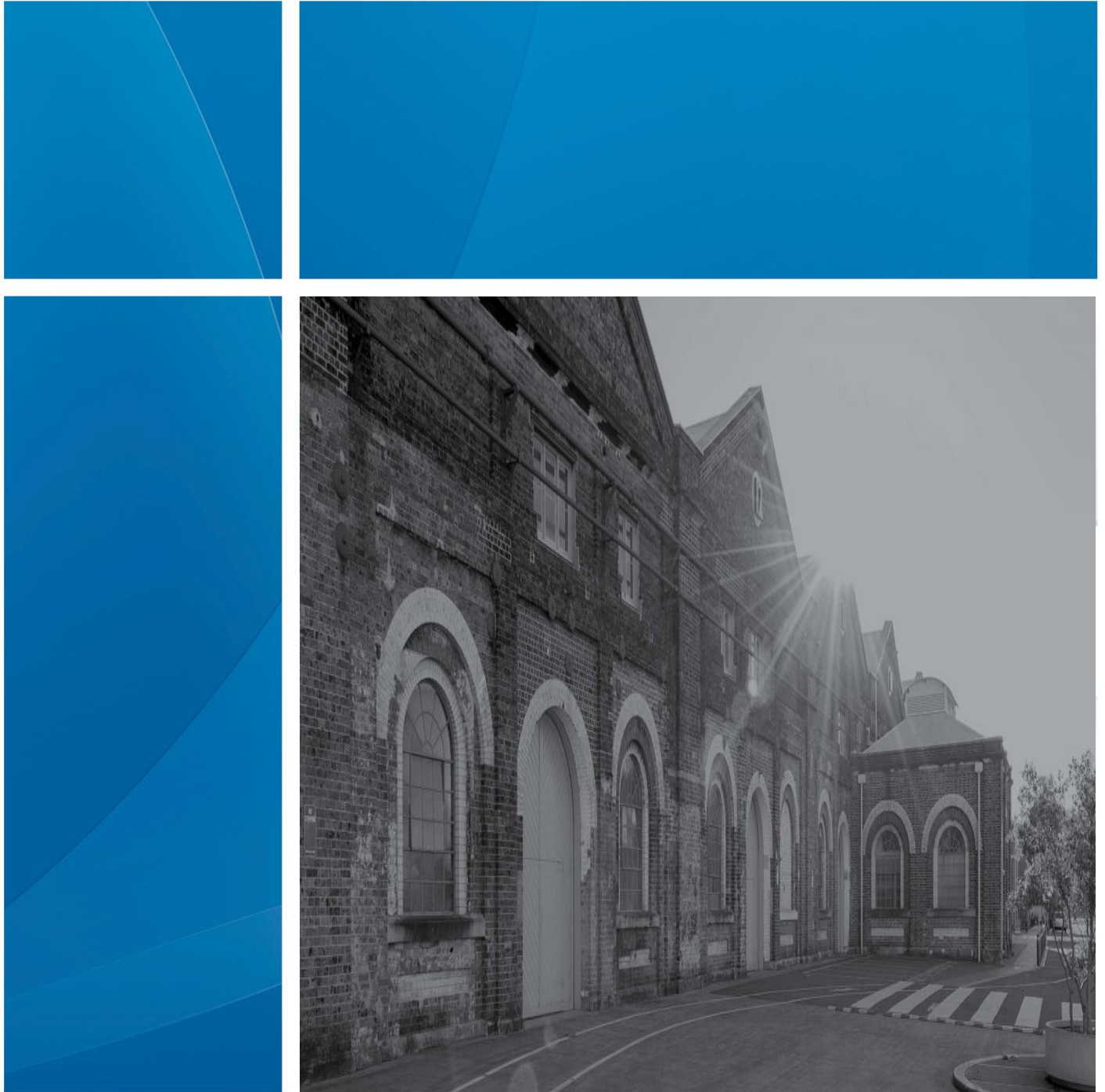


Report

SEARS – Ecologically Sustainable Development

AUSTRALIAN TECHNOLOGY PARK – LOCOMOTIVE WORKSHOP RETAIL (BAYS 1-4A)

Mirvac



CONFIDENTIAL

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EXECUTIVE SUMMARY

Australian Technology Park has made a commitment to address sustainability imperatives throughout the re-development and refurbishment of bays 1-4a within the Locomotive, which primarily consists of retail spaces.

