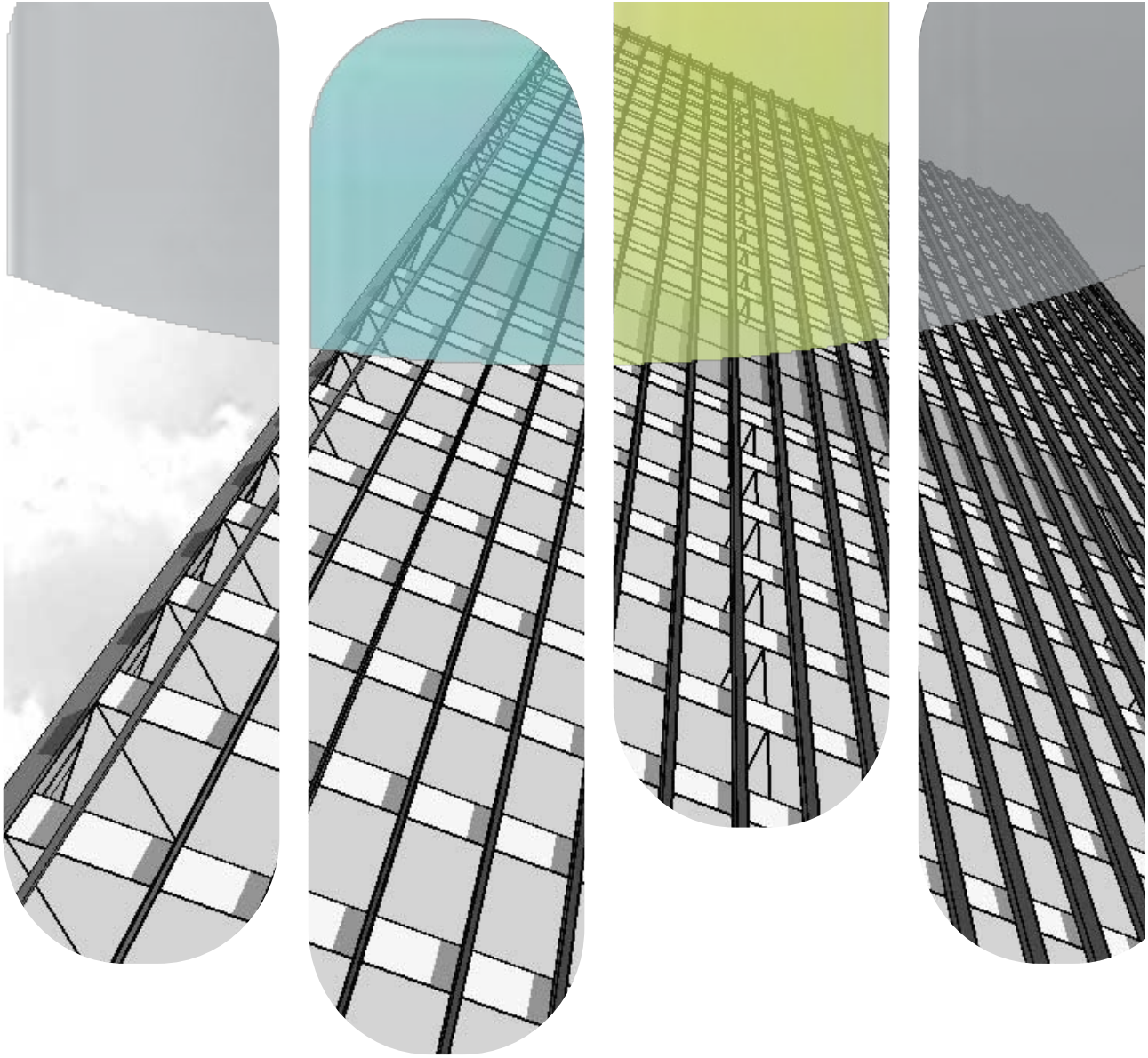


CHILDCARE CENTRE

Lot 125 (#488) Canning Highway, Attadale

CADDSGROUP
ENERGY + SUSTAINABILITY

SUSTAINABLE DESIGN ASSESSMENT REPORT

PREPARED BY

Evan Logan (CADDS)

Published 12/08/21.

