efficient LIVING

ECOLOGICALLY SUSTAINABLE DESIGN (ESD) REPORT

Pagewood - Stage 2
Lot E
128 Bunnerong Road, Eastgardens NSW 2035

Prepared for: Meriton
Attention: Norelle Jones

Issue	*File Ref.*	*Description*	*Author*	*Date*
A	*21-1738*	*Ecologically Sustainable Design Report*	*Tracey Cools*	*22/04/2021*
B	*21-1738*	*Revised per Meriton's comments*	*TC / AA*	*01/06/2021*
C	*21-2191*	*Revised per Council RFI*	*TC / AA*	*10/08/2021*

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Contents

1 Introduction

Efficient Living has been engaged to prepare an Ecologically Sustainable Design (ESD) Report to support a Stage 2 development application for the construction of a high density mixed use development at Lot E, 128 Bunnerong Road, Eastgardens.

The site forms part of the Meriton Pagewood Green development which involves the redevelopment of a former industrial site for a high quality mixed use development that will support a variety of residential dwellings, retail uses and community uses. The site is being delivered in two principle stages. Stage 1 has largely been completed. Stage 2 has commenced, Concept plan approval (DA2019/386) was granted for a mix use development comprising residential, childcare centre and retail uses complemented by new areas of public open space over the Stage 2 site on 26 November 2020. The Stage 2 concept plan will be delivered in eight stages as Lots A to J.

DA2019/386 includes a number of conditions that must be taken into consideration when developing the detailed design of each individual lot within the Stage 2 site, including specific requirements with respect to the ESD targets for the development. The concept plan was also supported by an ESD report which addressed the National Strategy for Ecologically Sustainable Development.

This report included several ESD commitments that are to be adopted in the detailed design of each development Lot and which broadly include the following key features:

- *Inclusion and promotion of open parklands*
- *Green roof tops*
- *WSUD*
- *A landscape plan that promotes flora and fauna*
- *Active and public transport modes*
- *Bike facilities including cycle paths and bike parking*
- *Car share*
- *EV charging*
- *Energy consumption monitors*
- *Solar power*
- *Community facilities.*

1.1 Background

Efficient Living was engaged to prepare an Ecologically Sustainable Design (ESD) Report to accompany the Development Application (DA) for the concept plan. The Stage 2 Concept is the vision of SJB Architects and will be constructed by Karimbla Construction Services (NSW) Pty Ltd, also referred to as Meriton. The masterplan seeks to re-purpose an industrial site into a future proofed and sustainable community.

The concept design supports a diverse and growing population, group together recreational, employment, retail, and leisure, focus on walkability to neighbouring amenities including Westfield Eastgardens, the golf club and the bus interchange.

This master plan addresses the National Strategy for Ecologically Sustainable Development by:

- *Being a design concept that allows for large open parklands throughout the site. Green roof tops, an extensive Water Sensitive Urban Design (WSUD) strategy and a landscape plan that promotes local flora and fauna.*
- *Promoting active and public transport modes, extensive bike paths and bike parking provisions, space for share cars and a significant commitment to Electric Vehicle charging stations.*
- *Energy efficiency optimised, with real time energy consumption monitors installed to all units and managing the residential base building energy demands.*
- *Generation of solar power onsite.*
- *Extensive community facilities for use by the residents and wider community.*

This development will be an asset that will be enjoyed by the wider community well into the future.

1.2 Aim of Report

This report has been prepared to demonstrate how the requirements of concept plan approval (DA2019/386) have been addressed. It includes the following sections:

- *A description of the Lot E site*
- *The ESD requirements applicable to Lot E as specified under DA2019/386*
- *A description of the site specific ESD initiatives adopted for the Lot E development*
- *Statement of Commitments*

This report should be read in conjunction with the architectural plans and other supporting technical reports and documents that accompany the DA.

2 Building Description

2.1 The Site

The development is located at Lot E, 128 Bunnerong Road, Eastgardens. Lot E is central to the Pagewood Stage 2 development as it forms a focal point next to the new community open space and adjacent to the new Village Heart on Lot B. The development at Lot E is a mixed-use building comprising of a three storey basement carpark, ground floor commercial podium including retail tenancies and visitor parking and 324 residential dwellings across building towers A (13 levels of residential units) and B (16 levels of residential units). There is central parklike common area leisure zone on the podium including an outdoor pool, spa, gym, BBQ areas and landscaped gardens.

Figure 1: Rendered Image view of the development at Lot E from the community open space

3 Concept Plan Approval DA2019/386

The following conditions of consent are applicable to Lot E.

DA2019/386 Conditions of Consent	Lot E Design Response
39. Public Domain Canopy Cover – min 30% tree canopy cover	Complies, See section 4.2 Green Roof Tops and Landscape Report for Lot E.
45. ESD a) Provision of electric charging facilities for 10% of the required bicycle spaces. b) Extensive use of planters on interior and exterior of buildings c) Each development is to designate a podium area for community gardens for residents and a composting facility d) Increased floor to ceiling heights for above ground car parking	Complies, see section 4.1 Open Space; Section 4.8 EV Charging; Section 4.2 Green Roof Tops; Section 4.4 A Landscape Plan that Promotes Fauna and Flora
46. Site Specific Sustainable Travel Plan A Green Travel Plan and Transport Access Guide is to be provided for the entire development (and an individual one for each building proposed as part of the subsequent development application). These shall address, but not be limited to, the following: • Encourage people to cycle and/or walk to the development • Encourage people to use public transport to travel to development • Adopt car sharing and car pool scheme • Provide bike storage area and end-of trip facilities in convenient locations • Include clear and time bound targets, actions, measurements and monitoring framework • Develop Transport Access Guides (TAG's) to the TfNSW requirements for residents / visitors with information on how to reach the site via public transport, walking or cycling.	Complies, see Section 4.5 Active and Public Transport Modes; Section 4.6 Bike Facilities; See separate Green Travel Plan for Lot E
50. Car Share Nominated fixed car share spaces are to be provided at a rate of 1 space per 50 dwellings and 1 space per 500m² non-residential GFA within the development. Only used and	8 car share spaces provided – over complies. See Section 4.7 Car Share

