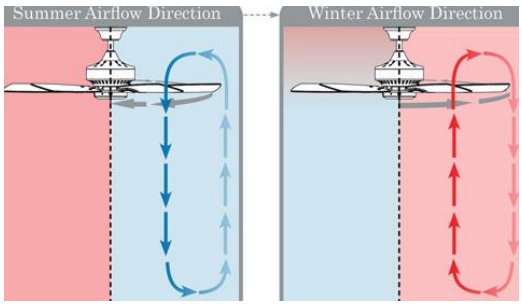


**Figure 9 Fans improve air circulation ensuring better distribution of air in both summer and winter.**

Additionally, the provision of ceiling fans will result in a further improvement of the NatHERS Star rating. Traditionally with the inclusion of ceiling fans, developments show an average NatHERS improvement of 0.5 Stars accounting for better movement of air throughout each dwelling.

The installation of ceiling fans is a low-cost improvement but will yield significant reductions in air-conditioning use throughout the year.

## 3.2 Low Toxicity Finishes

Interior finishes such as paints, adhesives, sealants and flooring contain volatile organic compounds (VOC) that are inherent to the use of solvents during the manufacturing process. Consequently, these become sources of indoor pollutants which have health implications. The design team will consider and aim to minimise the VOC and formaldehyde content of all products specified in the design process of the development.

## 3.3 Acoustic Comfort

Acoustic conditions of the site will be assessed in the future stages of the development to ensure that appropriate internal noise levels and reverberation levels are compliant with AS/NZ 2107:2016 standards.

## 3.4 Visual Comfort

The provision of internal window coverings such as block out blinds will allow residents to have better control of both the light levels and thermal comfort of their space. Installing window coverings with a light-coloured backing helps to reflect sunlight out of the space when closed reducing the solar heat gain into the space and therefore reducing cooling costs through summer. Window coverings will also reduce heat loss throughout winter.

# 4. Water Management

Given the current drought conditions being experienced in NSW the project is looking to minimise the impact that it will have Sydney's water systems. Through the use of efficient fixtures and fittings, rainwater collection and water sensitive design initiatives the site will not just consider the consumption of residents but also the effects of stormwater runoff, landscape maintenance and how leaks are identified and repaired. Some measures being considered are described below.

## 4.1 Water Efficient Fixtures & Fittings

Water Efficient Fixtures and Fittings will reduce the water consumption of the site. As an indication, the following Water Efficiency Label (WELS) rated fittings and fixtures will be considered:

- Wash hand basin taps - 5 star WELS
- General taps - 5 star WELS
- Toilets dual flush - 4 star WELS
- Urinals - 6 star WELS
- Shower heads – 4 Star WELS

## 4.2 Water Reuse

### 4.2.1 Rainwater Harvesting

At a minimum, the inclusion of rainwater harvesting will be considered for non-potable uses. Possible rainwater reuse opportunities include water for supply irrigation systems, car washing, communal laundries and cooling tower make up supply (where water based heat rejection is used), to reduce the potable water demand on site and lessen the impact to the local authority networks.

### 4.2.2 Fire Sprinkler System

During the design of the fire protection design in the consideration of sprinkler systems, the recirculation and storage of sprinkler testing water will be considered. This water can potentially be captured and stored in storage tanks for reuse during the next sprinkler test or connected to the rainwater tank for top up supply.

## 4.3 Pool Water Efficiency

Water is a precious commodity in Australia, particularly during periods of prolonged drought. A pool cover, liquid pool cover or pool blanket can be installed to reduce water evaporation.

## 4.4 Water Sensitive Urban Design

Implementing Water Sensitive Urban Design (WSUD) practices reduces the reliance of stormwater infrastructure whilst enhancing the biodiversity of a site.