Reference: 124278.

DOCUMENT REVISION

Date	*Document*	*Completed by*	*Revision Number*
13/08/21	DA Revision	Evan Logan	1
23/08/21	DA Revision	Evan Logan	2

DISTRIBUTION OF COPIES

Copy No.	*Source*	*Issued to*
1	Electronic	Stewart Urban Planning

CONTENTS

TABLES & FIGURES

1 INTRODUCTION

CADDS Energy has undertaken a Sustainable Design Review on the proposed Childcare Centre at Lot 125 (#488) Canning Highway, Attadale. The purpose of this sustainable design assessment report (SDAR) is to support the Development Application by identifying the initiatives incorporated in the design to demonstrate a best practice approach to sustainable design.

The SDAR report will address Sustainable Categories including:

- Indoor Environmental Quality (IEQ)
- Energy Efficiency
- Water Efficiency
- Stormwater Management
- Building Materials
- Transport
- Waste Management
- Urban Ecology
- Innovation
- Construction and Building Management

For each category the SDAR will demonstrate how each of the 10 key Sustainable Design Categories have been addressed and identify relevant sustainability targets and performance standards.

2 SITE ANALYSIS

CADDS has undertaken a review of the current site, building layout and included a number of sustainable strategies for inclusion within the project.

Table 1 Sustainable Initiatives

Initiative	***Target***	***SDAR Category***
Thermal Performance	High Level of natural daylight into primary areas Solar passive design	Indoor Environmental Quality & Energy Efficiency
Energy Efficiency	Natural ventilation where possible High efficiency LED Lighting Solar PV system	Energy Efficiency
High WELS & Drought tolerant / native vegetation	High WELS Ratings Reduced irrigation requirement for Vegetation	Water Efficiency, Storm Water Management & Urban Ecology
Cyclist Facilities	4 Staff/Visitor bike racks	Transport
Operational Waste Management Plan	75%+ recycling in operation	Waste Management

3 INDOOR ENVIRONMENTAL QUALITY

Through the enhancement of indoor environment quality, occupants will see improvements to health along with benefits to thermal and acoustic comfort resulting in a more inviting and liveable internal environment.

The project will review acoustic separation throughout the design. This will focus on internal noise levels and enclosed spaces.

A lighting system shall be designed to provide appropriate lighting levels, where required, and suitable control systems. Additionally, lighting control systems shall be provided to all common areas.

Ample external views have been provided to occupants through the utilisation of dedicated solar passive design principles.

Materials that emit VOC's or formaldehyde shall be minimised within this project.

3.1 Lighting Comfort

To address the perception of colour, light sources must have a minimum Colour Rendering Index (CRI) of 80. Bare light sources must be fitted with baffles, louvers, translucent diffusers, ceiling design, or other means that obscures the direct light source from all viewing angles of occupants, including occupants looking directly upwards.

3.2 Visual Comfort /Daylight

The design will be provided with strong solar passive design and external shading using verandas to avoid glare onto work surfaces for more than 80% of the working time for each space and façade. Internal Blinds will be provided by occupants.

At least 40% of the nominated floor area has been designed to high levels of daylight during hours of occupancy. At least 80% of the nominated floor area has been designed to be within 8m of either an external view or high-quality internal view.

Table 2 Daylight Factor Calculations

Primary Space Floor Area Total (m^2)	Primary floor area above threshold (m^2)	Percentage Floor area above threshold	Area Weighted average Daylight Factor
336.679	142.954	42.5%	2.8%

3.3 Indoor Pollutants

All paints, adhesives and sealants used for internal application on the project shall have a low VOC content as outlined below.