operated by a recognised commercial car share operator. Can be shared with visitor spaces	
51. Electric Vehicle charging A minimum of 20% of all car parking spaces must be equipped with Electric Vehicle (EV) charging facilities as per ESD Report. Publicly accessible EV charging stations must be equipped with fast charging facilities.	Complies, see Section 4.8 EV Charging
52 Bicycle Facilities. A) Residential Minimum provision: • Min 1 space per 2 dwellings • Min 1 visitor bicycle space per 5 visitor car spaces • Min 10% of the required spaces shall be fitted with electric bicycle charging stations B) Non-residential: • Min 1 space per 150m² GFA • End of trip facilities • 1 visitor space per 450m² GFA • Min 10% electric charging stations C) Publicly Accessible • 20 publicly accessible bicycle spaces within each open space identified … upon the indicative staging plan • Min 10% of the required spaces shall be fitted with electric bicycle charging stations D) All located in safe, convenient and well illuminated locations.	Over-complies, see Section 4.6 Bike Facilities and 4.8 EV Charging

4 Site Specific ESD initiatives

This section provides a detailed description of the ESD initiatives adopted for the Lot E development.

4.1 Open Space

The master plan for the Pagewood - Stage 2 site was designed around the principals of a landscaped setting.

Lot E is adjacent to the new community park and the ground level retail tenancies located to the east of Lot E connect directly with the community park. Lot E is also located adjacent to the new village heart on Lot B. The community open spaces are multi-functional and cater to a variety of

age groups and abilities. Community open spaces are key to the activation, education and liveability of the development.

The open spaces will include focal artworks and wayfinding signage. Outdoor alfresco dining areas are shaded with umbrellas. There are many spaces for relaxing on sculptural integrated seating under canopy tress.

Figure 2: Extract from Ground Level Landscape Plan

4.2 Green Roof Tops

There is a commitment across this masterplan design to incorporate green roof areas and leisure zones to all lower roof top podiums. On top of the Ground floor is an extensive residence private use landscaped podium. The community facilities include an outdoor pool, gym, sun lounger area, BBQ area, open grassed area suitable for yoga, balls games, and picnics and shaded seated areas. The podium has been designed with a suitable depth to support the planting of larger trees that contribute towards the master plans commitment of 30% tree canopy cover.