WSUD options that will be considered as part of this design approach are:

- Plantings around ground floor and the building entrances;

**Figure 10: Bioswales could be located in streetscapes to improve the water quality in the precinct**

- Sub-surface stormwater detention systems
- Green roof and planters at the common area balcony
- Community garden
- Native vegetation where applicable

## 4.5 Smart Water Metering & Monitoring

Water sub-metering with alarms for leak detection for common area facilities will provide a system for effective maintenance of the site. Smart metering which is connected to a monitoring system will allow for real-time consumption tracking and flag potential leaks at the moment they occur, minimising water wastage and protecting the building from water damage.

# 5. Sustainable Transport

Transport is an area of environmental impact that most development projects do not actively consider, the 5 Skyline Place in contrast has given significant thought to how residents will integrate with existing transport networks and provide a variety of transport options to residents. Some of the measures are outlined below.

## 5.1 Pedestrian & Cycle Links

Pedestrian pathways and cycle ways will be integral to the design of the precinct to encourage public transport use and high urban amenity areas. Cycle ways and pathways can provide ease of connection to near-by light rail stations and surrounding suburbs as indicated in the precinct's Travel Plan.

It is opportunity for Platino Properties to provide clearly marked cyclist pathways and pedestrian access around these areas, designed to include sufficient accessibility to ensure for a resilient precinct.

## 5.2 Cyclist Facilities & Access

The practice of cycling assists human health and reduces environmental impact by mitigating pollutants that would otherwise have been released by other transport options. According to the ABS over one third of daily car trips are less than 3km in length. Most of these trips could be replaced with cycling. Providing secure bike storage facilities for residents will promote the use of bicycles as a form of transport.

**Figure 11: Hybrid bike rack and bench**

Providing secure storage, either as a communal storage cage in the basement or a nook adjacent to dwelling entries, assists in encouraging cycling though the precinct. The provision of bike racks outside of the main building entries across the site will also be implemented where possible.

End of trip facilities should be provided for commercial office tenants to encourage the uptake of cycling to work. This initiative also aligns with the Warringah DCP requirements.

## 5.3 Car Share Hubs

The provision of a building precinct specific share car network would allow building occupants to relinquish car ownership entirely and would greatly reduce the number of parking spaces required within the building. The provision of a cluster of vehicles could be coupled with a site mobile phone app, allowing for a centralised booking system.

A third party such Go-Get could also be provided with a dedicated space, with residents given access to their booking system. This would reduce management requirements and move responsibility for the provision and maintenance of vehicles away from Platino Properties or building management.

Providing access to car share facilities will also allow more flexibility to residents as to how they use transport allowing them to select vehicles appropriate to the task at hand.

# 6. Waste Management

Waste management throughout construction is relatively straightforward however the project is also looking to set in place measures to ensure that effective resource management is able to be maintained longer term. This is achieved through the provision of adequate space and equipping residents with the tools required to use them effectively. Some of the waste management measures are outlined below:

## 6.1 Construction & Demolition Waste

Building materials account for approximately half of all materials and about half the solid waste generated worldwide incurring significant environmental impacts at each process interval. It is proposed that a significant portion of construction and demolition waste is to be diverted from landfill to reduce the carbon footprint of the site whilst reducing waste fees associated with landfill rates. This commitment could be incorporated into the head contractors' Environmental Management Plan for the site. Reclamation of high value building materials should be considered first preference. Where reclamation is not viable, materials such as asphalt, bricks, timber, plastics (including PVC) and concrete should be recycled accordingly.

## 6.2 Waste Sortation

Waste-sorting bins will be considered for all internal and external spaces to enable users to sort their rubbish and recyclables. Back of house areas will require sufficiently sized and conveniently located waste storage and sorting areas for ease of removal by waste contractors.

An organic waste stream could be introduced with a communal worm farm or compost system to support community gardens and educational programs rolled out in the precinct.


**Figure 12: Waste stream sortation**

## 6.3 Unified Bin Design

Unified bin design throughout the precinct is proposed as part of a waste strategy to create a waste sortation culture across the project. Not only should each be a different colour e.g. Red for general waste, yellow for co-mingled recycling, blue for paper and green for organics but should be consistent throughout the site. This is to assist with clarity and develop effective waste sortation prior to disposal. The waste strategy should be as part of the Waste Management Plan and considered during the early stages of the development to ensure appropriate design integration across all building uses.