Table 3 VOC Content

Product Category	Max TVOC content in grams per litre (g/L) of ready to use product.
General purpose adhesives and sealants	50
Interior wall and ceiling paint, all sheen levels	16
Trim, varnishes and wood stains	75
Primers, sealers and prep coats	65
One and two pack performance coatings for floors	140
Acoustic sealants, architectural sealant, waterproofing membranes and sealant, fire retardant sealants and adhesives	250
Structural glazing adhesive, wood flooring and laminate adhesives and sealants	100
General purpose adhesives and sealants	50
Interior wall and ceiling paint, all sheen levels	16
Trim, varnishes and wood stains	75

All carpets used within the project shall be certified under a recognised Product Certification Scheme.

All engineered wood products shall have no formaldehyde or meet the limits of the relevant testing protocols. These have been specified below:

Table 4 Formaldehyde Content

Test Protocol	Emission Limit/ Unit of Measure
Plywood - AS/NZS 2269:2004 & AS/NZS 2098.11:2005	< 1.0 mg/L
Particle Board - AS/NZS 1859.1:2004 & AS/NZS 4266.16:2004	< 1.5 mg/L
Plywood & Particle Board – JIS A 5908:2003	< 1.0 mg/L
MDF - AS/NZS 1859.2:2004 & AS/NZS 4266.16:2004	< 1.0 mg/L
MDF – JIS A 5905:2003	< 1.0 mg/L
Laminated veneer – AS/NZS 4357.4	< 1.0 mg/L

Test Protocol	Emission Limit/ Unit of Measure
ASTM D5116	< 0.1 (+/- 0.005) mg/m2/hr
ISO 16000	< 0.1 (+/- 0.005) mg/m2/hr
ASTM D6007	< 0.12 mg/m3
ASTM E1333	< 0.12 mg/m3
EN 717-1	< 0.12 mg/m3

4 ENERGY

A key concern with new buildings is greenhouse gas (GHG) emissions, making up approximately 20% of total GHG emissions in Australia. Several initiatives and various technologies will be incorporated within the project to ensure these are mitigated.

A crucial aspect will be minimising energy usage. This will be achieved through the following strategies:

- Solar passive design;
- High performance glazing;
- Efficient lighting & control systems;
- Efficient HVAC systems & controls systems;
- Solar PV System;

Based on the proposed initiatives, the total accumulated impact reductions of building life cycle are predicted to be 35% reduction in Global warming potential.

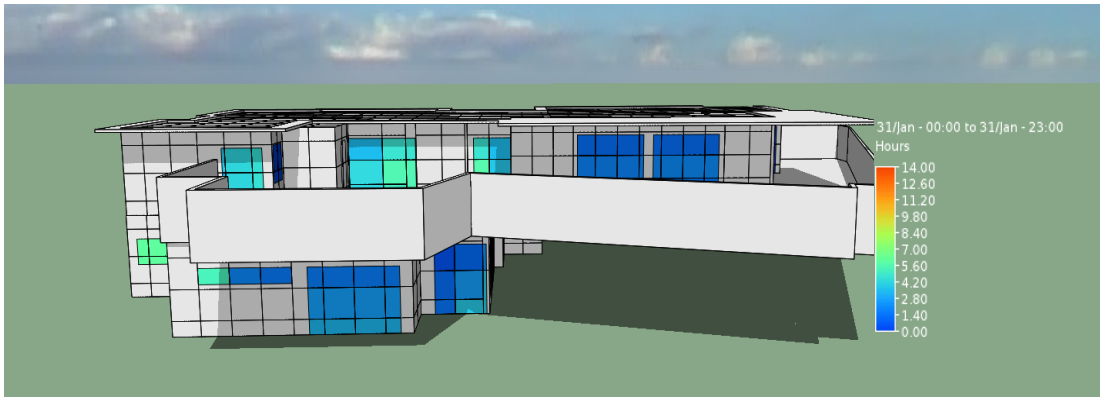
Table 5 Energy Savings

Initiative	Reduction in GWP
LED Lights	2.16%
Appliance Efficiency	0.44%
Thermal Performance	1.01%
Solar PV	23.67%
Energy Monitoring	4.32%
Water Efficient Fixtures	3.37%
TOTAL REDUCTION	34.97%

4.1 Solar Shading Analysis

Solar passive design principles have been considered, with glazing orientated to the North where possible and deep overhangs to reduce solar gains and improve energy efficiency.