Figure 3: Extract from Level 1 Communal Podium Landscape Plan

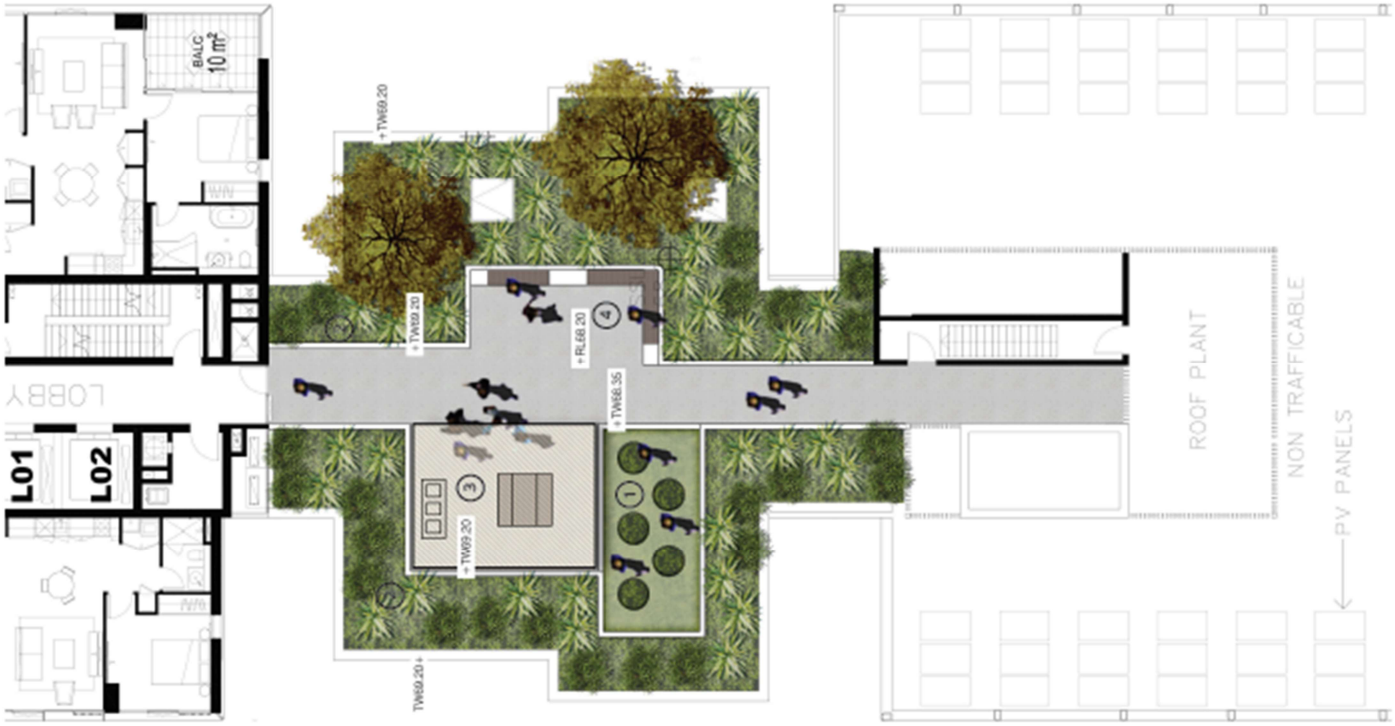


Figure 4: Extract from Level 14 Landscape Plan

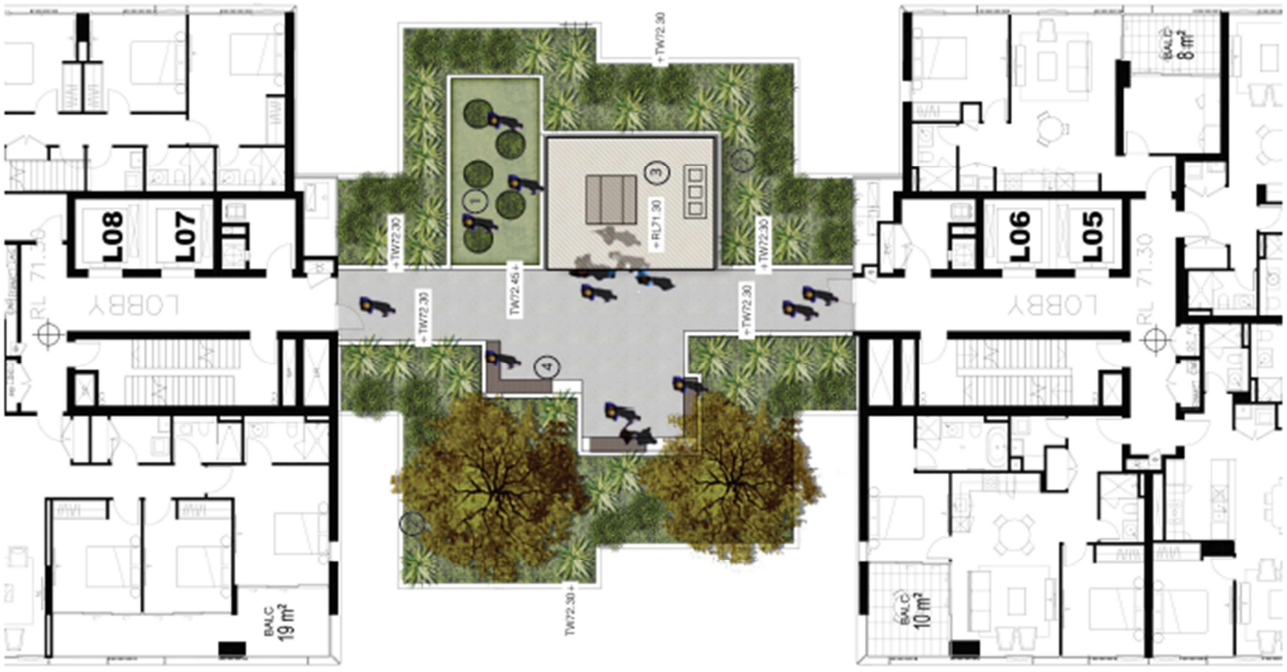


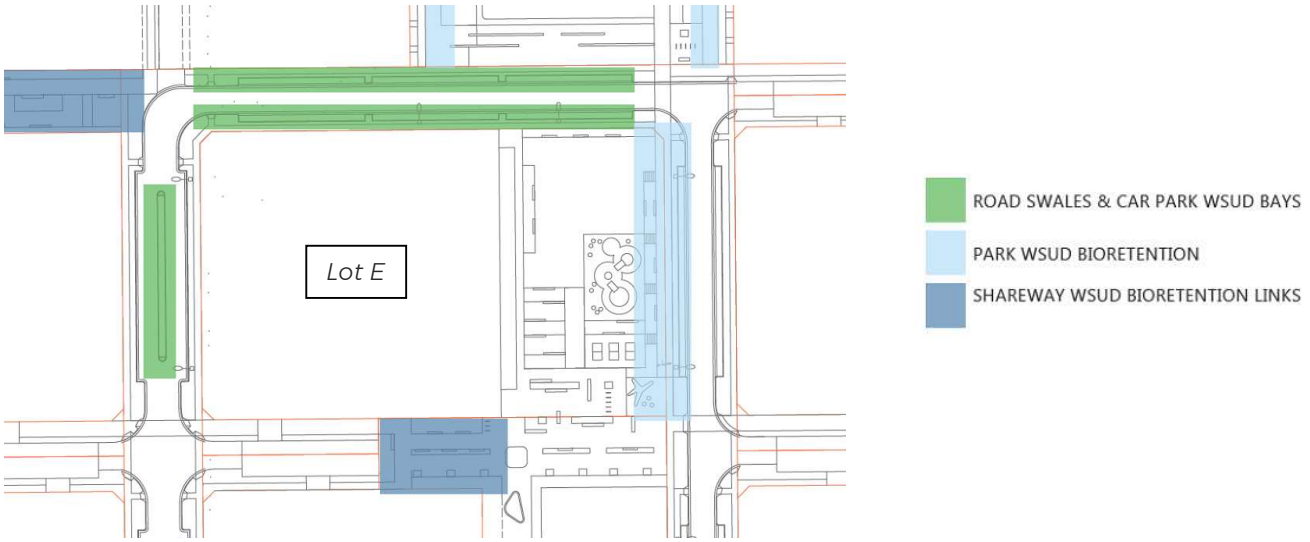
Figure 5: Extract from Level 15 Landscape Plan

4.3 WSUD

A Water Sensitive Urban Design (WSUD) approach has been incorporated into the design of the development. This improves the quality of the stormwater leaving the site through treatment methods which mimic natural systems. The flow-rates of the stormwater is managed through various infiltration, capture and stormwater methods minimising the risks of flooding and erosion to downstream areas. Stormwater capture and re-use is maximised to provide adequate public domain irrigation supply and promote vigorous plant growth.