## 6.4 Waste Education

Waste educational in terms of effective signage displays or programs would have a positive benefit to the community as part of a wider approach to enhance community participation, create social diversity and provide fun educational activities for residents and surrounding suburbs.

This inititive could be coupled with the digital signage in the common lobbies as a way of updating residents of different waste pick updates.

**Figure 13: Waste Education Programs**

# 7. Materials Selection

A major portion of the impact of the building is within its embodied energy. As such the considered selection of materials can result in significantly improved environmental outcomes. The use of locally sourced materials will reduce transport emissions and using certifications and reporting to make informed decisions will allow Platino Property to construct a project that minimises its embodied impacts.

## 7.1 Sustainable Use of Resources

When choosing building materials for this project, particular attention will be paid to:

- **Low Embodied $CO_2$** – Many modern building materials such as aluminium or concrete are high in embodied energy (the energy required to produce, transport and install a material), and with that contribute substantially to the overall carbon footprint of the building.
- **Sustainability of Resource** – many building materials are derived from finite resources and should be avoided or limited. Major building elements should have recycled content where possible (recycled steel and/or aggregates in concrete, recycled timber, cellulose fibre insulation using recycled paper etc.).
- **Health Impact** – All materials should be considered in regard to their impact on occupants' health. For example, some types of fibreglass insulations have very fine fibres that, once airborne, can easily enter into the lungs and cause severe irritation.
- **Third Party Certifications** – materials which have been certified or approved by independent bodies such as Ecospecifier or Good Environmental Choice Australia should be preferred over non-certified products. These rating systems provide evaluation of various products across a range of environmental performance criteria.
- **Recycled Content** – Recycled content should be specified in:
    - Concrete – fly ash and recycled aggregates; and
    - Structural and reinforcement steel
    - Recycled building rubble
- **Operational and Maintainability –** Selection of easily maintained or reparable materials will reduce the ongoing maintenance cost.


**Figure 14: Examples of Third Party Certification Labels**

## 7.2 Locally Sourced Products

Locally sourcing products for use in the construction of the precinct would help to keep transport and distribution impacts to a minimum. It will also help to support local employment and improve economic resilience of the Sydney manufacturing industry.

Utilising local manufacturing and suppliers should also help to minimise lead time for products, build positive relationships and make supply chain auditing easier. Overall the sourcing of locally sourced products should be explored and implemented where economically feasible.

# 8. Land Use & Ecology

## 8.1 Increased Ecological Value

Being situated near community infrastructure, the development is considered to have a significant urban activation potential.

The development will significantly improve the ecological value of the site with the following being considered;

- Street landscaping;
- Vertical gardens;
- Roof gardens.

Native vegetation will also minimise the ongoing environmental impact of the project by minimising soil erosion and land degradation, improving water quality and provides habitat for native flora and fauna.

## 8.2 Native Vegetation

Native vegetation plays a key part in the biodiversity and ecological stability of the site.

Endemic native vegetation plantings have the benefit of:

- Controls erosion through protecting soils and riverbanks
- Reduces land degradation and salinity
- Improves water quality and availability
- Provides habitat for a wealth of unique and threatened species.

In addition, native vegetation stores a significant amount of carbon, mitigating the effects of climate change. The planting of native vegetation throughout the precinct will reduce the water needed for irrigation systems, reduce vegetation maintenance requirements, promote biodiversity and improve compliance under BASIX.

## 8.3 Heat Island Effect

Urban heat island effect is defined as hard surfaces within a development heating up due to lower Solar Reflectance Indexes (SRI), compared to a natural area. This results in additional heat retention in the surrounding area, as well as allowing more heat to penetrate individual buildings.

The following will be considered in the development to reduce heat island effect;

- Roof Gardens;
- Artificial water bodies & water courses;
- Increased vegetation areas;
- Selection of paint finishes with high SRI properties such as light coloured exterior finishes.