Figure 1 Hours of Solar Exposure to Glazing – East Facade



Heavy shading on the East façade reduces direct solar gains, with Shade sails to outdoor play areas also proposed to further reduce thermal load on the building in summer months.

Figure 2 Hours of Solar Exposure to Glazing – West Facade

Exposure on the West façade has been mitigated on the first floor with the use of highlight windows and deep eaves. Ground floor glazing will have limited shading in the afternoon hours, with potentially up to 7 hours of exposure in some areas. It is recommended that blinds or shutters are added to reduce direct solar gains in these areas.

4.2 Improved Thermal Performance

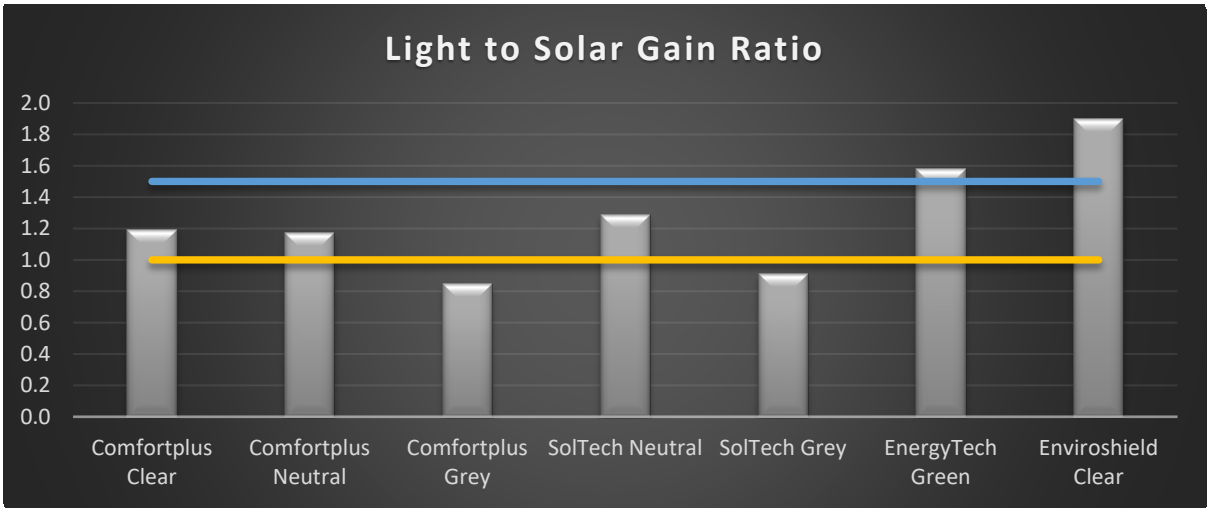
Achieving improvement over NCC 2019 Section J 'Deemed-to-satisfy' requirements will ensure reduction benchmarks for Global Warming Potential (GWP) are achieved for this site. CADDS Group will work with services consultants during design development stage to ensure the HVAC equipment is to be sized with lower capacity to reduce the operation cost of HVAC system. This will result in reduction of life cycle impact of the building in many aspects throughout the life of the building. Specification of HVAC system will exceed minimum MEPS requirements and achieve COP/EER of 3.8 or higher.

The carbon emissions associated with heating and cooling accounts for up to 15% of the total operational carbon. A high-performance building envelope fabric will ensure the design will withstand future climate predictions through the life of the building. Refer to Table 1 for construction materials proposed.

Table 6 Preliminary Building Fabric Specification

Construction		Materials
External Walls	**Rt2.3**	Concrete tilt panel walls Insulated with rigid insulation or the like
Roof/ Ceiling	**Rt5.2**	Reflective blanket under roof cover and ceiling insulation Light coloured Roof

Glazing Specification		U-Value	SHGC	VLT
Glazing	High performance, high visible transmittance, light to solar gain ratios of 1	4.5	0.55	>0.55



4.3 Lighting

Use of LED lighting instead of conventional Compact Fluorescent and Incandescent Lighting will give significant savings in operation energy. As operation energy is responsible for 79-80% Life Cycle Impact of buildings, efficient lighting system would make a significant impact reduction in the life cycle of the building.

