Level 11, 345 George Street, Sydney NSW 2000
T (02) 9241 4188 F (02) 9241 4324
E sydney@northrop.com.au ABN 81 094 433 100

PLANNING PROPOSAL SUSTAINABILITY REPORT

Job No:	Job Name:	Date:	29.3.2017
150077	38-44, 44 & 44A Wharf Road, Melrose Park	Pages:	9 (including this page)
From	Amir Girgis		
Subject	Planning Proposal – Sustainability report		

1. SUMMARY

Northrop consulting engineers have been engaged by PAYCE to provide an Ecological Sustainable Design (ESD) statement to accompany the planning proposal submitted for the new development at 38-42, 44 and 44a Wharf Road, Melrose Park.

The new development at Melrose Park will incorporate a number of key initiatives to reduce the impact on the environment, and enhance the quality of living for the precinct.

This report focuses on the following key areas to be investigated during future design development stages;

- Energy Efficiency
- Indoor Environment Quality
- Water Management
- Sustainable Transport
- Waste Minimisation
- Materials Selection
- Land Use & Ecology
- Community & Liveability

1.1 Site Description

The site covers an area of approximately 25Ha. Based on aerial photography, the site appears to be approximately 70 - 80% impervious predominately comprising of access roads, on-grade car parking and commercial buildings.

It is understood that site would comprise of the following:

- Apartments (Approx.) 4,900
- Affordable Housing Apartments (Min.) 150
- Retail 10,500 m^2 (GFA)
- Commercial 15,000 m^2 (GFA)
- Community 3,000 m^2 (GFA)
- Childcare 1,500 m^2 (GFA)
- FSR 1.85:1
- Height limit 18 Storeys

1.2 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. PASSIVE DESIGN

The site 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 facade including glazing selection and extent, external shading, daylight direction devices, insulation levels, surface properties and possible natural ventilation openings.

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.

In Sydney, the predominant wind directions for the warmer months of the year occur from the southerly and north-easterly winds and would be the governing factors.

Figure 1 Prevailing Winds – Melrose Park

2.1 Cross ventilation

The designs will consider providing dwellings with dual aspects where high levels of cross-flow ventilation can occur. Ventilation for single aspect apartments can be improved by maximising distance between openings on the external wall. Single sided ventilation will be considered where cross ventilation is ineffective.

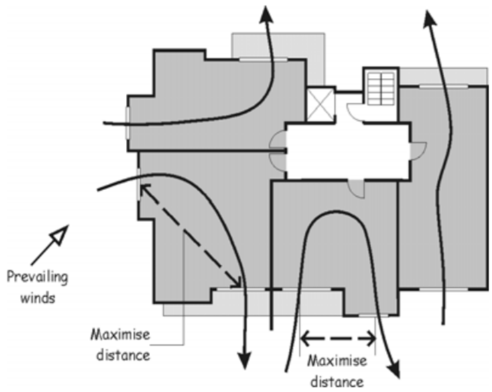

Figure 2 Natural ventilation

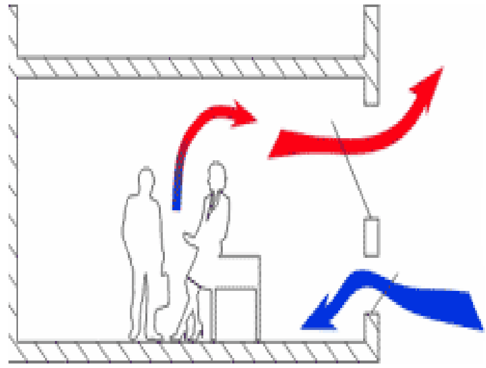

Figure 3 –Single sided natural ventilation

2.2 Natural Lighting

Lighting is a crucial part of healthy indoor environments. Effective natural lighting improves light quality and lowers energy requirements. Outdoor views help to maintain healthy eyesight and improve morale.

Providing sufficient daylight will be considered to exceed minimum planning requirements for all building types.