The WSUD approach for the management of stormwater runoff in the public domain also improves community awareness of stormwater treatment practices, engaging everyone in the process and leading to a holistic improvement in environmental management.

The WSUD interventions included in the landscape design of Lot E include broken or flush kerbs for passive irrigation of verge garden beds, and shareway bio-retention links.



ROAD

SHAREWAY LINKS



4.4 A Landscape Plan that Promotes Flora and Fauna

The planting strategy for the public domain and ground level has been developed in collaboration with Bayside Council as an overall masterplan and review of existing species. The planting palette for Lot E has been selected carefully to accommodate for different micro-climates around the site, including native and exotic species.

PODIUM LEVEL TREES


Pyrus Calleryana


Elaeocarpus reticulatus


Banksia integrifolia


Waterhousia floribuna

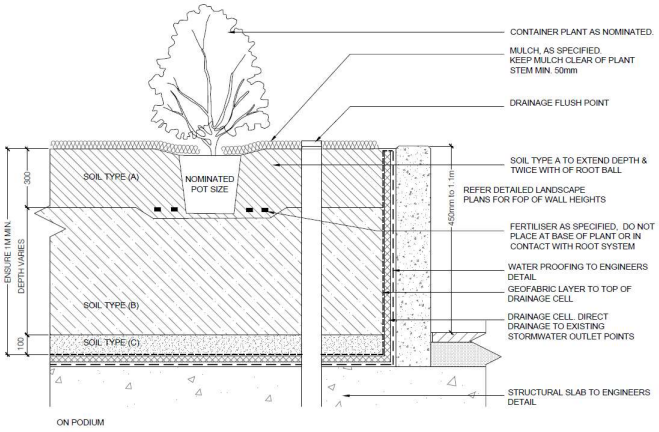
PUBLIC DOMAIN / GROUND LEVEL TREES


Lophostemon confertus


Angophora costata


Corymbia maculata

The podium has been designed with a suitable depth to support the planting of larger shade trees that contribute towards the master plans commitment of 30% tree canopy cover.



TYPICAL PLANTING DETAILS

Lot E will have elevated garden beds on the podium, dedicated for the exclusive use of the residents to participate in community run edible garden programs. Communal gardens can provide a means of bringing people living in close proximity together to share and build relationships. The gardens are easily accessible and positioned near high pedestrian traffic areas.

Composting facilities will be included in the community gardens. Food waste disposed of in landfill rots and becomes a significant source of methane – a potent greenhouse gas with 21 times the global warming potential of carbon dioxide. Using worm farms to process food waste stops the carbon emissions and allows waste to naturally return to the food cycle.

4.5 Active and Public Transport Nodes

A Green Travel Plan has been developed for the site. The key aim of the Green Travel Plan is to reduce reliance on private vehicles for the site by maximising the use of public transport, walking, cycling and car sharing.

The development has been designed to be a walkable neighbourhood and there is a good existing network of local footpaths that will be further supported by public domain improvements which form part of the overall site development. The design of Lot E promotes access to a range of open spaces for residents and visitors including the new community park and urban heart. Lot E is within 500m walking distance to several other parks, playgrounds, a golf course, supermarkets, banks, a library, and a shopping mall.

Footpaths connect the site with public transport services with signalised pedestrian crossings provided at appropriate locations on the surrounding roads. The site has good access to public transport. It is primarily served by buses and the Light Rail. In future it may be served by an extension to the light rail to Marouba Junction and metro West services.

Several bus stops are located along Heffron Road, Bunnerong Road and Tingwell Boulevard. Several major bus routes operate on nearby roads.

Bus Route	Bus Stop Location
Route 301, Eastgardens to Redfern Station	Westfield Drive / Westfield
Route 302, Eastgardens to Circular Quay	Bunnerong Road
Route 307, Port Botany Depot to Mascot Station	Bunnerong Road / Heffron Road
Route 316, Eastgardens to Bondi Junction	Tingwell Boulevard
Route 317, Eastgardens to Bondi Junction	Tingwell Boulevard
Route 353, Eastgardens to Bondi Junction	Bunnerong Road
Route 391, La Perouse and Little Bay to Railway Square	Bunnerong Road
Route 392, La Perouse and Little Bay to Circular Quay	Bunnerong Road
Route 400, Eastgardens to Bondi Junction	Maroubra Road / Westfield
Route 400N, Eastgardens to Bondi Junction	Bunnerong Road
Route 420, Burwood to Eastgardens via Sydney Airport	Westfield
Route 617E, Randwick to Matraville	Westfield
Route 634E, Bondi Junction to Eastgardens	Bunnerong Road
Route 653E, Randwick to Matraville	Bunnerong Road
Route 657E, Randwick to Botany	Bunnerong Road
Route 694E, Matraville to Waverley	Bunnerong Road
Route X92, Little Bay to City	Bunnerong Road

Table 1: Bus Services near Lot E

4.6 Bike Facilities including cycle paths and bike parking

The development includes new cycle paths around the Lot E site. The pedestrian and cycle network is designed to promote a low speed environment to encourage pedestrian and cycling emphasis over vehicular use and focus on creating environments that are connected, safe, comfortable and sustainable.

The wider area is also well serviced by bike paths, which promotes active and healthy lifestyles. Proposed external upgrades to Bunnerong Road, Heffron Road and Banks Avenue cycleways have been approved as per the Regional Bicycle Network Plan.

