

Report

Ecologically Sustainable Development

AUSTRALIAN TECHNOLOGY PARK - LOCOMOTIVE WORKSHOP COMMERCIAL (BAYS 5-15)

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 5-15 within the Locomotive, which primarily consists of office 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, verified through industry-wide accepted sustainability certification tools, 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 project is targeting the following sustainability benchmarks and certifications:

- 5 Star Green Star 'Design & As Built' v1.1 rating;
- 5 Star NABERS Office Energy (Base Building) rating;
- 4 Star NABERS Office Water (Whole Building) rating;
- NCC Section J compliance;

The above design pathways are illustrated in the Sustainability Strategy Section of this report.

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 8449) seeks approval for the adaptive reuse and redevelopment of the western portion of the Locomotive Workshop Building (being Bays 5-15) within Australian Technology Park (ATP), Eveleigh as described in the Project Description section of this report.

This report outlines The Australian Technology Park's sustainability commitment to the redevelopment of the western portion of the Locomotive Workshop Building (Bays 5-15). 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 (Mircvac) 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 building is to be redeveloped in its entirety, however planning approvals are sought through the submission of two separate SSDAs. This Application relates to the western portion of the Building and 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 building is identified in **Figure 2**.



 The ATP Precinct

Figure 1 – ATP Precinct

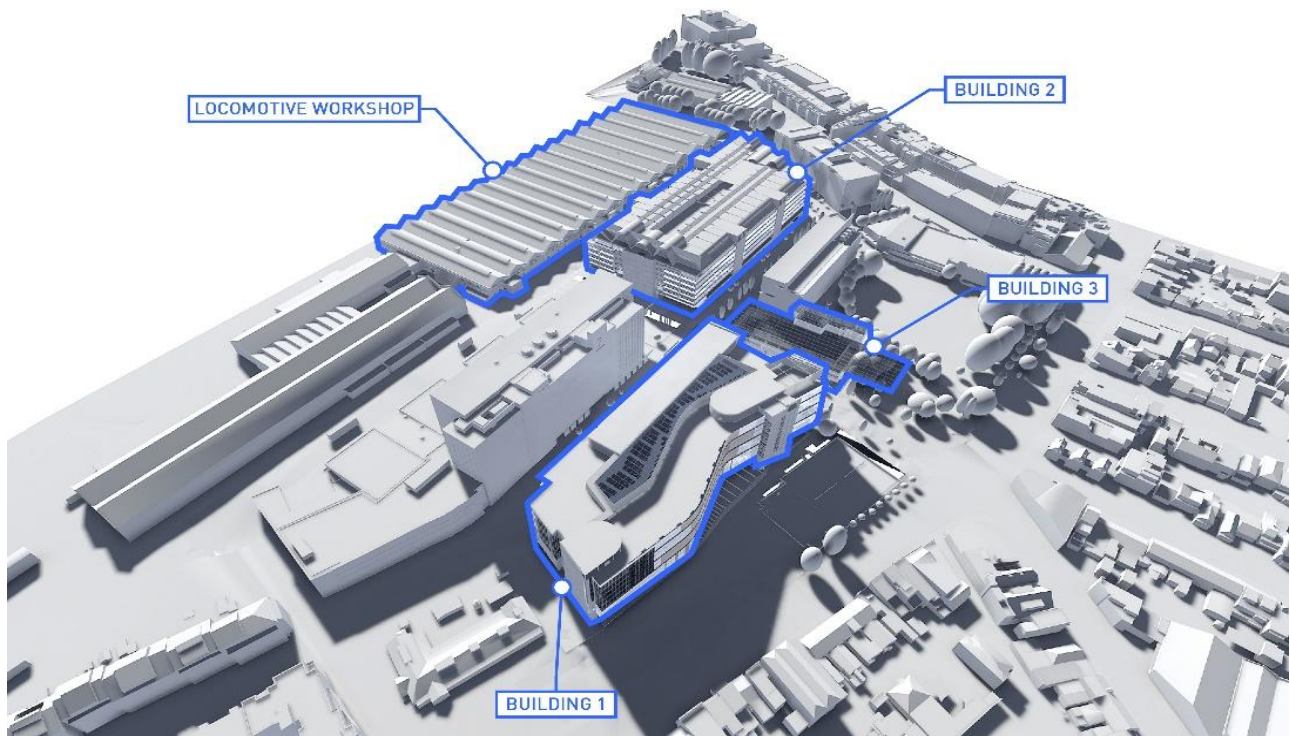


Figure 2 – Locational context of the Locomotive Workshop

1.4 Proposed Development Description

This SSDA seeks approval for the following:

- demolition of existing ‘modern’ infill fit-out elements to Bays 5-15;
- the adaptive reuse of the western portion of the Locomotive Workshop Building for ‘commercial premises’ uses including light industrial floorspace;
- construction of internal and external improvements to the Locomotive Workshop Building;
- heritage interpretation and conservation works;
- public domain improvements within the curtilage of the Building;
- 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.