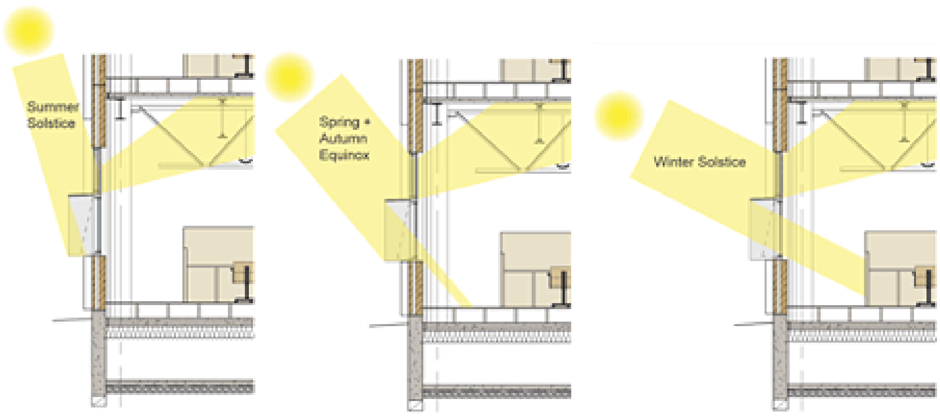

Figure 4 – Typical Daylight modelling design assessments

3. REDUCED CARBON FOOTPRINT

3.1 HVAC Systems

In general, apartment buildings in Sydney are served by reverse cycle split air conditioning systems. While split systems provide high flexibility for individual control and simplicity from a body corporate 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, control strategies and zoning.

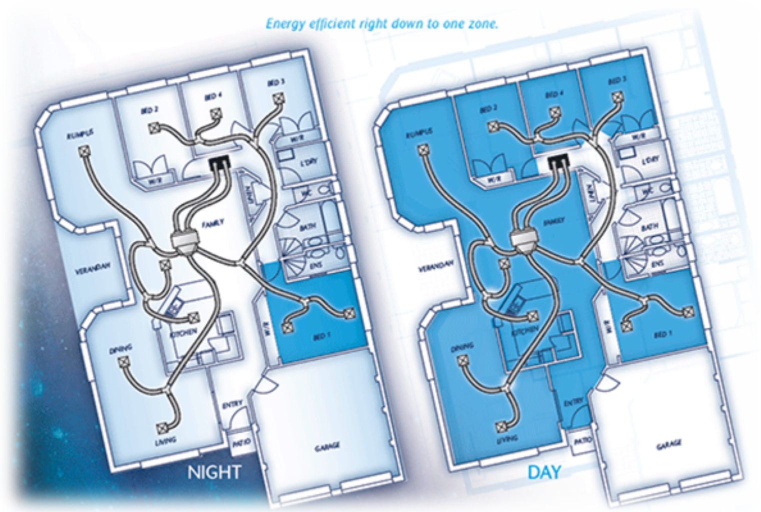

Figure 5 – Day/night zoning

3.2 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 6 Typical Energy rating labels

3.3 Renewable and Low Carbon Energy

3.3.1 Solar Photovoltaic

There are numerous potential options with PV – mono-crystalline, polycrystalline and amorphous, as well as building integrated PV (on north facing facades).

Solar panels are an effective way of illustrating that a building has renewable energy features, and are often installed to improve the green image of a development. The installation of solar PV on this site will be considered to form an important component in demonstrating leadership and in educating the local community about renewable energy opportunities.

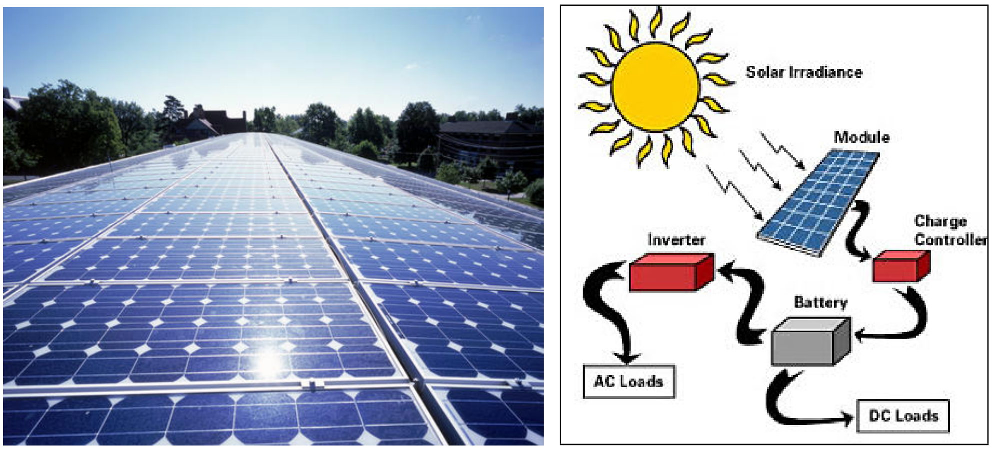

Figure 7 - Solar PV components

3.3.2 Solar Domestic Hot Water

Solar with natural gas booster hot water heating is one of the most energy efficient ways of heating water for domestic use, whilst minimising greenhouse gas emissions.

