

Glen Iris, Jandakot

Sustainability Report

Windsor Knight

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Executive summary

This report outlines the Sustainability Strategy for the proposed development of the Glen Iris local shopping centre at 1000L Berrigan Drive in Jandakot, Western Australia. The site is located within the City of Cockburn's local area boundary. The new shopping centre development will encompass a site area of 7,001 m², and 796 m² of soft landscaping area. The project will also include the planting of additional trees in the parking areas and within the adjoining road reserves. Furthermore, the design incorporates additional public seating along a raised planter within the central forecourt.

The following Tables 1-1, describe how the proposed development meets the City of Cockburn and State requirements and outlines which sections of this report are relevant for each requirement. Overall, the proposed development is considered to meet all the objectives relevant to sustainability included in the City of Cockburn local planning requirements. The following policies have been considered within this report:

Table 1-1 Local Planning Policies

Applicable action or target	Requirement will be met	Comments
City of Cockburn Local Planning Strategy – Part 1		
<i>1.0 Environment Objective: Our city will protect and enhance environmental values and the diverse natural landscape, promote sustainability, and respond to a changing climate</i>		
1.02 Protect and enhance areas of ecological value, while supporting opportunities to enjoy our natural areas	✓	The development sits as an important connector and meeting place surrounded by an abundant park network including the proposed Prinsep Park open space, walking trails and connected open space planned for the Estate. This will allow for users to enjoy and support the natural areas.
1.03 Maximise all opportunities to increase and retain tree canopy cover to reduce the heat island effect, provide urban habitat, enhance amenity, protect local character, and improve the health and well-being of residents, including: Tree canopy within the public realm that is maintained, protected and increased over time. More trees and gardens within existing and proposed urban and rural environments, including private properties. Commercial and industrial developments to contribute to tree canopy cover	✓	The design has continually involved to include additional trees and reduce parking area – assisting with the urban heat island effect amongst other benefits. In addition to this the updated design now integrates a small parklet at the NW corner on the site (in lieu of car bays). In total 11.36% of the site is covered by soft landscaping, providing a relaxed feel with a focus on shade through use of exotic and native species are reflected in this development and throughout the new Glen Iris Estate.
1.06 Improve the City's climate change resilience	✓	The development will look to reduce resource consumption as far as practicable and in turn reduce the developments impact on climate change. See Section 4.0 of this report for further detail.
1.08 Development and built form that is environmentally sustainable and responsive to the prevailing climate in Perth.	✓	The development will utilise passive design principles to simultaneously take advantage and protect occupiers from Perth's climate. Succinctly this will include minimising glazing size through the utilisation of extensive shading elements (including additional trees) alongside

		consideration of orientation and form factor with the use of good quality fabric insulation.
1.09 Improve the City's water resilience and security.	✓	The development will utilise waterwise species, irrigations systems with moisture sensors, water efficient (high WELS rated fittings) and have smart metering throughout.
<i>All other polices from the City of Cockburn Local Planning Strategy were deemed to be N/A to ESD and thus covered in other discipline reports or N/A to the development itself.</i>		

Table 1-2 Western Australian Climate Policy

Applicable action or target	Requirement will be met	Comments
Transition towards net zero by 2050	✓	Onsite solar PV, smart metering, passive solar design, good fabric insulation and LED lighting within the development will contribute to the policy aims. Please refer to Section 4.1 for further information.
Energy efficiency, reducing carbon emissions.	✓	The project will undergo a Section J assessment. In addition, various energy efficiency measures are in place to ensure carbon emissions are reduced. Please refer to Section 4.1 for further information.



Figure 1 - Artists Impression of the proposed development

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1.0 Introduction

This report outlines the sustainability strategy for the proposed local shopping centre development at 1000L Berrigan Drive, Jandakot, Western Australia, and evaluates the design in relation to relevant state and local government policies. The site is located approximately 21 km from Perth CBD.