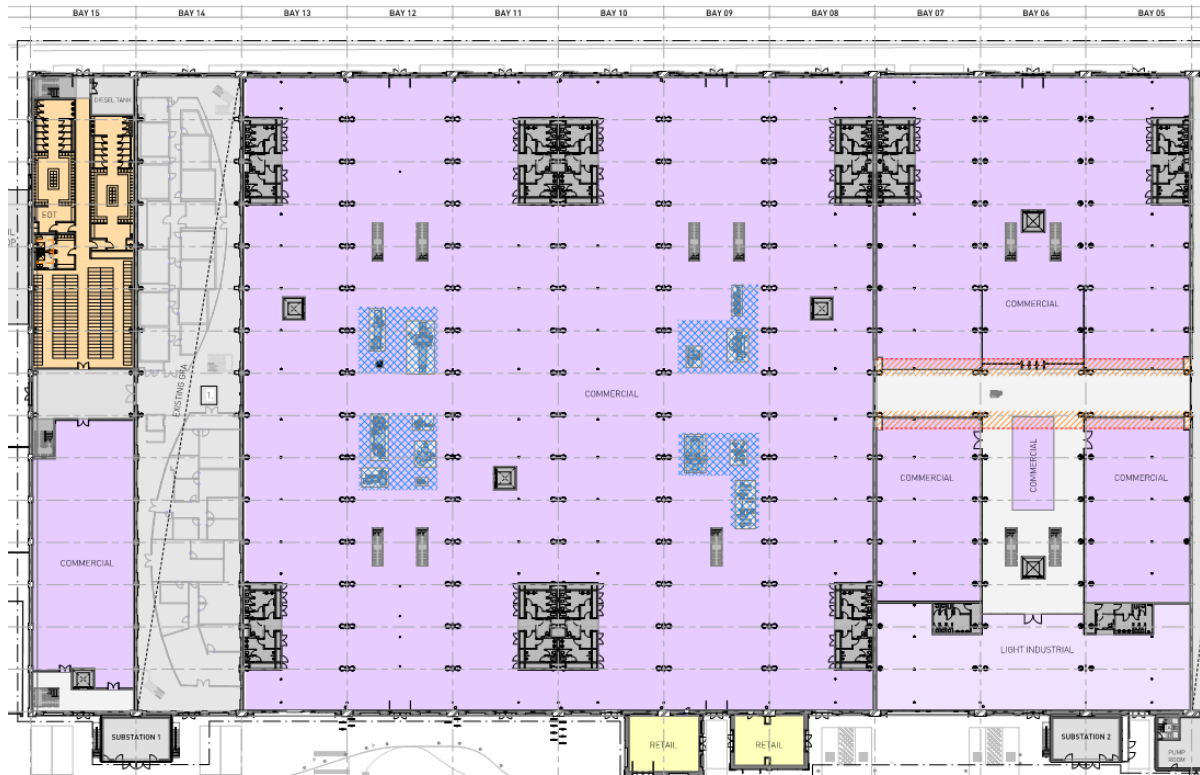


Figure 3 - Locomotive Workshop Proposed Level 00



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>
Demonstrate that the development has been assessed against a suitably accredited rating scheme to meet industry best practice;		<i>See section 2.1 & 2.2</i>
Detail the measures that would be implemented to improve environmental performance, including water and energy efficiency design and renewable energy usage.		<i>Throughout this report</i>
Description of sustainability initiatives which would reduce drinking water demand, including any alternative water supply, water conservation measures and water sensitive urban design.		<i>See section 2.2 & 2.4</i>
NCC Section J 2016		
Section J Energy Efficiency		<i>See Section 1.3.1 & 2.3.4</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 (Energy Efficiency)

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 throughout Australia.

Volume 1, Section J outlines energy efficiency provisions required for NCC class buildings (including Class 9b Gym, and Class 6 Restaurant). There are eight (8) Deemed-to-Satisfy subsections, J1 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 incorporate ESD principles into Locomotive Workshop structure. The ESD performance targets have been based on the code and guidelines as follows:

- 5 Star Green Star 'Design & As Built' v1.1 rating;
- 5 Star NABERS for Office Energy (Base Building) rating;
- 4 Star NABERS for Office Water (Whole Building) rating;
- 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

The Green Star rating system, developed by the Green Building Council of Australia (GBCA), is a holistic certification methodology and internationally recognised rating system which delivers independent verification of sustainable initiatives and outcomes through the life cycle of the development. Green Star sustainability initiatives are widely accepted as current best practice design and construction and provide an accepted methodology for comparing developments.