This report demonstrates compliance with the following policy and development approval documents:

- Secretary's Environmental Assessment Requirements (SEARS) – Issued on 8th June 2017;
- NCC Section J 2016.

Sustainable principles and initiatives will be included in the Locomotive Workshop redevelopment to minimise environmental impacts in design, construction and ongoing operation of the redevelopment. Incorporating best practise sustainable building initiatives in line with industry-wide accepted sustainability certification principles, will improve the environmental performances and resource consumption across a holistic range of categories including energy and water efficiency, material selections, waste reductions and emissions reductions.

The Sustainability Strategy section of this report details how compliance with the relevant planning requirements is met.

1 CONTEXT

1.1 Introduction

This report supports a State Significant Development Application (SSDA) submitted to the Minister for Planning pursuant to Part 4 of the *Environmental Planning and Assessment Act 1979* (EP&A Act).

The Application (referred to as SSDA 8517) seeks approval for the adaptive reuse and redevelopment of the eastern portion of the Locomotive Workshop (being Bays 1-4a) within Australian Technology Park (ATP), Eveleigh as described in the Proposed Development Description section of this report.

This report outlines the Australian Technology Park's sustainability commitment to the redevelopment of the eastern portion of the Locomotive Workshop Building (Bays 1-4a). A number of sustainable initiatives have been identified and will be incorporated in all the phases of the project.

1.2 Background

Historically, ATP was used for railway maintenance, storage and other associated industries. Use of the site as marshalling yards and workshops formed part of a large railway-based precinct on both sides of the main railway line, dating from 1882 and growing in size until its closure in 1989. Since this time, the precinct has been progressively redeveloped and repurposed.

In 2014, the NSW Government resolved to offer development sites within the ATP for sale through a selective tender process conducted by Urban Growth NSW Development Corporation (UGDC). In November 2015 Mirvac Projects Pty Ltd (Mircac) was named as the successful party and ownership and development rights of the precinct were subsequently transferred.

In December 2015, an SSDA was submitted to the Department of Planning & Environment for a multi-building redevelopment (i.e. Buildings 1, 2 and 3 shown in **Figure 2**) of the ATP to provide new commercial office, retail and community uses and a significant upgrade to the ATP public domain. Following public exhibition, and the submission of additional information, the development was approved by the Planning Assessment Commission on 20 December 2016. The construction of Buildings 1, 2 and 3 is currently underway.

The redevelopment of the Locomotive Workshop is also part of Mirvac's redevelopment strategy for the ATP. The Locomotive Workshop is to be redeveloped in its entirety, however planning approvals are sought through the submission of two separate SSDAs. This Application relates to the eastern portion encompasses the heritage Bays 1 and 2, the existing Blacksmith operation and Bays 3, 4 and 4a. In conjunction with SSDA 8449 that relates to Bays 5-15, this Application is envisaged to be the next phase of urban regeneration within the ATP.

1.3 Site Location

The Locomotive Workshop is located within the Australian Technology Park (ATP), Eveleigh. The ATP precinct is located approximately 5km south of the Sydney CBD, 8km north of Sydney airport and within 200m of Redfern Railway Station and has an overall area of approximately 13.2 hectares. An aerial photograph of the ATP precinct is shown in **Figure 1** and the locational context of the Locomotive Workshop is identified in **Figure 2**.



