



SSDA ESD REPORT

# Project Nerio

Lot 1, Eastern Creek Drive, Eastern Creek NSW 2766

PREPARED FOR  
Charter Hall  
Level 20, No. 1 Martin Place  
Sydney, NSW, 2000

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# SSDA ESD Report

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# 1. Introduction

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Northrop has been commissioned by Charter Hall to prepare this Ecologically Sustainable Design (ESD) and Greenhouse Gas Assessment in support of a development application SSD-30923027 for Lot 1 DP 1274322 Eastern Creek Drive.

This report is intended to provide an overview of the ESD principles and greenhouse gas and energy efficiency measures that will be implemented and is intended to form part of the Environmental Impact Statement (EIS) for the State Significant Development Application (SSDA). For the facilities officer and users to understand the sustainability initiatives, a building user's guide will be included.

Specific sustainability initiatives proposed for the facility include, but are not limited to:

- Space efficient building layout
- Water Sensitive urban design principles
- High Efficiency Electrical Systems
- Large scale on-site renewable energy generation utilized within the buildings electrical and water systems.
- Increased use of daylighting to reduce power usage.
- Installation of a rainwater capture and reuse system for all buildings on-site
- Energy Efficient heating, ventilation and air conditioning including natural ventilation to open spaces.
- Waste Minimisation strategies.

Through the implementation of the initiatives noted in this report, the project addresses, and endeavors to mitigate against negative environmental, social, and economic impacts associated with the site. Overall, the project is exceeding the targets set out in the SEARs and has set a six (6) star (Global Leadership) Green Star Design and As Built rating target.

## 1.1 Response to Secretaries Environmental Assessment Requirements (SEARs)

This report addresses how the proposed project addresses the SEARs. These requirements are outlined below alongside where the response to each can be found within this report;

Key Issue No. & Description	Issue & Assessment Requirements	How It Is Addressed	Location Within This Report
Issue 8. Ecologically Sustainable Development	Identify how ESD principles (as identified in clause 7(4) of Schedule 2 of the EP&A Regulation) are incorporated in the design and ongoing operation of the development	This ESD report details how the project aims to address ESD Principles and their incorporation into the design and ongoing operation of the project.	Section 3
	Demonstrate how the development will meet or exceed the relevant industry recognised sustainability and environmental performance standards.	The project is targeting a 6 Star Green Star Design and As Built Rating, reflective of Australian Excellence in sustainability. This rating will be certified following project completion by the Green Building Council of Australia (GBCA)	Section 5
	Demonstrate how the development minimises greenhouse gas emissions (reflecting the Government's goal of net zero emissions by 2050) and consumption of energy, water (including water sensitive urban design) and material resources.	This report outlines how the project aims to reduce energy, water, and materials use. Section 3.1.9 notes how the project will remove onsite fossil fuel use and in concert with the other measures outlined in section 3 aligns to the NSW Governments goals of net zero emissions by 2050.	Section 3.1 (Energy) Section 3.6 (Water) Section 3.4 & 3.8 (Materials/Waste)

## 1.2 Limitations

Due care and skill have been exercised in the preparation of this report.

No responsibility or liability to any third party is accepted for any loss or damage arising out of the use of this report by any third party. Any third party wishing to act upon any material contained in this report should first contact Northrop for detailed advice, which will consider that party's requirements.

All simulations and performances noted within this report are estimations only. They are based on the existing design of the facility and best practice estimation techniques. These figures are indicative only and should not be used for cost or other analysis purposes.