## 8.4 Rooftop Garden

Plants have the ability to reduce the overall heat absorption of the building which then reduces energy consumption. The primary cause of heat build-up in cities is solar radiation, the absorption of heat by roads and buildings in the city and the storage of this heat in the material. By installing roof gardens, the development is creating a passive solution to this build-up of heat with the plant surfaces cooling the space through the process of transpiration. This will help to minimize temperature rise in these spaces to no more than 4-5°C above ambient improving thermal conditions within the buildings across the site and minimising the precinct effect on urban heat islands.

**Figure 15: roof gardens help to cool the space and reduce the urban heat island effect.**

## 8.5 Non-obtrusive outdoor lighting

Light pollution released into the night sky (sky glow) or spilling on to neighbouring properties can harm the environment in many ways including effects on:

- Migratory birds – nocturnal birds use the moon and stars for navigation and can become disoriented by lights shining upwards into the sky;
- The disruption of biological rhythms and other effects on the behaviour of nocturnal animals and insects;
- Greenhouse gas emissions are emitted to unnecessarily light the night sky.

Ensuring that no outdoor lights face up into the night sky would not attract any additional costs and would provide ongoing operational and maintenance savings and reduce the sites impact on the natural environment.

# 9. Community & Livability

## 9.1 Communal Gardens & Facilities

The provision of urban agriculture that promotes education and community through garden facilities, will promote community cohesion within the residents of the precinct and provide a valuable educational facility.

The community gardens should be incorporated into the space design with the overall aim of creating a self-sustaining community initiative managed by the residents of the building. Initially there will need to be a commitment of time and financing for the construction of the physical gardens and for the education of residents regarding the effective management of these facilities.

Overall, the benefits of providing the provision for urban agricultural facilities will include;

- Providing residents with access to fresh food,
- Reducing household waste going to landfill though the provision of composting facilities
- Reducing the need to provide private “backyard” space
- Promoting community engagement
- Educating residents about food production; and
- Providing biological diversity across the site.

**Figure 16: Community gardens would promote social cohesion and a sense of community**

## 9.2 Environmental Education

To assist the environmental education of building occupants and visitors, the following opportunities will be considered:

### 9.2.1 Community programs

Scheduled events and programs are good ways to encourage access to a diverse range of people in the community; celebrating culture and heritage that drives positive growth and joy in the neighbourhood.

Community events could include sustainable educational workshops with varying topics, for example, permaculture classes, composting and worm farming to complement the proposed communal gardens.

### 9.2.2 Environmental Displays

Creating interactive spaces is an effective way to encourage environmental education whilst providing a fun and vibrant atmosphere. Interactive digital display screens can be used as a tool to provide such a space which provides education to the occupants by making resource savings and consumption data readily accessible in the public space, such as the lobby areas or lifts. Information could for example detail live water and energy consumption data in the form of a touch screen display and relate back to the carbon footprint of the site in context of the individual, building or precinct.

# 10. Conclusion

The new development at 5 Skyline Place, Frenchs Forest will incorporate a number of key initiatives to reduce the impact on the environment and enhance the liveability of the precinct and demonstrate compliance against the environmental benchmarks and relevant planning instruments applicable.

Future detailed design stages of the development will explore integrating core sustainability principles and providing further detail to the project implementation of best practice sustainability. These measures that are targeted for consideration include the following.

- Good passive design including considered use of shading.
- The inclusion of efficient equipment and systems.
- Smart metering to enable residents to understand their energy consumption.
- Water efficient fixtures and fittings.
- Good thermal comfort for residences and office areas
- Considered selection of materials to reduce negative health and environmental impacts.
- Improved site ecology.
- Reduce urban heat island effect through the inclusion of vegetation.
- Provision of education and engagement programs to educate occupants on the efficient operation of the buildings.

Through actioning these measures the project demonstrates it strong commitment to efficiency in the design, construction and operation of this project and meets the targets set out by Warringah Council and Platino Properties.