-  The ATP Precinct
-  Bays 1- 4a of Locomotive Workshop

Figure 1 – ATP Precinct (Source: Ethos Urban)

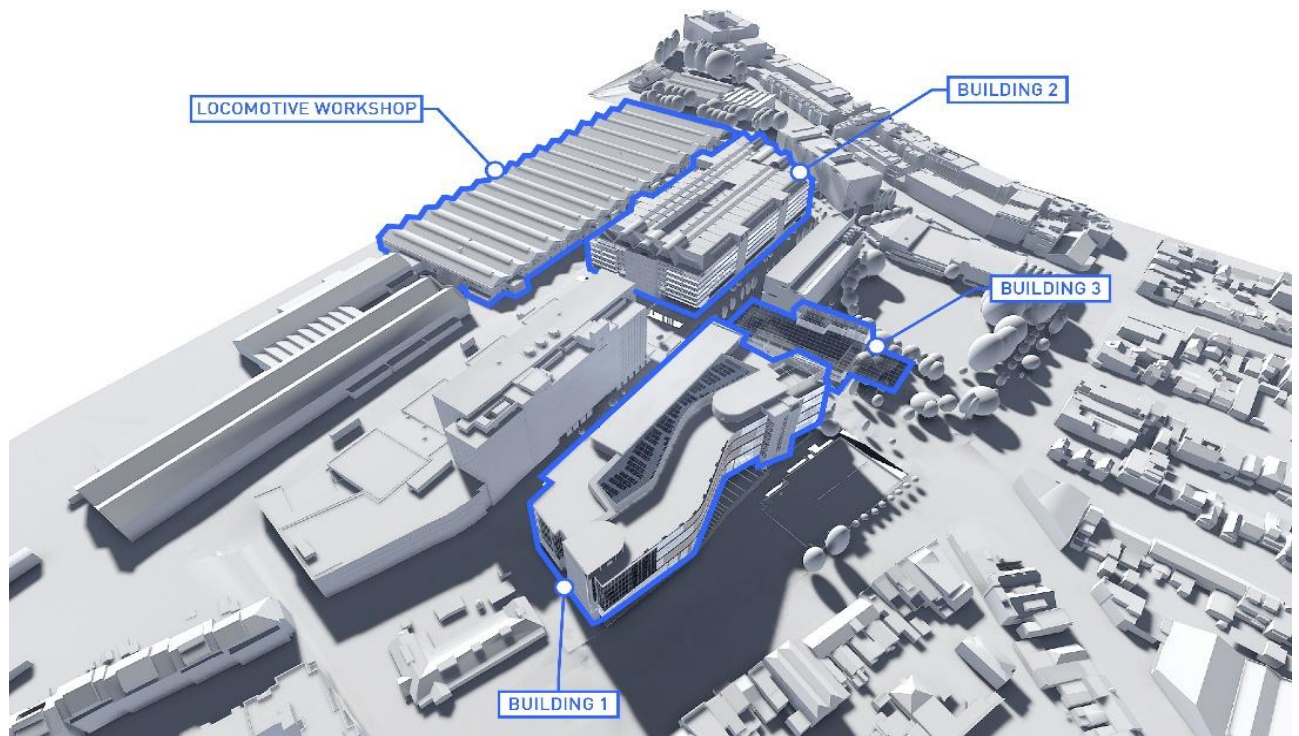


Figure 2 – Locational context of the Locomotive Workshop (Source: Sissons)

1.4 Proposed Development Description

This SSDA seeks approval for the following:

- demolition of existing ‘modern’ infill fit-out elements to Bays 3-4a, including display barriers in Bays 1 & 2;
- relocation of moveable heritage items;
- adaptive reuse of the Bays 1-4a and two annex structures for retail premises uses, function centre uses, information and education facility uses, general industrial uses, recreation facility (indoor) uses and associated back of house facilities;
- construction of internal and external alterations to Bays 1-4a;
- heritage interpretation and conservation works;
- public domain improvements within the curtilage of Bays 1-4a;
- provision of an external building illumination system;
- signage; and
- associated utilities and infrastructure.

A more detailed and comprehensive description of the proposal is contained in the EIS prepared by Ethos Urban.

Proposed Workshop levels 00 and 01 are shown in **Figure 3** and **Figure 4**.