INTERNAL SHAREWAY

There are 167 bike racks provided in the basement of Lot E, which are a mix of secure bike lockers, cages and racks for the use of residents, their visitors, retail workers and visitors to the retail spaces. The provision of secure bicycle parking is expected to encourage residents to cycle to work and exercise throughout the day.

At least 20 publicly accessible bicycle parking spots will be available in the community open space adjacent to Lot E, including EV charging spots.

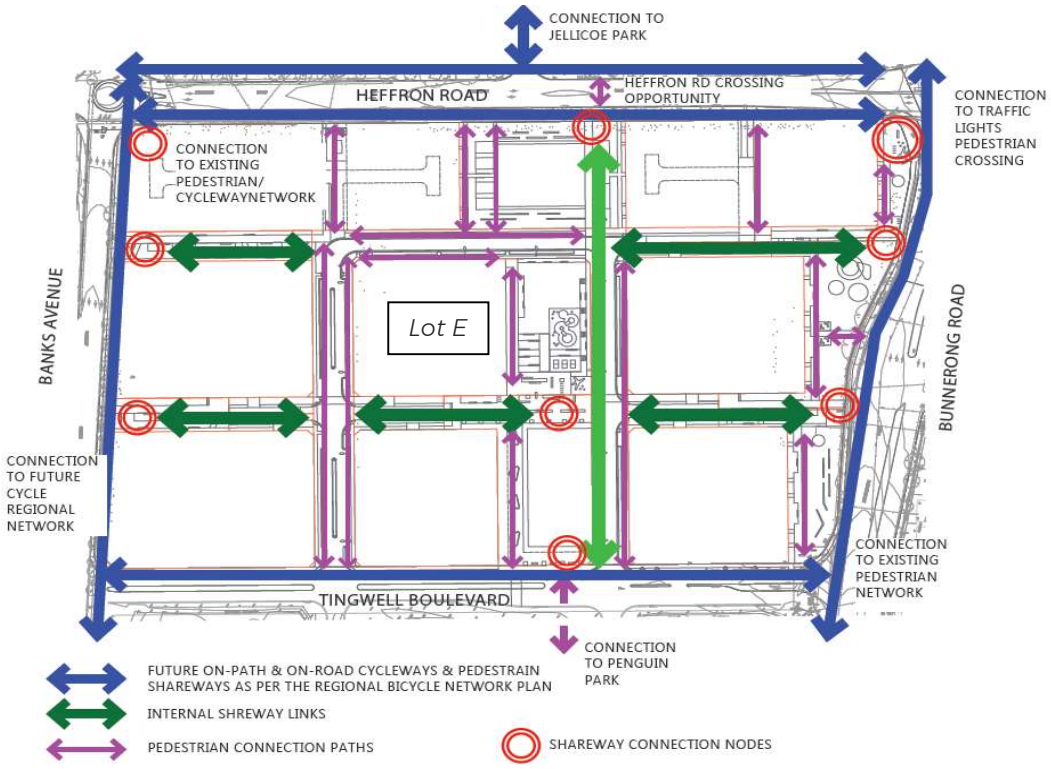


Figure 6: Extract from Masterplan showing Shareway / Cycleway Network and Entry Nodes

4.7 Car Share

Each share car in an area reduces the number of private cars in the area by about 10. Local research found that car share members drive 50% less than other drivers by combining multiple errands in each trip. More car share drivers mean fewer cars on the road and more efficient use of those cars.

Lot E has parking allocation for 8 dedicated car share services provided on the ground floor.

4.8 EV Charging

Meriton are committed to supporting Electric Vehicles (EV) trajectory targets and will be partnering with an experienced third party EV infrastructure expert to provide integrated custom EV charging within the sites electrical system.

At least 20% of the parking spots on Lot E will be EV capable. A total of 100 EV parking spots are provided across the basement and ground floor parking levels. Two (2) charging spaces will be fast charge on the ground floor level for retail visitors, and three (3) will be fast charge for car shares. The total number of EV spaces is more than the 5% target set by the Green Building Councils recommendation under the Green Star tool and over time homeowners can sign up to the EV infrastructure provider's service agreement for EV charging.

There will be electric bike charging stations available for both residents and visitors. There will be 21 EV bike charging stations on the ground floor for residents, retail staff and visitors.

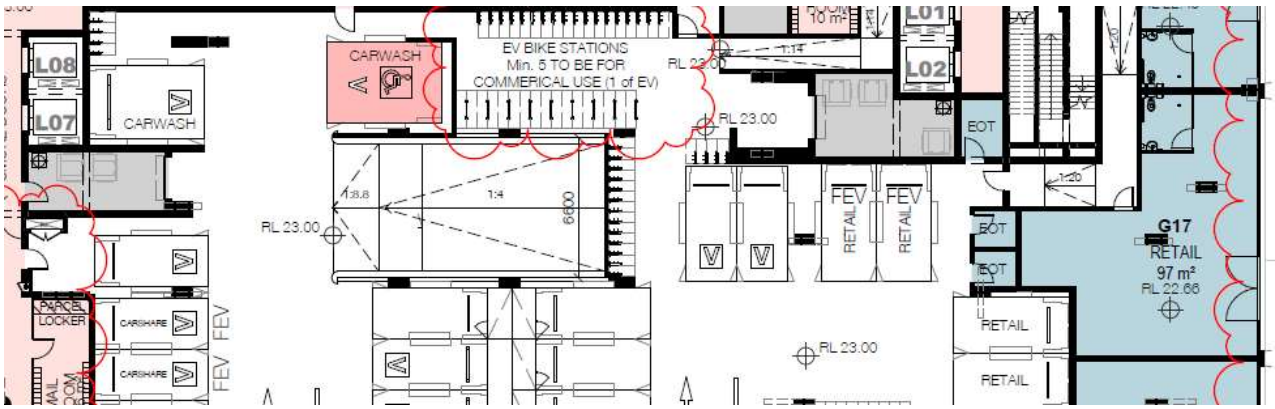


Figure 7: Extract from Ground Floor plan showing EV bike charging stations

4.9 Energy consumption monitors

The development will have energy metering facilities to allow the building manager to monitor and optimise the building's energy use. The facilities will individually record the energy consumption of the air-conditioning, lighting, appliance power, central hot water supply and the lifts.