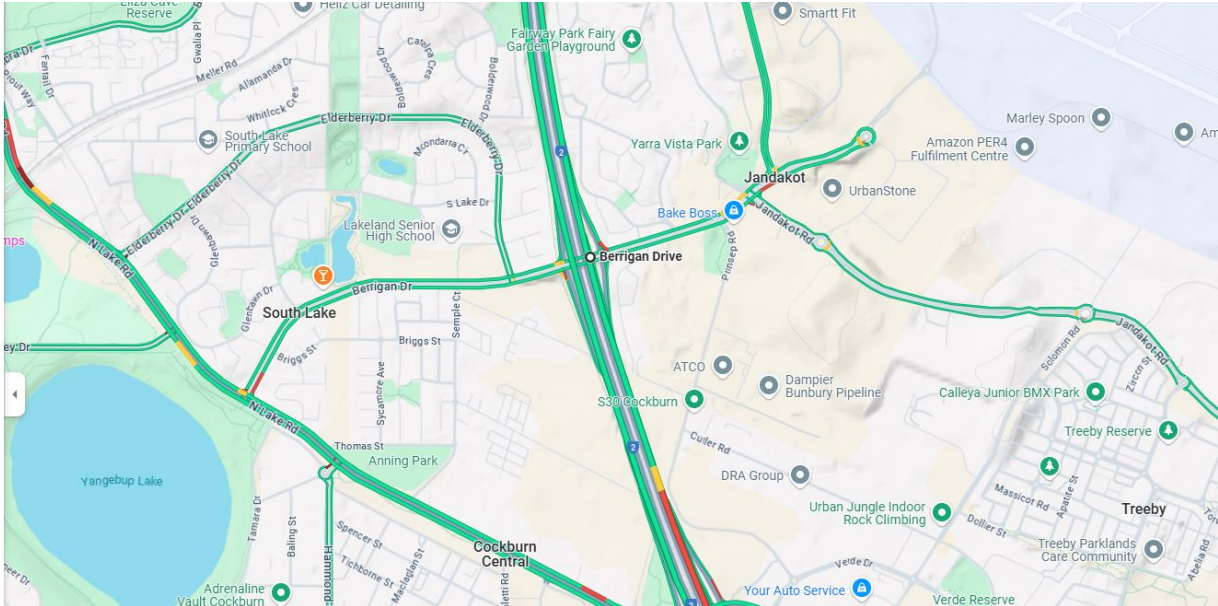


Figure 1-1 Site location of the proposed development.



Figure 1-2 Site Plan with Uses

1.1 City of Cockburn Schemes and Policies

The local planning policy guides development of individual sites within the City, and clearly explains what Council aims to achieve through development control.

In October 2024, the Council adopted the City's Local Planning Strategy, designed to guide the development of future plans, programs, and activities across the city. This strategy aligns with the City's strategic goal of fostering a more sustainable and resilient local government and community. It identifies several aspirations related to sustainability, with a focus on key strategies for shopping centre developments. Key sustainable practices include:

- **Environmental Responsibility:** It advocates for sustainable environmental management practices such as enhancing green spaces, minimizing environmental impact, and protecting local biodiversity. Projects should incorporate sustainable landscaping and energy-efficient designs.
- **Energy Efficiency and Renewable Energy:** Encouraging the integration of renewable energy sources (like solar panels) and energy-efficient technologies in building designs to reduce greenhouse gas emissions and energy consumption.
- **Water Management:** Promoting water-sensitive urban design by integrating efficient water use, reuse systems, and stormwater management solutions to protect local water resources.
- **Transport Accessibility:** Ensuring developments are accessible via sustainable transport options like pedestrian pathways, cycling routes, and proximity to public transport. Reducing dependency on cars aligns with the city's goal for a connected and low-emission transport network.
- **Community Engagement and Amenities:** Including public amenities such as seating areas, green spaces, and community-friendly zones to enhance usability and inclusivity for residents.
- **Waste Management:** Implementing robust recycling and waste management systems to support the city's focus on reducing waste and promoting a circular economy.

1.2 Western Australia Climate Policy

Western Australia's Climate Policy produced in November 2020 by the Government of Western Australia is a policy to commit to a low carbon future for Western Australia. Relevant actions from the Climate Policy are summarised below:

Climate Resilience Action Plan 2022–25:

- Develop a coordinated, collaborative plan to support Western Australian industries, cities, and regions to identify and manage climate impacts and enhance climate resilience.