## 2. The Proposal

### 2.1 Project Details

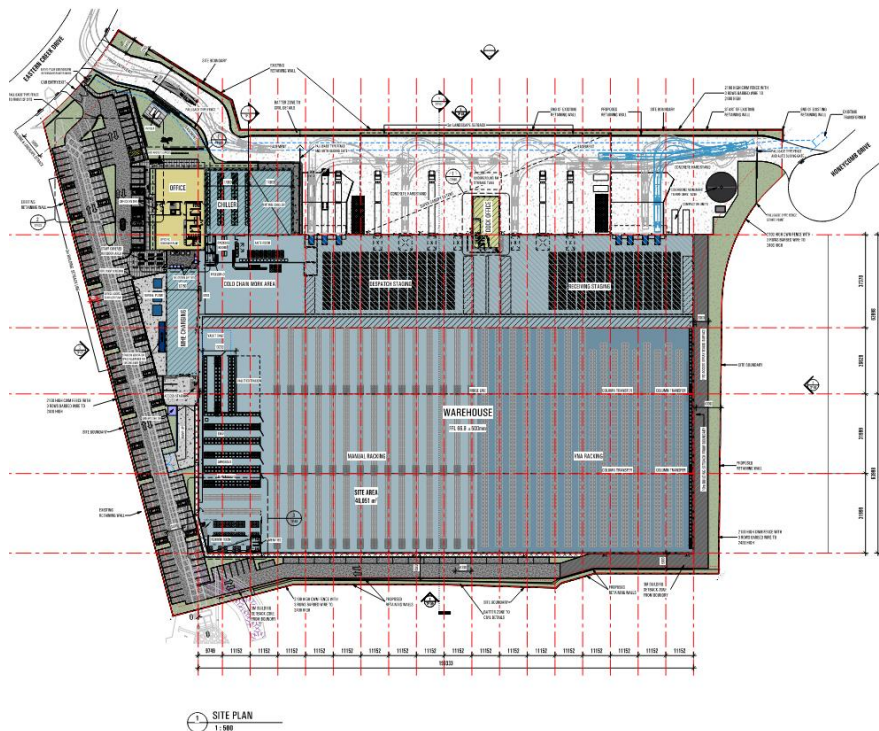
Component	Description
Project Name	Project Nerio
Address and Legal Description	Lot 1, Eastern Creek Drive, Eastern Creek 2766 Lot 1, DP 1274322
Site Area	Total area of 48,053 m <sup>2</sup>
Current Use	The site is currently an undeveloped greenfield

### 2.2 Project Description

Construction and 24/7 operation of a warehouse and distribution centre at Lot 1 Eastern Creek Drive, Eastern Creek, comprising:

- minor earthworks involving cut and fill works.
- site preparation works and servicing.
- warehouse, main office, ancillary office, dock office, loading docks, carparking, forklift charging room.
- external hardstands and landscaping;

As shown in Figure 1 below.



**Figure 1: Site Plan**



## 3. Ecologically Sustainable Development

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The following section describes how ESD principals (as defined in clause 7(4) of Schedule 2 of the Environmental Planning and Assessment Regulation 2000) are being incorporated in the design, construction, and operation phases of the project. These initiatives illustrate how the project addresses the following;

- The precautionary principle – through the implementation of environmental management and an assessment of the building's operational maintainability, the project attempts to incorporate adaptability and resilience into the project design. The concept behind the precautionary principle is to create spaces that can both; accommodate for changes, which may eventuate in the future, and avoid the risk of serious or irreversible damage to the environment.
- Inter-generational equity to ensure that the health, diversity and productivity of the environment are maintained or enhanced for the benefit of future generations – through the inclusion of zero ozone depleting refrigerants, best practice PVC and low impact paints, sealants and adhesives, alongside a focus on providing greater vegetation and support for the buildings connection with nature, the project demonstrates a strong commitment to the preservation of environmental health, diversity and productivity of the local area.
- Conservation of biological diversity and ecological integrity – through the planting of native vegetation, improvement of stormwater runoff from the site and use of integrated landscaping, the project will act to improve, conserve and support the local biological diversity and integrity.
- Improved valuation, pricing and incentive mechanisms - the design process should involve significant input from the Quantity Surveyor who will be involved ensure that the project both remains on budget and effectively considers environmental factors in the valuation of assets and services. Furthermore, the project will look at maintainability and the operational costs associated with individual design initiatives and the overall design.

Through the inclusion of the above and the sustainability initiative outlined within this report the project clearly addresses the ESD Principles into the design, construction and operation of the building as defined in clause 7(4) of schedule 2 of the Environmental Planning and Assessment Regulation 2000. Further detail of the general sustainability initiatives is outlined below.

### 3.1 Energy Efficiency:

Energy efficiency will be considered throughout the design development process with the following improvements specifically considered by the design team. It is expected that the measures outlined in the following section, alongside a large solar array, will significantly reduce the site's grid electricity demands when compared to a standard practice building.

The project will also look to minimise the use of fossil fuels, in line with Charter Hall's commitment to becoming net-zero emissions by 2030. This will be supported by a transition plan and power purchase agreements, resulting in an elimination of Greenhouse Gas Emissions from the facility 20 years ahead of the NSW Government's goal of net zero emissions by 2050.