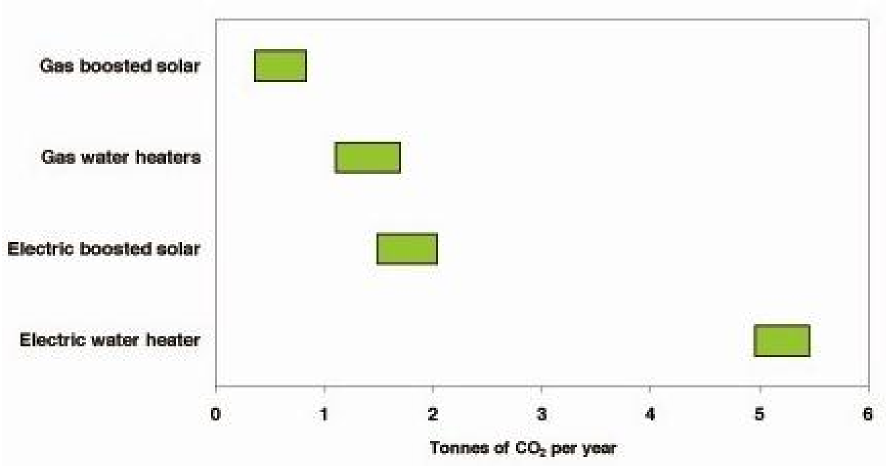

Figure 8 - Greenhouse gas emissions of different hot water systems

A central domestic hot water system will be considered for all apartments and common area amenities, comprising:

- Solar panels;
- Solar storage tanks;
- Instantaneous gas fired booster units;
- Flow and return reticulation with Authority read hot water meters for billing purposes for each apartments and common area amenities toilets.

3.3.3 Integrated renewable energy generation

Building integrated renewable energy generation can reduce space dedicated for energy generation and reduce building material consumption through dual purpose materials. Building integrated photovoltaic (BIPV) arrays are a well-developed technology that can form sun shadings, facades or roof cladding. Should roof mounted solar PV not be deemed favorable, building integrated PV will be considered.

Figure 9 Integrated PV in shading structure

3.3.4 Building Integrated Wind Turbines

The proposed apartment building will be sufficiently high relative to those buildings around it - therefore the use of wind turbines as a source of renewable energy could be considered. Recent advances in commercialised wind turbine design now make it possible to effectively integrate wind energy onto buildings. This technology involves the use of vertical axis turbines that produce little noise or vibration and are less susceptible to turbulent conditions.

Wind turbines have the potential to generate significant amounts of renewable energy at costs much lower than alternative methods such as solar photovoltaics. Wind turbines can be used as a key means of reducing the overall the carbon footprint of the building to levels unattainable by non-renewable energy sources.

Figure 10 Examples of vertical wind turbines

3.3.5 Combined Heating and Power Systems

Combined cooling, heat, and power (CCHP) systems—also called trigeneration systems—are the combination of cogeneration plants and absorption chillers. They offer an optimal solution for generating air conditioning and/or refrigeration. Absorption chillers provide an economic and environmental alternative to conventional refrigeration with compression chillers. Combining high efficiency, low-emission cogeneration equipment with absorption chillers enables maximum total fuel efficiency, elimination of HCFC/CFC refrigerants, and reduced overall air emissions.

A combined heating & power system will be considered for the prancing, with addressing load demands in the retail and residential portions.