4.4 Appliances and Equipment

All appliances installed are to have a minimum Energy Star rating of 1 Star below the maximum energy star rating available for

- Fridge/freezers
- Dishwashers
- Clothes Washers

4.5 Solar PV

With the rising price of electricity, the economics of solar are very favourable for occupancy of Childcare centres. Using solar generated power on site results in much lower emissions associated with the development compared to using the fossil fuel powered grid. Feeding out to the grid assumes a net environmental credit as the electricity will be consumed by a neighbouring consumer therefore reducing the demand on the grid.

By connecting the system to the grid electricity, energy not used on-site will feed back into the (predominantly fossil fuel fired grid). This can be thought of as offsetting the carbon associated with the materials used in constructing and maintaining the building.

The development will be installing a solar PV system to offset energy use.

Chart below demonstrates the estimated annual electricity generation for a 30kW Solar PV Generation.

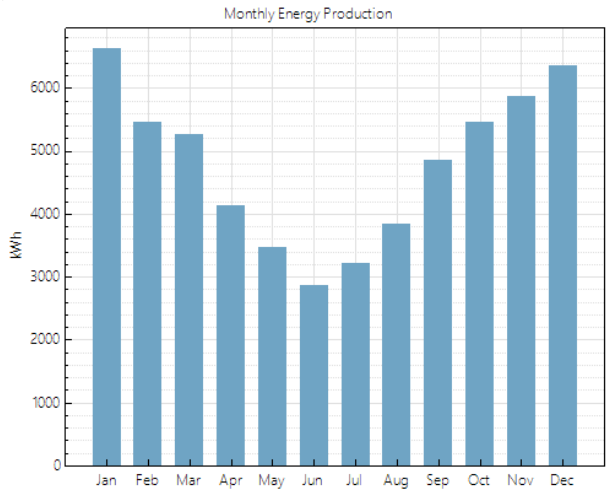


Figure 3 Solar PV

4.6 Local Electric Hot Water Service with Solar Feed-In from Rooftop

HWS to be located within close proximity of Showers and Kitchens. Localised Electric HWS to be considered as Electric Heat Pump. Potable Water calculations and estimation of annual hot water consumption will be conducted at Design Development stages. Solar Photovoltaic (PV) will be implemented as a sustainable initiative and will operate in conjunction with electric HWS to reduce day-time peak demand.

4.7 Building Metering and Monitoring

A monitoring system will be provided capable of monitoring at a minimum electrical and potential for water consumption throughout the building with software providing easy to read monitoring and trend usage data. The information recorded by this system shall be available to the property owner/tenant. This information shall be utilised by the owner company in relation to billing of water and electricity usage.

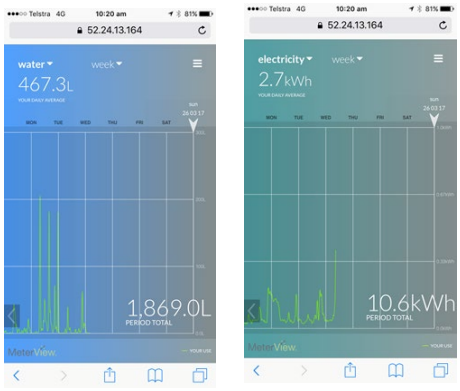


Figure 4 Metering

5 WATER

Perth has a limited potable water supply due to the increases in population and reductions in rainfall levels. By reducing this demand will help to alleviate the concerns related to potable water usage. All new water services are to ensure that high WELS rating fixtures and fitting are to be installed as appropriate.

Sub-soil drip Irrigation for plantings to be determined during design development. Fire system test water and water used in HVAC systems will also be determined during the design development stage with relevant consultant.