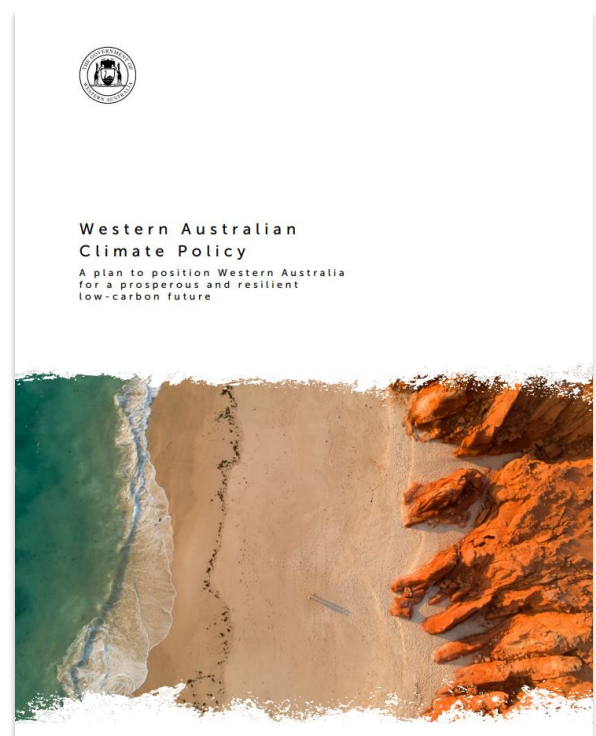


Figure 1-3 WA Climate Policy, November 2020

2.0 Carbon Reduction

The construction industry is responsible for nearly 20% of Australia's carbon footprint. These emissions include embodied carbon, construction emissions, operational resource consumption, and end of life demolition.

The Government of Western Australia outlines their aspirations to achieve net zero greenhouse gas emissions by 2050 in their Climate Policy published in November 2020.

The following section summarises the specific initiatives being investigated for the development in relation to reducing carbon.

2.1 Upfront carbon

Carbon emissions produced by the building industry are not only released during a building's operation, but also during the sourcing, processing, and transportation of building materials. Embodied carbon is an often-overlooked source of emissions which acts a significant source of emissions, estimated at around 11% of global carbon emissions (World Green Building Council, 2019).

The project aims to address the issue of upfront carbon by considering various design initiatives, including but not limited to:

- Reducing concrete mass by optimising structural design.
- Consideration of replacing Portland cement (a target of 20%) in select concrete mixes with waste materials such as fly-ash
- Minimise foundation mass where possible, in coordination with geotechnical requirements.

The above initiatives are significant as they help reduce concrete consumption, which can lower upfront carbon emissions given the high energy intensity of producing Portland cement.



Figure 2-1 A typical concrete production facility, which comprises several energy-intensive processes.

2.2 Energy efficiency

A wide range of energy efficiency features will be incorporated into the development. Please refer to Section 4.1 for a full description of these initiatives.

2.3 Renewable energy

The project is currently planning significant on-site electricity generation. This will be achieved through an array of solar PV panels located on the roof.

At the current stage the specific system capacity is unknown, however it is anticipated to supply a significant portion of the buildings energy requirement.

2.4 Sustainable transport

Sustainable transport options are a key feature of the proposed development, with several sustainable modes of transport to be accommodated and encouraged within the development.

The projects electrical engineer has confirmed sufficient capacity for two AC EV chargers. These will be added to the development, with the location to be determined. Bike racks will also be available to promote active travel to the site.

Please refer to Section 6.0 for full details on these initiatives.

3.0 Social sustainability

Sustainable design is not only about environmental aspects. Social and governance initiatives are equally important and must be considered for a good design outcome and the successful operation of a building.

The following section summarises the specific initiatives included in the design in relation to social sustainability.