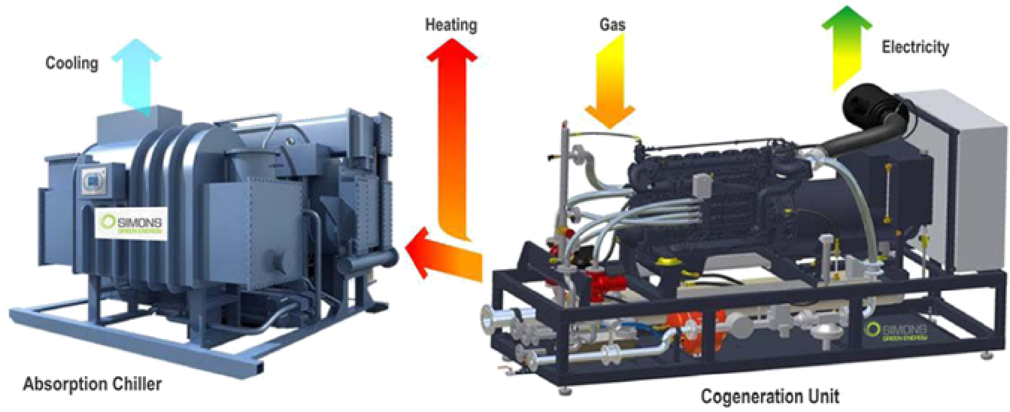

Figure 11 Tri-generation plant arrangement

An apartment building is built for people – and the importance of providing spaces that are comfortable and inspiring cannot be over emphasised. A residential project that prioritises people is likely to be well subscribed to.

4. THERMAL COMFORT

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, which is a step above minimum code compliance. The retail 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

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

Figure 12 Typical NatHERS home owners certificate

5. WATER USE

5.1 Fixtures & fitting

Water Efficient fixtures and fitting will reduce the water consumption of the site. As an indication, the following will be considered:

- Wash hand basin taps 5 star WELS
- General taps 5 star WELS
- Toilets dual flush 4 star WELS
- Urinals 0.8 L per flush 6 star WELS
- Shower heads 7 L per minutes 3WELS

5.2 Water recycling

5.2.1 Rain Water

Roof collection and tank storage – Water harvesting opportunities will be examined as part of the projects detailed design. Rain water harvesting will be considered to serve all toilets, laundries and land escape irrigation for the whole precinct.

A precinct approved recycled water scheme will be considered for implementation.

5.2.2 Grey & Black Water recycling

Grey water is defined as wastewater generated from showers and wash hand basins. This kind of wastewater treatment, or sewage treatment, is an effective method of water conservation and can be reused for toilet flushing, irrigation and possibly for cooling tower make up supply.

Black water consists of toilet waste and kitchen wastewater which can contain heavy loads of organic material, fats and caustic additives. Black water can be supplied as make-up water to the cooling towers subject to the treatment of the water meeting the cooling tower manufacturers' criteria. Alternative water recycling systems will be considered during design development.

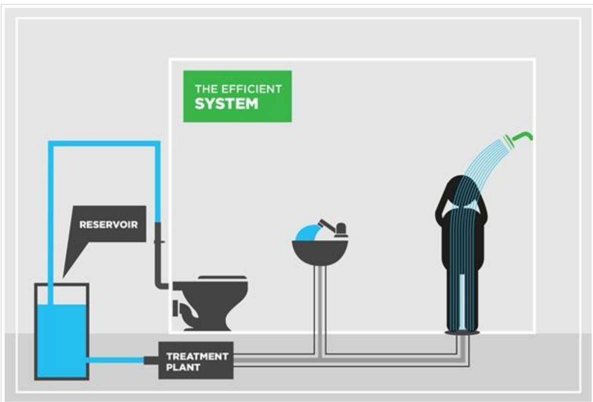

Figure 13 Grey water treatment

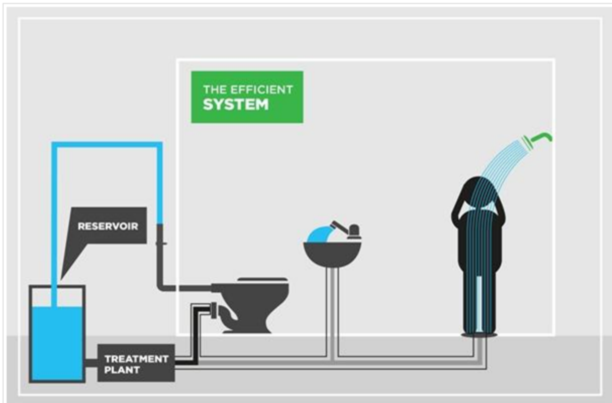

Figure 14 Black water treatment

5.3 Water Sensitive Urban Design

Implementing WSUD practices reduces the reliance of stormwater infrastructure whilst enhancing the biodiversity of a site. Options that could be considered as part of this design approach are:

- Rain Gardens or plantings around building entries;
- Tree Gardens/pits & Bio swales for storm water runoff treatment

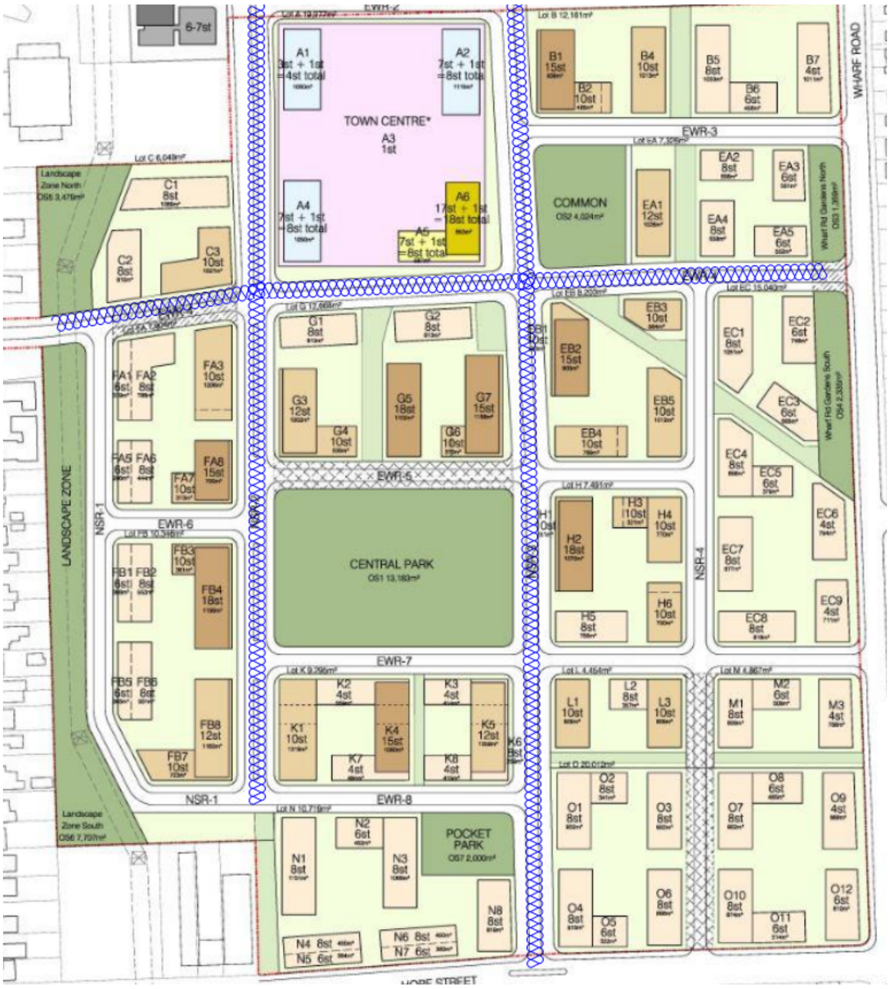

Figure 15 Roads with opportunities for Stormwater run-off treatment

6. TRANSPORT

6.1 Buses

Alternative buses are being considered to provide enhanced transport options for the residents of the Melrose Park development. The development is currently investigating both hybrid and electric bus options in effort to minimise pollution, congestion and energy.

Figure 16 Alternative bus route

6.1.1 Hybrid Buses

Hybrid buses are a relatively new concept that is proven technology, readily available for commercial sale. Where conventional buses rely on 100 percent diesel to fuel the vehicle, hybrid buses utilises waste energy lost during braking and is stored in the battery. The recovered energy is used to charge the battery to allow the bus to run on electricity during low speeds; thus saving diesel fuel and reducing greenhouse gas emissions. This approach is likely to present a reduction in emissions up to **41 tonnes of CO_2-e/yr.**

This is equivalent to taking 18 cars off the road*.

6.1.2 Electric Buses

Electric buses is a new innovation in the transport industry. Battery powered electric buses are an environmentally friendly alternative to conventional engines powered by diesel or natural gas, when combined with renewable energy sources.