5.1 Sanitary Fixtures Efficiency

The project shall incorporate the following WELS Ratings:

Table 7 WELS Ratings

Fixture / Equipment Type	WELS Rating
Taps	5 Star
Urinals	5 Star
Toilets	4 Star
Showers	3 Star (not more than 7.5L/m)

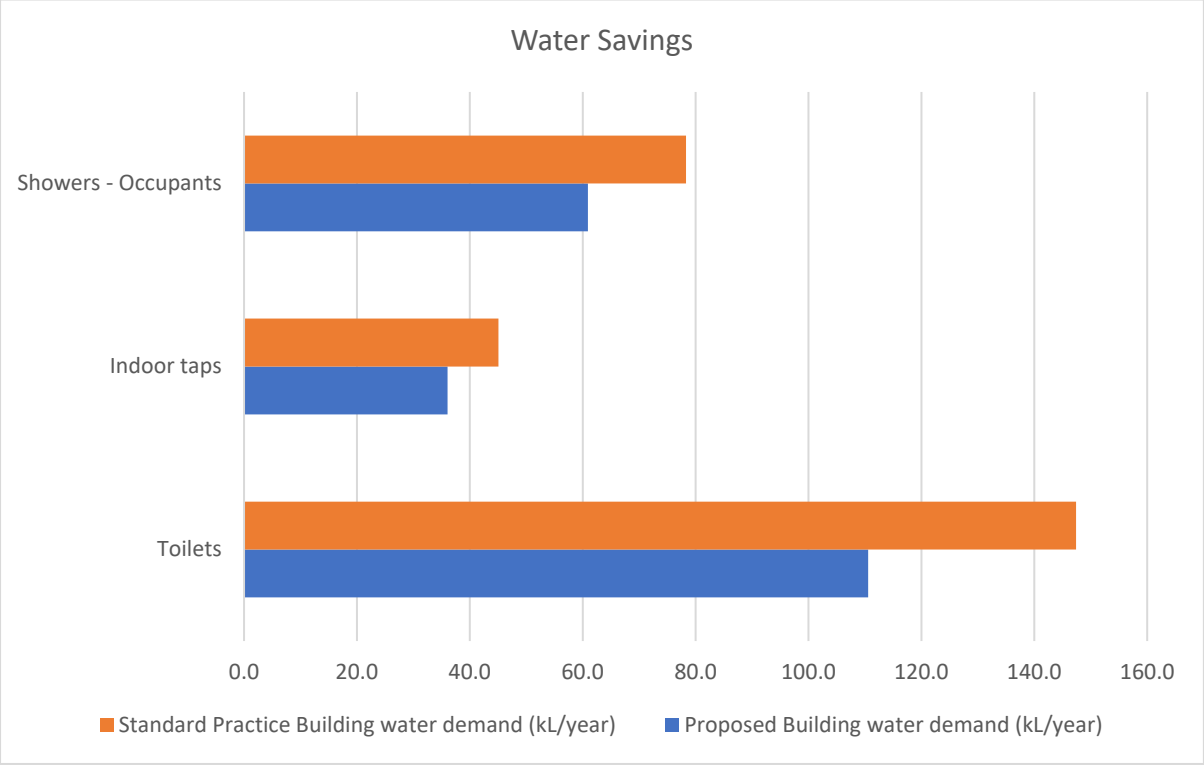


Figure 5 Water Savings

5.2 Heat Rejection

The project will not utilise water-based heat rejection systems, instead air-cooled systems shall be provided.

5.3 Landscape Irrigation

All landscaping irrigation to include drip irrigation and include moisture sensor override or alternatively the use of Xeriscape garden. Where Xeriscape garden is implemented, there will be a provision for the removal of irrigation within three months of landscaping installation reducing the need for watering after.

6 STORMWATER MANAGMENT

The project has been designed to minimise the peak storm water outflows from the site with the use of deep-rooted zones and landscaped gardens.

7 BUILDING MATERIALS

The project will improve the procurement processes related to material sourcing, resulting in reduction in embodied energy along with improvements in the quality and longevity. By incorporating these aspects into the supply chain, it will facilitate in increasing the frequency in recycling and re-use of these materials.