Embedded energy networks have been committed to for the residential portion of the building. Meriton will partner with Origin energy for the energy infrastructure on this building. As part of the agreement Origin are providing all residences with access to an app that will allow individual occupants to monitor their daily energy use.

Knowledge is power

Consumer education is a very powerful tool in curving occupant behaviour and delivering energy savings. As a commitment to energy efficiency all occupants in the residential dwellings will be provided with an app that gives them real-time energy usage data.

Occupants will see the dollars and cents impact of running the air-conditioning compared to opening the doors or leaving the lights on when the leave the unit, this over time equates to changes in lifestyle habits and big wins for the environment.

Lot E will have a Building Management System (BMS) connected to all major energy consuming systems with-in the common areas. Most of the strata's energy is consumed in the lifts, lighting and ventilations systems. This BMS will feed real-time data to building managers and allow them to optimise and control energy efficiencies on a daily basis.

4.10 Solar power

Solar power systems derive clean pure energy directly from the sun. Installing solar panels helps combat greenhouse gas emissions and reduces our collective dependence on fossil fuel. Renewable energy also improves public health.

Photovoltaic panels will be provided at roof top level on both Tower A and Tower B. The energy generated from these solar systems will be used to reduce main power for the common areas of the residential towers. The final design size and location of the system will be developed with the service provider.

5 Energy

5.1 Thermal Comfort

Solar Access: *The floor plates of these towers has been designed to maximise solar access, with only 2 units having a south orientation and no direct solar access. There is a significant amount of space between these buildings and those on neighbouring sites and a 24m separation between the 2 towers.*

Figure 8: Solar analysis of a typical floor plan

Ventilation: *The proximity to the coast will help stabilise the local climate and the height of the towers will allow them to gain access to accelerated wind speeds. The floor plates have been designed to maximise the amount of dwellings achieving natural cross ventilation and rooms with access to natural daylight. 74% of these dwellings achieve natural cross ventilation. Each bedroom will have at least 2 windows with opening sash types to increase the amount of natural ventilation.*

Meriton invest in high quality mechanical ventilation systems and externally duct the exhaust fans from each unit to the façade instead on common ventilation systems. All range hoods are also externally ducted instead of recirculating.

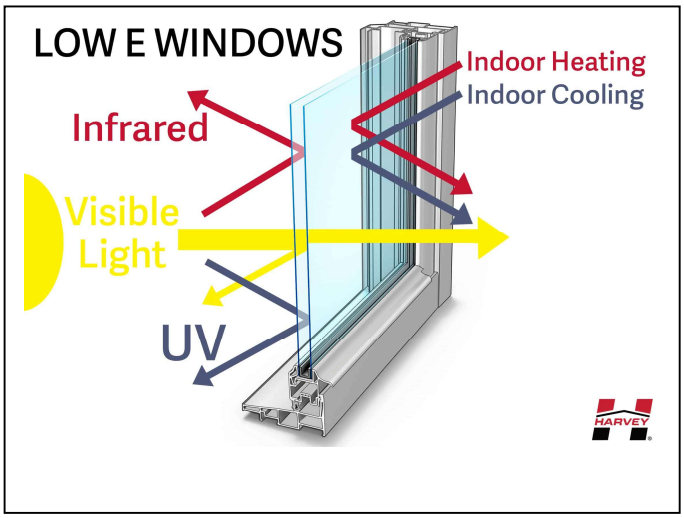
Figure 9: Ventilation analysis of a typical floor plan – 74% of dwellings comply

Façade: *The façade is a combination of masonry and vision glazing panels on the lower levels, and vision panels and colour backed glass with an insulated wall system behind it on the upper levels. With the majority of the façades facing east and west it results in the bulk of the building facades receiving solar access from a rising and setting sun. The angle that solar radiation strikes glass has a major impact on the amount of heat transmitted. Low Emissivity coatings on the vision panel glass has been specifically designed to combat this problem.*

The low-e coating is spectrally selective, which means it affects some wave lengths of light but not others. Long wave infrared is the heat produced by our bodies, heaters, and the furnishings in a warm room.

The transmission of long wave infrared is significantly reduced by the low-e coating. It reflects the amount of energy escaping through the glass keeping the room warmer and reducing the amount of heat required to be generated by the artificial heaters.

Low-e glass with low SHGC will control the heat being conducted through the windows.



Minimum performance glazing and insulation values are determined by NatHERS thermal simulation modelling to ensure the design reaches and exceeds BASIX heating and cooling load limits. Final product selections however often over comply as products are chosen to suit the construction methodology and also manage acoustics, internal daylighting levels, wind loads and condensation control.

Thermal mass: *This development has high thermal mass walls, floors and ceilings that will work harmoniously with the generous solar access to provide excellent thermal mass performance. High thermal mass reduces building peak loads and annual energy consumption.*

Due to the above, the passive design initiatives incorporated into design will reduce the need for mechanical ventilation during favourable ambient weather conditions. During times of extreme hot or cold, high performing windows and well insulated facades will ensure high energy performance when HVAC is in operation.