3.1 Healthy living and work environment

Good visual access to natural spaces, gardens, and greenery is essential for promoting the mental and physical health of individuals within a shopping centre environment. Unfortunately, many shopping centres lack these vital features. To address this, the design will incorporate vegetation, particularly the proposed trees on the western side of the site, which contribute to the north-south green link. This feature will offer amenity, provide shade from the western sun, and enhance overall environmental quality.

A healthy living and working environment can be created through thoughtful design elements that prioritize connectivity, shade, and sustainable landscaping. In this design, establishing green links—such as corridors connecting parks and open spaces—fosters a seamless connection to nature and enhances accessibility for outdoor activities. Retained trees and greenery in public open spaces offer natural shade, buffer zones, and help create a visually appealing and comfortable environment, reducing urban heat and promoting relaxation.

Incorporating a mix of deciduous and evergreen species ensures year-round ecological benefits, while low-maintenance landscape treatments, such as strategically placed planters, walls, and furniture, support pedestrian and vehicular flow. These design strategies create an environment that nurtures mental and physical well-being, encourages social interaction, and integrates nature into everyday spaces, offering holistic benefits for both visitors and workers.



Figure 3-1 Examples of outdoor vegetated areas present on the project.

3.2 Inclusive construction and workforce

The head contractor will aim to implement policies on site that increase awareness and reduce instances of discrimination, racism, and bullying.

Provision of on-site mental and physical health support services is also being considered, through a provider such as Mates in Construction (MIC).

4.0 Resource consumption

The following sections set out design strategies being investigated for utilisation in this development to reduce the building's energy and water demand, and waste.

4.1 Energy efficiency

4.1.1 High performance building fabric

The proposed development will include a high-performance façade, maximising daylight whilst creating self-shading for solar protection. The building fabric will additionally aim to exceed NCC Section J requirements.

A lower glazing U-Value will be targeted to minimise the conductive loss or gain of heat between the interior and exterior of the building. This would enable an improved energy rating as well as reducing the operational carbon footprint of the development.

4.1.2 Thermal bridging

Thermal bridging is the transference of heat through a wall at a point through which it can bypass the insulating layers of the structure. It is through these points in a building's envelope that they can experience unwanted heat gains and/or losses and as such will be considered when designing for sustainability and energy efficiency.

The wall and roof construction types for the project will consider the issue of thermal bridging and apply design principles where possible to introduce thermal breaks and other measures.

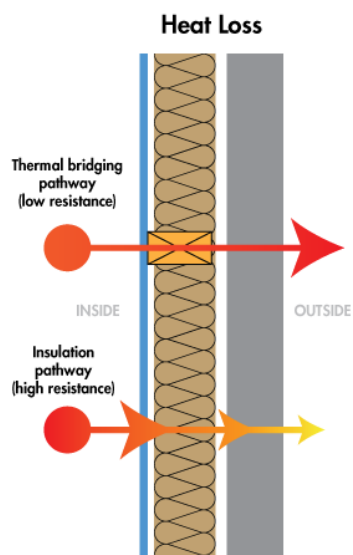


Figure 4-1 Thermal bridging principle

4.1.3 Lighting efficiency

All light fittings within the project will be specified as LED fittings. Additionally, downward facing fittings will be considered for the external landscaped areas to reduce the negative effects of light pollution in the environment and further save energy.

Common area lighting in both indoor and outdoor settings will also consider incorporating sensing devices such as occupancy sensing (PIRs) to reduce lighting consumption when lighting is not required.

4.1.4 Solar photovoltaic (PV) panels

Solar photovoltaic panels are currently proposed for the project to help mitigate carbon emissions associated with operational energy.



Figure 4-2 Rooftop PV system, for example only.

4.2 Water efficiency

The water consumption of Western Australia is the second highest in Australia with an average of 241,000 litres per household per annum, well above the Australian average of 190,000 litres (Australian Bureau of Statistics, 2017).

A reduction of water usage does not only alleviate pressure from the local water supply but also helps reduce operational costs. Additionally, Perth's water system is highly energy intensive, so any water savings also help achieve significant energy savings.

The following section summarises the specific initiatives to be investigated for inclusion in the design in relation to water efficiency:

4.2.1 Water efficient fittings

Occupant consumption is a major contributor to potable water usage. Water fixtures will be low flow and selected with consideration of the WELS rating in an attempt to reduce water usage. Smart meters will also be utilised.