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 relevant Green Star certification for the Locomotive Workshop redevelopment is the Green Star Design & As-Built (v1.1) tool. The scope of the Design & As-Built rating is primarily for the design and construction of 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 groups initiatives related to certain sustainability issues and impacts, with each initiative referred to as a credit. Each credit outlines accepted best practice prescriptive and/or performance solutions to address a common issue or impact initiative that improves a project's performance in term of sustainability.

The minimum required points to achieve the targeted 5 Star rating is 60, however it is expected that a +10% contingency is targeted to achieve the 60 points in practice, therefore 66 points are expected to be targeted for the project during the design phase.

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).

A formal NABERS rating requires an Accredited Assessor to provide an accredited rating that evaluates the operational performance of a building (new or refurbished, with occupancy > 75%) using 12 months of historical data derived from energy bills and metered data.

2.2.1 NABERS Energy

There are three types of NABERS Office Energy ratings:

- Base Building Rating;
- Whole Building Rating; and
- Tenancy Rating.

The NABERS Energy rating system is a 1 to 6 star scale based on greenhouse emissions per metre of NLA.

The Locomotive Workshop redevelopment NABERS rating will be for the commercial area of the development, targeting a 5 Star NABERS Office Energy Base Building rating.

2.2.2 NABERS Water

NABERS Water for Office is a whole building rating. All sources of external water consumption being used by the office building component must be included in the rating, including the water used by base building and office tenancies. Non office use can be excluded from the rating if sub-metering is provided in accordance with NABERS metering rules.

The NABERS Water rating system is a 1 to 6 star scale based on potable water consumption per metre of NLA.

A target of 4 Star NABERS Water Office (Whole Building) has been set for the development, which will require significant water saving features including demand-side efficiencies of hydraulic fixtures and fittings, landscape irrigation and cooling tower consumption and supply-side water re-use systems to minimise potable water consumption. The rainwater collection tank, reticulation, and filtration system design will be further developed during detailed design.

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 unrequired 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;
- Selection of energy efficient IT equipment and appliances;
- Minimisation of hard scaping where possible and the utilisation of materials with low solar reflection indexes (SRI);
- Incorporation of passive design principles to improve the building envelope and reduce mechanical system heat loads and energy consumption; 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 including 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 and reduce reliance on mechanical cooling and heating and 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.

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 for toilet and urinal flushing and cooling tower water consumption. In order to further reduce potable and non-potable water consumption, the 4 Star NABERS Office Whole Building Water target for the commercial development will be a major driver for the Locomotive Workshop hydraulic design. The rainwater re-use 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, such as 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. Materials will be selected that are certified recycled or subject to a chain of custody that addresses the issue of natural resources depletion.

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. A minimum of 90% of the waste generated during construction and demolition of the development will be diverted from landfill, with monthly reporting to track progress.

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, including from after hours areas through timers and/or blinds. Light pollution from the site will be in compliance with AS4282 Control of the Obtrusive Effects of Outdoor Lighting.

All external luminaries will have an Upward Light Output Ratio (ULOR) below 5%, related to their mounted orientation, in order to reduce the impacts to wildlife.

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 consulted 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 by addressing issues including air quality, lighting, thermal and acoustic comfort with multiple benefits as a result, from an environment and occupant viewpoint.

2.7.1 Thermal Comfort

A high degree of thermal comfort will be provided to promote productivity, equivalent to at least 80% of all occupants being satisfied in the space. The thermal requirements will comply with ASHRAE 55-2013 and will ensure that the Predicted Mean Vote (PMV) levels are between -1 and +1 (inclusive).

2.7.2 Acoustic Comfort

Appropriate acoustic conditions will help maintain comfortable sound levels, reduce acoustic disruptions, and increase speech privacy. The standard AS/NZS 2107: 2000 provides criteria for reverberation time and internal noise levels, which will not exceed 5dBA in the nominated area, as measured when the space and adjacent spaces are unoccupied but ready to be occupied.

2.7.3 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.

A provision of end of trip (EoT) facilities and amenities in the development (Bay 15) will promote cycling and foot commuting options. Onsite showers, changing rooms, bicycle storage and lockers will be available for building occupants to encourage daily physical activity and reduce transport greenhouse gas emissions.

2.9 Conclusions

The Locomotive Workshop redevelopment will incorporate various energy and water efficiency and sustainability initiatives into all phases of the project as outlined in this report, which will be assessed through the industry accepted best practice certification schemes of Green Star and NABERS.

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, *NCC Section J* (2016).



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