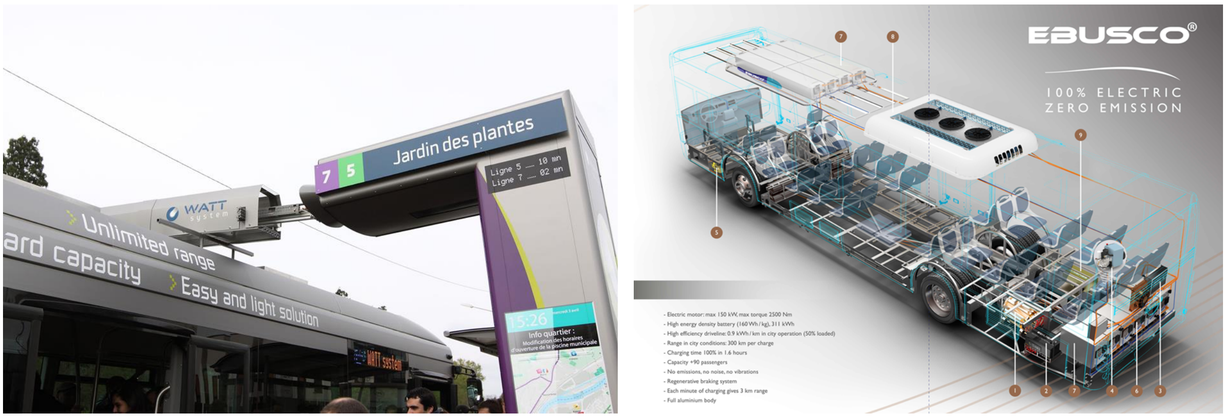

Figure 17 Electric buses concept

Electric buses are also being considered to enhance transport options for the development. Electric buses will be investigated to undertake alternative routes, connecting the precinct with train stations and ferry wharfs. This approach is likely to present a reduction in emissions by **106 tonnes of CO_2-e/yr.**

This is equivalent to taking 46 cars off the road*.

6.2 Electric Car Charging Stations

An electric car charging station will be considered for the residents for the use of electric bus technology. Providers such as ChargePoint, Better Place or E-Station could be up taken to provide electric charging stations. This type of facility could promote the engagement of the residents with the sustainable aspects of this development.

Figure 18 Car charging concept

* Based on passenger car emission of 165g CO_2-e/km
(https://www.greenvehicleguide.gov.au/Vehicle/QuickCompareVehicles)

6.3 Cyclist facilities

Cyclist facilities will be considered for building's occupants. Bicycle storage and community bikes will be considered for residents to use on cycle ways within the precinct, and as means of travel to public transport hubs (train stations, ferry wharf, etc.). Complete end of trip facilities will be considered for commercial & retail components.

Considerations will also be given to incorporating public art with cyclist facilities.

Figure 19 bicycle parking alternatives

As part of the development, the works will also contribute to the restoration of the Parramatta Valley Cycleway.

7. MATERIALS CONSUMPTION

7.1 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.

Figure 20 – Waste stream sortation

7.2 Sustainable Construction

Construction works can significantly impact the environment, particularly at a local level. These can arise from site disturbance, pollution, construction waste, water and energy use.

Traditionally, the bulk of construction waste has gone to landfill. Through government programs (such as the Commonwealth Government's WasteWise Construction Program), waste from construction projects is now regularly achieving 70% waste diversion.

A target construction recycling percentage will be considered for this project. Achieving 60 to 80% recycling is generally achievable without cost penalty.

7.3 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. Some types of fibreglass insulations have very fine fibres that, once airborne, can easily enter into the lungs and cause severe irritation.

- **Environmental Accreditation** – 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

8. ECOLOGY

8.1 Increased ecological value

The development is considered to have a significant urban activation impact, and will involve transforming a “greyfield” into a vibrant precinct boasting various areas of greenery. The development will significantly improve the ecological value of the site with the following being considered;

- Public parks & oval;
- Bio-retention basin; and
- Street landscaping;
- Roof gardens.