5.2 Air Conditioning and Ventilation

All units will be equipped with energy efficient air-conditioning units. The approved concept masterplan included a commitment to use air-conditioners with a low Global Warming Potential (GWP). This is no longer possible due to a number of factors. Energy efficient air-conditioners will be installed.

The carparks ventilation systems will have fans with carbon monoxide monitors and variable speed drives.

5.3 Lighting

Lighting can use over 20% of a buildings electricity consumption, therefore efficient luminaires and lighting control systems are critical in order to optimise a buildings energy efficiency. The following measures are being implemented in design:

- *LED lighting incorporated throughout development;*
- *Daylight control, motion sensors and zoned switching.*

The residential lighting energy load has been calculated within the BASIX assessment and the above initiatives contribute to the development meeting its BASIX energy target for the residential portion of the building.

NCC lighting calculations indicate Meriton's selected light fittings and layouts will use considerably less watts / per / m2 than the maximum allowable amount in the relevant building codes.

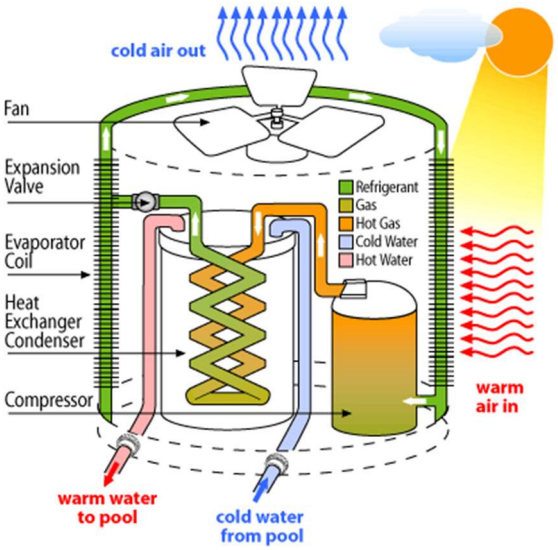
5.4 Appliances

Appliance energy efficiency has been considered and the star ratings targeted are reflective of the best performance level available while still achieving the functionality, performance and budget set by the client.

Residential Units	*Star Rating*
Dishwashers	*3.5 Stars*
Clothes Dryers	*2.0 Stars*
All dwellings / common areas	*Star Rating*
Air-conditioners	*COP / EER of 4.0 or greater* *The air-conditioning units will be day/night zoned.*
Mechanical Ventilation to car park	*Controlled with carbon monoxide monitors and a variable speed drive.*
Pool / Spa Heating	*Electric heat pump*

5.5 Pool and Spa Heating

The podium design features a pool and spa for the use of residents. Indoor pools have lower heating requirements and lower evaporation than outdoor pools, saving both energy and water. Encouraging residence to get exercise is also extremely good for over-all health and wellbeing.



Pool heat pumps are known for being extremely efficient. For every 1kW of power consumed they create approximately 5kW of water heating energy per hour. The heat pump should be able to heat the water by approximately 0.20 – 0.25 degrees per hour. High quality heat pumps are equipped with corrosion-protected heat exchangers and can thus heat any swimming pool water, whether it is treated with chlorine, bromine, ozone or chlorine-free products. A heat pump allows the pool to be used all year round.

5.6 Embedded Energy Network

Meriton will be partnering with Origin Energy to deliver an embedded energy network. Embedded electrical networks are privately owned and operated metering networks that allow high-rise residential buildings to pool their electricity purchasing power and share in discounted electricity prices. Embedded networks deliver benefits for the builder, the Owners Corporation and the end customer. They are also recognised by the Green Building Council as a favourable solution for multi-residential developments.

5.7 Lifts

Meriton partner with KONE as a preferred lift supplier, to provide lifts across most of their projects. The KONE EcoDisc motor acts as a generator, and the car, counterweight and braking system generate energy that is converted into electrical current that can be used elsewhere in the building or to drive other elevators. Up to 30% energy savings with regeneration and permanent magnet motor. In addition to this the higher buildings will have destination control programed lifts to further reduce energy consumption.

6 Indoor Environmental Quality

6.1 Thermal Comfort

It is important that the thermal comfort of occupants isn't compromised when implementing energy efficiency measures in design. The following measures will be implemented in design for the proposed development at Lot E to ensure a high level of internal thermal comfort is maintained:

- *HVAC systems adequately sized to cope with seasonal peaks;*
- *High thermal mass in order to reduce the internal loads during times of peak loads;*
- *Strategic location of habitable spaces;*

6.2Air Quality

The following measures will improve internal air quality:

- *Paints will contain low VOC levels.*
- *Low VOC glues and floor finishes will be selected where practical.*
- *All exhaust fans to wet areas and the kitchen range hood will be externally ducted to the façade.*
- *Individual air-conditioning systems per dwelling have been favoured for each unit over central HVAC. Central HVAC is more challenging in controlling the spread of diseases.*

6.3 Daylight

The following measures will be implemented to improve internal daylight levels:

- *Light internal colour schemes to maximise daylight penetration;*
- *Glass selection with optimised Visual Light Transmittance (VLT).*
- *Large window sizes have been maintained to maximise natural light and give the occupants a greater sense of space and connection to the outside world. Meriton choose to invest in high performance glazing to meet the thermal comfort obligations and still maintain large windows that promote a greater sense of wellbeing and opulence.*

6.4 Noise

A noise assessment has been prepared to inform the detailed design. Additional assessment of the projects acoustic requirements will be carried out at construction design stage, for the development in accordance with Australian Standard AS2107:2016, considering external noise intrusion, noise separation between spaces, as well as noise from building services.