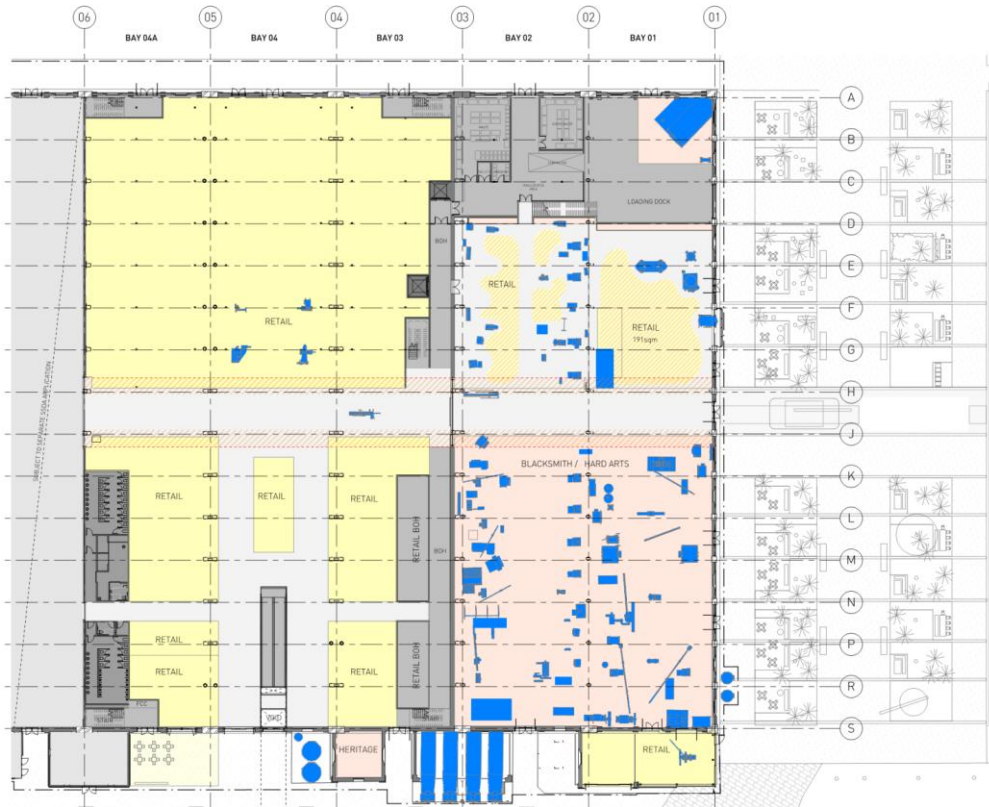


Figure 3 - Locomotive Workshop Proposed Level 00



Figure 4 - Locomotive Workshop Proposed Level 01

1.5 Sustainability Policy

There are a number of relevant documents that require Sustainability and/or Environmental Sustainable Design (ESD) to be addressed. Those considered of material consideration to the development application process are listed below:

- Secretary's Environmental Assessment Requirements (SEARS) – Issued on 8th June 2017;
- NCC Section J 2016.

Table 2 provides a summary of where compliance with these policies, either in parts or their entirety, is demonstrated within the overall Locomotive Workshop development.

Table 1 Policy Compliance

Relevant Development Policy		Report Reference
Secretary's Environmental Assessment Requirements (SEARS) <i>Schedule 2 Environmental Planning & Assessment Regulation 2000</i>		
Outline how ESD principles will be incorporated in the design, construction and ongoing operation of the whole development;		<i>Throughout this report</i>
Provide a framework for how the proposed development will reflect best practice sustainable building principles to improve environmental performance, including energy and water efficient design and technology, and use of renewable energy;		<i>See section 2.1, 2.3, 2.4</i>
Description of sustainability initiatives that will reduce drinking water demand, including any alternative water supply, water conservation measures and water sensitive urban design.		<i>See section 2.4</i>
NCC Section J 2016		
Section J Energy Efficiency		<i>See Section 1.5.1</i>
J.0	Energy Efficiency	
J.1	Building Fabric	
J.2	Energy Efficiency	
J.3	Building Sealing	
J.5	Air-Conditioning & Ventilation System	
J.6	Artificial Lighting & Power	
J.7	Heated Water Supply	