8.2 Heat island Effect

Urban heat island effect is defined as hard surfaces within a development heating up due to darker Solar Reflectance Indexes (SRI), compared to a natural area. This results in additional heating generated in the ambient surrounding temperatures 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 SRIs

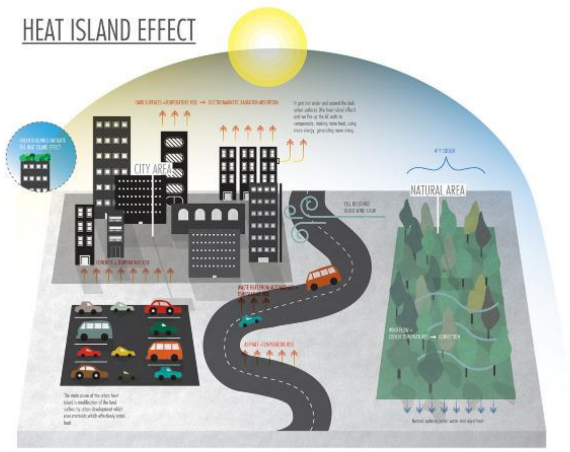

Figure 21 – Urban Heat Island effect

9. COMMUNITY FACILITIES

9.1 Communal Gardens and Facilities

Access to external areas is important to the health and wellbeing of the residents of an apartment building. In addition, community facilities promote neighbourly interaction, enhancing the social performance of a development.

Community gardens will be considered for the development. The roof of the development could be utilised as a roof garden, and potentially a productive garden for the use of residents.

Figure 22 –Community gardens

9.2 Community Environmental Education

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

Environmental Displays

Live data of the energy and water usage can be displayed on a LCD monitor in the foyer, alongside with the amount of rainwater, solar energy etc. harvested. Data of the estimated building energy and water targets as well as a comparison of consumption against standard buildings could also be displayed.

Figure 23 - Environmental Displays

Community Intranet Portal

A local intranet ESD portal could be installed for residents and visitors of the development. There are a number of functions this intranet portal could fulfill:

- Display of live data of the energy and water usage as well as rainwater and grey water harvest. This data will be sourced from the Building Information Management (BIM) System;

- Additional data displayed could be weather (current and predicted), household waste generated, public transport information, local community information and/or maintenance programs;
- The portal can be used as a forum where ESD initiatives or healthy lifestyle issues are being discussed;
- Car-pooling could be organized through the portal.

9.3 Way finding

A high-functioning way finding system makes the environment “unique” and enhances the visitors’ experience as it increases their comfort, builds their confidence, and encourages them to discover unique events, attractions and destinations on their own. Way Finding can also be utilised to direct occupants to key facilities and amenities; cafeterias, gift retailers, 24 hours beverage outlets, ATMs, etc.

The figure below highlights some key principles that will be considered for way finding design;

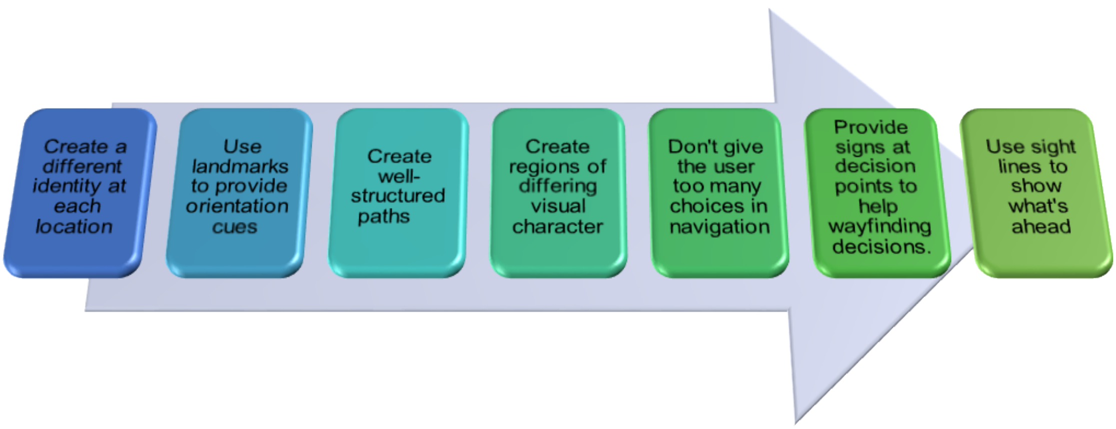

Figure 24 Way Finding design principles

10. CONCLUSION

The new development at Melrose Park will incorporate a number of key initiatives to reduce the impact on the environment, and enhance the quality of living for the precinct.

Future detailed design stages of the development will explore integrating core Sustainability principles, and firming up a strategy for implementation.