A good level of acoustic amenity will be embedded in design in order to ensure a comfortable internal environment, reducing negative impacts associated with noise pollution.

7 Water

The National Strategy for Ecologically Sustainable Development requires new development to not only conserve but enhance the community's resources now and into the future.

Water is becoming an increasingly scarce resource in Australia, therefore new buildings should aim to reduce water demand by incorporating efficient fixtures, fittings and white goods. These water saving initiatives reduce the pressure on the local infrastructure and protect the development from future water shortages resulting from climate change.

7.1 Fixtures and Fittings

The development will reduce water consumption by installing fixtures and fittings in line with Meriton Design Standards:

Fixture Type	WELS Rating
Taps	5
Urinals	4
Toilet	4
Shower	6L – 7.5L/min
Dishwashers	4

7.2 Landscape & Irrigation

In line with the Botany Bay LEP, the complex is designed with a significant landscaped terrace on the podium as well as perimeter planting around the building.

Water reducing irrigation measures implemented include:

- *Irrigation systems will comprise of subsurface drip systems and automatic timers;*
- *Where possible, stormwater runoff (on-grade & podium) will be directed to the lawn and garden beds;*
- *Irrigation will be provided to all soft landscape areas.*

7.3 Rain Water Tanks

The non-trafficable roof tops are ideal for the capture and reuse of rainwater. These areas will feed into rainwater tanks and be used to water the common area gardens and connected to the toilets and wash down areas on the ground floor and podium levels.

7.4 Stormwater Management

An on-site detention (OSD) tank strategy has been developed in accordance with local council requirements. The OSD tanks will incorporate flow control measures to ensure peak flows generated under proposed conditions do not exceed flows generated under pre-developed conditions, in accordance with Sydney Water's requirements. The OSD tank will also be used for the watering of landscaped areas.

Overflows from hardscaped areas will be filtered and temporarily detained in OSD systems before slowly releasing back to community storm water systems.

Vegetated podium areas and open terraces will reduce peak rates of runoff and alleviate the pressure on storm drainage systems by the retention, diffusion and evapotranspiration of rainwater.

It is considered that storm water runoff is to be treated using appropriate devices and filtration systems to improve storm water quality.

8 Waste and Recycling

8.1 Demolition and Construction waste

Meriton have engaged Bingo Industries for the building demolition and waste resource recovery solutions on this site.

Bingo Industries have a 'Waste Free Australia' objective and they support a circular economy by turning waste into recycled products.

Meriton can commit to a 90% target recycling construction waste for BATA 2 Pagewood (Lot E). Meriton and Bingo Industries have previously achieved in excess of 94% for a construction site at 180 George Street, Parramatta.

BINGO INDUSTRIES

8.2 Durability and Longevity

The average life span of a strata building far exceeds that of a single residential home. Mertion always build with the same tried and tested construction methods and building inclusions because they are high quality, durable and low maintenance.

8.3 Reduced Consumerism

The environmental footprint of people living in a unit over a suburban home is significantly reduced, due to; lower heating and cooling energy loads, greater reliance on public transport, smaller spaces to furnish and less room to store clothes and goods. This often leads to the occupant buying less and investing in better quality.

8.4 Ongoing waste management

Elephants Foot has been engaged as the project waste consultant, and therefore will be addressing applicable LEP requirements. In summary the following initiatives are provided for the operational waste management throughout the development:

- *Signage to educate occupants on correct waste disposal practices;*
- *Recycling bins will be provided on each level, with general waste chutes provided for each tower (two in total). Quantities of bins provided are in line with waste consultant estimations.*
- *Green Waste will be separately addressed by the landscape contractor;*
- *Food retail tenants will responsibly dispose of cardboard and oils used for cooking;*
- *A suitable storage area will be provided for chemicals, pesticides and cleaning products;*

9 Statement of Commitment

The following table is a summary of all ESD initiatives that the applicant is committed to include within the Lot E development.

Ref.	*Initiative*	*Commitment*
1	*Community vegetable garden*	*Garden bed available for resident use to be provided within the podium level community space (refer to podium landscape plan)*
2	*Composting facilities*	*Worm farm available for resident use to be provided within the podium level community space (refer to landscape plan)*
3	*Electric Vehicles*	*100 charging spaces to be provided for resident use* *2 charging spaces (fast charge) to be provided for retail use*

		(refer to architectural plans DA-0207, DA-0208, DA-0209 and DA-0210)
4	*Car Share*	*8 car share spaces will be provided (refer to architectural plan DA0210 – Ground Floor)*
5	*Bicycle Facilities*	*167 bike racks are provided for resident and visitor use* *(refer to architectural plans DA-0207, DA-0208, DA-0209 and DA-0210)*
6	*Open Space*	*Ground floor open space areas – community park* *(see architectural plan DA-0210 – Ground Level and Lot E Landscape Report)*
7	*Green Roof Tops*	*The podium roof top will be planted. (refer to landscape plan)*
8	*WSUD*	*Stormwater run-off will be treated with permeable paving, road swales, car park WSUD bays and share-way WSUD bio-retention links. (refer to landscape ground floor plan)*
9	*Fauna and Flora*	*Appropriate species will be chosen for the planting on site. Refer to the Landscape Report.*
10	*30% Tree Canopy Cover*	*At least 30% of the site will have large canopy tree cover. (refer to the Landscape Report and plans)*
11	*Solar Power*	*Solar panels will be provided on the roof tops to serve the common area demand. (refer to architectural drawing)*
12	*Rainwater connected to garden*	*Rainwater tanks will be connected to the irrigation system. See stormwater plan and irrigation plan)*
13	*Embedded Energy Network*	*Origin Energy has been signed up to provide an embedded energy network*
14	*Building Management System*	*Lot E will include a Building Management System*