1.5.1 NCC 2016 – Section J

The National Construction Code (NCC) is produced and maintained by the Australian Building Codes Board (ABCB) on behalf of the Australian Government with the aim of achieving nationally consistent, minimum necessary standards of relevant health and safety, amenity and sustainability objectives efficiently. The NCC contains mandatory technical provisions for the design and construction of buildings and other structures, and plumbing and drainage systems through Australia

Volume 1, Section J outlines energy efficiency provisions required for NCC class buildings (including Class 9b Gym, and Class 6 Restaurant). There are seven (7) Deemed-to-Satisfy subsections, J1 to J3 and J5 to J8, focusing on different aspects of energy efficiency as follows:

- J1 - Building Fabric (i.e. the ability of the roof, walls and floor to resist heat transfer);
- J2 - Glazing (i.e. the resistance to heat flow and solar radiation of the glazing);
- J3- Building Sealing (i.e. how well parts of a building are sealed to ensure comfortable indoor environments are efficiently maintained);



-
- J5 - Air Conditioning and Ventilation Systems (i.e. the efficiency and energy saving features of heating, ventilation and air-conditioning systems);
 - J6 - Artificial Lighting and Power (i.e. power allowances for lighting and electric power saving features);
 - J7 - Hot Water Supply and Swimming Pool and Spa Pool Plant (i.e. the efficiency and energy saving features of hot water supply);
 - J8 – Facilities for Energy Monitoring (i.e. access to certain energy efficiency equipment for maintenance purposes).

2 SUSTAINABILITY STRATEGY

The Ecologically Sustainable Development Report has been prepared to demonstrate how ESD principles have been integrated into the Locomotive Workshop design, construction and operation. The ESD performance targets have been based on the code and guidelines as follows:

- GBCA Green Star design and construction principles; NCC Section J Compliance;
- Passive design principles;
- Waste Management;
- Energy Efficiency Initiatives;
- Water efficiency initiatives;
- Reduced impacts from materials;
- Reduced pollutant emissions;
- Improved indoor environment for occupants; and
- Reduced transport emissions

2.1 Green Star design and construction principles

The Green Star rating system, developed by the Green Building Council of Australia (GBCA), is a holistic certification methodology and internationally recognised rating system. Green Star sustainability initiatives are widely accepted as current best practice design and construction and provide a common language of ESD for developments. The design of the Locomotive Workshop redevelopment will follow the principles of this framework to improve the building environmental performance, including energy and water efficiency.

Green Star is composed of four different sustainability rating tools (Design and As Built, Interiors, Communities, and Performance), each relevant to distinct project types or asset phases. The design principles from the Green Star Design & As-Built (v1.1) tool are most relevant for the Locomotive Workshop redevelopment as the scope of the Design & As-Built rating is primarily for the design and construction of new buildings and major refurbishment.

Green Star covers sustainability attributes across the following nine categories:

- Management;
- Indoor Environmental Quality;
- Energy;
- Transport;
- Water;
- Materials;
- Land Use and Ecology;
- Emissions; and
- Innovation.

Each category includes initiatives referred to as credits. Each credit outlines accepted best practice prescriptive and/or performance solutions to address a common issue or impact that improves a project's performance in terms of sustainability.

2.2 NABERS

NABERS (National Australian Built Environment Rating System) is a rating scheme managed by the NSW Office of Environment and Heritage on behalf of Federal, State and Territory governments. The NABERS Energy rating tool has primarily been developed as a benchmarking tool to enable commercial buildings to be assessed based on their operational greenhouse performance (i.e. the level of greenhouse gas emissions associated with a commercial building over a 12 month consecutive period).

NABERS has a tool for Shopping Centres, however this tool can only be used to rate base building services of retail shopping centres over 15,000m² Gross Lettable Area Retail (GLAR). As the Locomotive Workshop retail area is less than 15,000m² GLAR, a NABERS rating is not applicable for this development.