4.2.2 Water-wise landscaping

For this development, water wise landscaping will be considered in the design, and may include the use of hardy natives and other drought tolerant vegetation. To further reduce the amount of water required for landscaped areas, a drip system with moisture sensor control for irrigation.

Best practice WSUD principals will be applied throughout the site and the feasibility of the hybrid seasonal drainage for vegetative basins will be explored further as the design develops.

4.3 Building materials

The building will aim to reduce the total embodied energy and carbon considered in the construction and then aim to maximise the operational efficiency of the building's services.

Most notably, the proposed development will look to optimize the quantities of concrete required, and additionally aim to use low carbon concrete mixes. These typically involve the use of fly-ash and other cement replacements to mitigate emissions associated with producing general Portland cement, which is highly energy intensive.

4.4 Waste

In 2020-21, Australia generated 75.8 mega tonnes (Mt) of total waste, including 14 Mt from households and local government, 32.8 Mt from the commercial and industrial sector and 29 Mt from construction and demolition (Australian Circular Economy Hub, 2024). A reduction of both construction and operational waste is therefore an important target for the development.

The following section summarises the specific initiatives that will be investigated for inclusion in the design.

4.4.1 Construction and demolition waste

The design team is targeting a reduced waste generation footprint during construction.

Specifically, the development will commit to a diversion from landfill will be set for construction and demolition waste which is yet to be determined for the project. A waste management plan will be developed, as per the council requirements.

In addition, the team will investigate the following:

- Specifying SSA produced reinforcing bar and mesh.
- Use of low carbon construction concretes.
- Sustainably sourced timber.

Additionally, 'Designing out Waste' principles should be applied where possible. These principles are:

- Design for reuse and recovery.
- Design for off-site construction.
- Design for materials optimisation.
- Design for waste efficient procurement, and
- Design for deconstruction and flexibility.

4.4.2 Operational waste

A dedicated waste storage area will be provided for the separation and storage of recyclable waste during operation, allowing for the different waste streams to be separated to match the local recycling scheme. The development will aim for two waste streams including landfill and recycling and is considering a third waste stream for organic/food waste that will be explored further post development approval.

Throughout project design, operation and construction, principles of resource recovery will be applied, so that materials and products are recovered and reused where possible, reducing landfill and saving money. Some strategies that will be investigated include:

- Innovative waste separation and collection strategies to allow materials to be isolated for reuse.
- A purchasing policy which aims to minimise waste from products and packaging, encourages the use of products which have minimum environmental impact.

5.0 Indoor environment quality

The Indoor Environment Quality (IEQ) of a building aims to improve the occupants' experience of the space. A holistic approach to sustainability will result in multiple benefits both in energy efficiency and encouraging occupant wellbeing.

This can be achieved by improvements to air quality through appropriate ventilation, providing high levels of thermal, visual, and acoustic comfort, reduction to occupant stress and the creation of a low-toxicity environment through the reduction of pollutants.

The following section summarises the specific initiatives to be investigated for inclusion in the design in relation to IEQ:

5.1 Thermal comfort

An indoor environment that is too hot or too cold can affect mood, performance, and productivity. However, at which temperature a resident feels comfortable varies significantly from person to person. To control internal comfort and minimise excessive heat loss in winter and heat gains in summer, several strategies will be investigated for the proposed development:

- High-performance glazing systems will be considered for this development to improve the thermal performance of the building envelope.
- The façade will be well sealed to avoid draughts and air leakage.
- External shading and screens to prevent excessive heat gains in summer.

5.2 Visual comfort

Similar to thermal comfort, the human body feels best when receiving natural levels of daylight and views of the external environment. Additionally, excessive light in the form of glare is detrimental to user wellbeing and should be mitigated. To ensure these parameters are provided for building occupants, several strategies are being considered for the proposed development. These include:

- Windows, with appropriate Visual Light Transmittance (VLT) to allow good daylight entry.
- Windows placed and sized with consideration of solar heat gain, with shading structures ensuring glare is avoided.
- High quality landscaping and inclusion throughout the development, enhancing views.
- Use of flicker-free lighting to improve artificial light quality.