Preference will be given to environmentally responsible materials during the selection process. All materials, where applicable, shall have environmental certifications and manufacturing quality certification, shall have low VOC, reduced PVC content and formaldehyde content, shall seek to have recycled or eco preferred content and product stewardship.

7.1 Responsible Building Materials

The ESD specification include requirements for sustainable sourcing of PVC (best practice or PVC replacement) and steel products.

7.2 Construction and Demolition Waste

The site contains an existing building to be demolished. The demolition contract, and the main construction contract, will have a specified requirement to achieve at least 90% recycling rate.

8 TRANSPORT

It is the intention of this category to reduce occupant's dependency on private vehicle usage. This is achieved by providing alternatives methods of transport and provide a high level of amenity in the surrounding vicinity. The development will provide bicycle storage facilities.

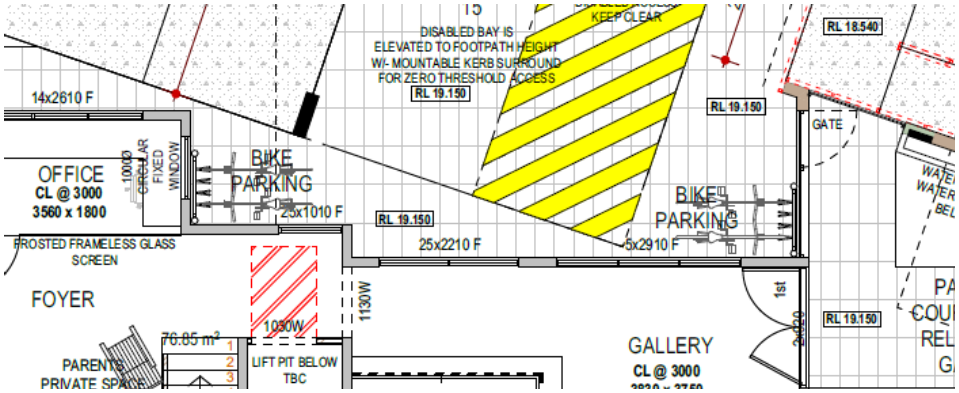


Figure 6 Proposed Bicycle facilities

The location is close to a number of bus services including:

- Bus Route No.111 runs along Canning Highway between Perth and Fremantle at a 5-to-10-minute frequency during the morning (6am to 9am) and afternoon (3pm to 6pm) peaks on weekdays.
- Bus route No 910 connects Fremantle to Perth and runs along Canning Highway at a 10–15-minute frequency between 5am and 8pm weekdays and connects to train lines at Canning Bridge Station and Fremantle Station.

9 WASTE MANAGEMENT

A Waste Management Plan has been prepared to demonstrate that sufficient capacity is provided in the bin store to accommodate bins for general, recyclable and 'FOGO' waste streams.

10 URBAN ECOLOGY

The category will seek to mitigate the negative impacts that buildings have on the surrounding natural environment.

This development site has been previously developed with remaining structure evident on-site. The development will seek to improve the ecological value of the current site by incorporating soft landscaping, drought tolerant planting and the use of materials that will provide an aesthetically pleasing surrounding to the project.

Appropriate colours selected throughout the development to help mitigate the Heat Island effect.

10.1 Emissions

Building emissions have a large negative impact on the natural environment. Emissions from the site will be minimised as far as possible. By using environmentally friendly refrigerants and insulation and eliminating light spill, any significant impact of the building's emissions can be significantly reduced.

11 CONSTRUCTION AND MANAGEMENT

The project will encourage an environmental focus in the management of design, construction, and operational phases of the development. The project will have a thoroughly integrated approach to constructing and operating a building with good environmental performance.

The building will undergo a servicing and maintainability review along with a commissioning process. Project Teams will develop building operations and maintenance information along with a Building Users' Guide to inform the building owner and occupants of the environmental features in the building and the requirements for their maintenance during construction.