2.3 Energy Efficiency

The Locomotive Workshop facility will aim to drive greenhouse gas emissions and operational energy consumption reduction through the incorporation of some or all of the following:

- NCC Section J Compliance - Building Envelope Performance.
- Provision of energy efficient LED lighting design;
- Provision of energy efficient HVAC systems to minimise conditioning of unnecessary and unoccupied spaces within the expansive space, using an innovative combination of variable air volume and displacement to achieve design conditions while minimising energy consumption;
- Minimisation of hard scaping where possible and the utilisation of materials with low solar reflection indexes (SRI); and
- Investigation of roof mounted solar photovoltaic (PV) system to reduce greenhouse gas emissions of the development.

2.3.1 Passive Design Principles

The design of the Locomotive Workshop redevelopment will consider passive design strategies that respond to environmental conditions of the building. Solutions include solar access, prevailing winds, seasonal and diurnal temperature changes. Passive design principles will be maximised where practical to improve the indoor environmental quality, thermal comfort and energy efficiency for the development. It will also reduce reliance on mechanical cooling and heating, simultaneously reduce noise and pollution sources.

2.3.2 Section J - Building Envelope Performance

The building envelope performance will be designed in accordance with compliance with the NCC [Section J]. Improvements on minimum requirements will be maximised where practical. Glazing on facades with high solar radiation exposure should incorporate high performance glass to reduce solar heat gains through these facades. Glazing on facades with less solar income may be maximised where practical to improve daylight access and heating during the winter months.

Section J of the NCC sets regulations for energy efficiency for all types of buildings with respect to the building's nature, design and activity.

Considering the heritage requirements applicable to the Locomotive Workshop, there is minimal alteration that can be performed to the external walls of the development. Components in the thermal envelope that can be altered will be improved to compensate for the inability of the other envelope components to comply with the prescribed requirement of the NCC Section J. Performance solution will be proposed and verified using the NCC Section J JV3 methodology.

2.4 Water Efficiency

2.4.1 Fixtures & Fittings

Water sanitary fittings and fixtures are expected to constitute major water use for the Locomotive Workshop. Selection of water efficient sanitary fittings and fixtures can significantly reduce potable water demand. All fittings and fixtures installed by the project will be within one star of the proposed WELS ratings in Table 4 below, in line with Green Star Design & As-Built v1.1 Potable Water Credit requirements.

Table 2 - WELS rated fittings and fixtures as per as per the Green Star (Design & As Built v1.1) Potable Water Credit.

Fittings and Fixtures	Standard Practice Benchmark	Proposed WELS Rating
Taps	4 Star (7.5 L/min)	6 Star (4.5 L/min)
WC	3 Star (4 L/Flush)	5 Star (3L/Flush)
Urinals	3 Star (2 L/min)	6 Star (1 L/min)
Showers	3 Star (9 L/min)	3 Star (<=6 L/min)

2.4.2 Rainwater Harvesting

After water demand has been reduced, water supply will be addressed through a water reuse system which will significantly reduce potable water utilisation. Rainwater will be collected from the roof and stored to be utilised in landscaping irrigation, toilet and urinal flushing as well as wash down facilities. The rainwater reuse strategy and sizing will be further developed during the detailed design phase.

2.5 Materials

The Locomotive Workshop redevelopment will focus on improved resource management and supply practices. Best practices include waste reduction and recycling strategies, as well as selecting building materials with lower environmental impacts.

Minimisation of waste across the entire project life cycle with efficient design and material selection will reduce waste production to landfill. Material selection will consider resource and supply chain impacts to address the issue of natural resource depletion and emissions from resource manufacturing.

Operational waste for the development will be reduced either through provision of waste and recycling facilities in line with best practice guidelines for separation of waste streams, storage areas for waste and access to the waste storage areas to facilitate collection of the different streams, or through a performance approach by a specialist waste auditor. The waste auditor assesses the expected waste volumes and streams of the building users and tailors the waste facilities to meet these requirements.