In addition to this, lighting fittings used within the building will be designed to avoid glare, which will further improve occupant's visual comfort.

5.3 Exposure to toxins

Volatile organic compounds (VOCs) are emitted as gases and are widely considered as an indoor pollutant. VOCs encompass a variety of chemicals, some of which may have short- and long-term adverse health effects. VOCs are emitted by a wide array of products, typically paint, cleaning supplies, pesticides, building materials and furnishings, and office equipment such as copiers and printers.

To create a healthy indoor environment for all building occupants, the proposed development will aim to specify materials with low-VOC and low formaldehyde content to avoid contaminating the indoor air. In addition, efficient filtration and a CO₂ sensor based outdoor air system will be utilised to further improve indoor air quality.

5.4 Acoustic comfort

Good acoustic separation between spaces is important to enable a sense of privacy.

An acoustic comfort strategy will be developed for the project. Consideration of acoustic separation through provision of adequate acoustic insulation, as well as impact noise transfer between floors may also be considered.

6.0 Sustainable transport

The use of motor vehicles directly contributes to climate change. This occurs both through the energy required to produce cars and transport infrastructure, and the direct emissions that result from car operations. Therefore, providing sustainable transportation options within new developments is an important way to reduce emissions and mitigate further climate change.

To reduce reliance on individual petrol and diesel-based transportation, it is necessary to maximise alternative transportation options. This may include initiatives that encourage and make possible the use of mass transport options, cycling or walking, and the selection of sites that are close to many amenities.

The proposed development has considered the importance of sustainable transport early in the design process. The following section summarises the specific initiatives present in the proposed design in relation to transport.

6.1 Low carbon vehicles

To accommodate and encourage the growth of electric vehicles (EVs), the proposed development will provide spaces for electric vehicle parking and car-sharing to reduce private vehicle emissions.

6.2 Cyclist facilities

Bicycle facilities will be considered for the development to encourage cycling. This will include the potential of bike storage facilities.



Figure 6-1 Cycling is a sustainable method of transport that will be encouraged.

6.3 Access to public transport and amenities

The proposed development is located on Berrigan Drive, a major road. As a result, building occupants will have great access to local public bus routes. There are several bus stops located within proximity, including the 515,520,514 and 530 bus routes.

7.0 Impacts to nature

The following section summarises the specific initiatives included in the design in relation to natural systems impacted by the development.

7.1 Light pollution

Light pollution is an environmental issue where excessive amounts of light are projected upward. It is often a waste of energy and resources and has also been proven to impact local wildlife by affecting various vision and migration instincts.

Similar effects have been found in humans, with some people struggling to sleep and relax with prolonged exposure to artificial daylight and glare from poorly fitted external lights.

The project will investigate the use of all external light fittings pointing downwards, mitigating the effects of light pollution.



Figure 7-1 Example of a downward facing external lighting fixture.

7.2 Minimising heat island effect

The heat island effect describes the condition where urban areas have a higher average temperature than its rural surroundings owing to the make-up of the built environment. The use of light-coloured external materials combined with shaded and landscaped areas can reduce the heat island effect significantly and contributes to further energy savings.



Figure 7-2 Light coloured façade elements will help reduce heat absorption.

8.0 Codes and ratings

The development will be subject to voluntary and mandatory building codes and metrics to measure the performance of the building. This section of the report outlines the main codes and ratings and identifies the project's response.

8.1 NCC Section J – Building Energy Efficiency

The building compliance must satisfy the energy efficiency requirements laid out in Section J of the National Construction Code (NCC) 2022. Compliance can be achieved through two separate pathways.

The first pathway is prescriptive, where a development must meet the Deemed to Satisfy (DTS) requirements for construction. In the event the DTS requirements cannot be met, the second pathway uses a modelling approach to verify that the building energy efficiency is equal to or better than what would be achieved under DTS.

The proposed development will look to satisfy the Section J requirements through either one of these two pathways, based on later versions of the design.

9.0 References

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