2.5.1 Site Waste Management Plan

A site specific Operational Waste Management Plan (OWMP) and Construction Management Plan (CMP) will be developed prior to starting works on site to outline the strategy for demolition and construction waste

generated on site. Waste generated during construction and demolition and sent to landfill will be minimised through reduced waste generation processes and diversion through recycling.

2.5.2 Waste Storage

The project will provide a storage area along Locomotive St and external waste collection zone to allow for the separation and collection of recyclable waste generated by the building occupants. This ensures that recyclables are sorted and stored for collection that enables recycling opportunities that diverts these waste streams from landfill. Waste and recycling storage area and access design will limit manual handling of waste and provide convenient access route for an easy depositing and collection of waste.

A qualified waste auditor will develop an Operational Waste Management Plan (OWMP) for the site to identify waste facility requirements based on the expected building operations and set targets and strategies to reduce operational waste. The OWMP will be developed in coordination with building tenants to tailor the facilities provided with the expected waste and recycling streams generated. The OWMP will identify safe methods of waste transfer and collection, outline methods to encourage better recycling practices, and incorporate a review process based on operational experience.

2.6 Emissions

The project aims to assess the environmental impacts of 'point source' pollution generated by the development by reducing light pollution from the site and potential impacts from refrigerant leakage.

2.6.1 Light Pollution

The development will minimise light pollution from internal and external sources. Lights operating in after hours areas will be connected to sensors or timers to limit energy consumption. Light pollution from the site will be in compliance with AS4282 Control of the Obtrusive Effects of Outdoor Lighting.

Except where being used for signage or lighting of specific surfaces, all external luminaries will have an Upward Light Output Ratio (ULOR) below 5% related to their mounted orientation.

2.6.2 Refrigerant Impacts

Impacts from refrigeration equipment leaks will be minimised by selecting low-environmental impact refrigerants as per accepted standards and guidelines such as the AIRAH Refrigerant Selection Guide (2003) and AS/NZS 1667.2:1998 Refrigerating Systems-Safety requirements for Fixed Applications. The Green Star Total System Direct Environmental Impact (TSDEI) methodology will also be considered to ensure appropriate refrigerant selection.

2.7 Indoor Environment

People will be placed at the heart of design, construction, operations and development decisions. High quality indoor environment enhances comfort and well-being of occupants. The design of the indoor environment will consider issues including indoor air quality, acoustic comfort and lighting comfort.

2.7.1 Acoustic Comfort

The large warehouse and close proximity to the train line create acoustic challenges for the development. Acoustics will be a consideration of the design development to minimise the adverse effects and create improved acoustic comfort for building user.

2.7.2 Lighting Comfort

All lighting levels will comply with best practise guidelines, be flicker free and accurately address the perception of colour in the space with a Colour Rendering Index (CRI) of at least 80.

2.8 Transport

A major source of greenhouse gas emissions is transport emissions from car commuting, including car manufacturing and maintaining roads and infrastructure. Site selection and provision of facilities to encourage 'green transport' options can significantly reduce the emissions from fossil fuel vehicle use.

The location of the Locomotive Workshop will reduce transport emissions by providing convenient access to a large number of users through good vicinity to the Redfern rail and bus hubs on Gibbon Street and Henderson Road.

2.9 Conclusions

The Locomotive Workshop redevelopment will incorporate various energy efficiency, water efficiency and sustainability initiatives into all phases of the project as outlined in this report, aligned with the industry accepted best practice principles of Green Star.

The report details the measures that will be implemented to improve environmental performance, including water and energy efficient demand-side design as well as supply-side renewable energy generation and water re-use systems to reduce greenhouse emissions and drinking water consumption.

Based on the targeted included initiatives, the development complies with the energy efficiency and sustainability requirements under the Secretary's Environmental Assessment Requirements (SEARS), *Environmental Planning & Assessment Regulation* (2000) Schedule 2 and *NCC Section J* (2016) requirements.



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