#### 3.1.1 Natural Ventilation of Tertiary Spaces

The project incorporates significant logistic areas, and areas for circulation and vehicles, these spaces will, where achievable, be naturally ventilated or open air in the case of truck loading areas. These areas will be able to operate as naturally ventilated spaces exploiting the buoyancy of air to draw ventilation through the space. Central circulation spaces such as bathrooms and stairs will also

look to incorporate natural ventilation and the use of spill air from adjacent spaces to provide passive temperature control.

### **3.1.2 Insulation within the Warehouse Spaces**

Given the nature of the project, an allowance has been made within the design to enable air conditioning and refrigeration within the warehouse areas, and as such the project design will incorporate insulation to minimise heat gains into these spaces and provide resilience into the future as temperatures increase.

### **3.1.3 Improved building fabric and glazing performance.**

The building envelope comprises several different façade types, with the proposed scheme using a combination of light-colored metal finishes, prefabricated concrete and glazing to lower heat gains throughout summer while maintaining good daylighting throughout of the building.

The use of well-designed glazing and building materials will also assist the projects targets for energy efficiency, acoustic performance and thermal comfort.

### **3.1.4 Integration of Cool roofs**

To address heat islanding across the site and wider area, the site should incorporate cool roofing with a high Solar Reflectivity Index (SRI 82) which will minimise the buildup of heat within the material and reduce load on the HVAC system.

### **3.1.5 HVAC System Control**

The proposed HVAC system incorporates individual area controls for thermal comfort conditions within the office spaces allowing building occupants to maintain comfort conditions suitable to the use and occupancy of spaces. This system assists in optimising the sites energy efficiency while maintaining comfortable conditions.

### **3.1.6 Energy Metering and Monitoring**

An energy metering and monitoring strategy will be implemented to effectively monitor the main energy uses within the building, alongside the lighting and small power use. This aims to provide fault detection and monitoring of the different areas of the building. This will be connected to Charter Halls portfolio monitoring system with data reported and tracked to achieve their overarching energy and water performance targets.

### **3.1.7 Improved Outdoor Air Provision**

The project will aim to improve the outdoor air provided to regularly occupied spaces. This will minimise CO2 build up within the office areas and improve comfort for the building occupants.

To address energy use concerns the design will also look to incorporate on an outdoor air economy cycle which will allow the building to exploit periods where the buildings external conditions can effectively provide thermal comfort in the space reducing the run times of the air-conditioning system.

### **3.1.8 Highly efficient lighting system**

The installation of LED lighting throughout the building will assist in the minimisation of lighting energy use. Improved lighting energy also reduces the heat loads within cooled spaces and therefore lowers the energy used to condition the building. The use of efficient controlled lighting within the warehouse areas will provide a significant improvement in energy use.



### **3.1.9 Electric-Only Building**

All building systems and appliances will be electric, avoiding on-site use of gas and aligning the project to the NSW Governments Net Zero Emissions by 2050 Policy.

### **3.2 Energy Generation:**

With the above energy efficiency measures, the energy load of the facility will be reduced significantly, allowing a large portion of the sites electrical energy demand to be met through the inclusion of a large solar array. This will assist to both offset the sites energy use and minimise the sites daytime peak demand from the grid.

### **3.3 Indoor Environment Quality**

Indoor environment quality is always an important consideration in spaces that are regularly occupied such as the offices and warehouse areas. The following considerations have been considered as part of the building design:

#### **3.3.1 Daylight Access**

The design of the project has currently allowed for roof lights within the warehouse space to provide daylight penetration into the occupied spaces. The areas for these have been informed through parametric modelling to optimise the balance between daylight and thermal comfort as part of Charter Hall's Industrial Design Standards. This optimisation of roof light area will improve access to daylight throughout the building with the aim of both minimising the energy used for lighting and improving occupant connection to their external environment.

#### **3.3.2 Interior noise level control**

Internal noise levels will be actively considered with the building layout and systems design with a focus on managing internal noise levels and reverberation within the facility. The use of acoustic insulation and sound isolation will ensure that interior noise levels to be maintained below acceptable limits.

### **3.4 Material selection**

Materials selection for the project aims to improve the internal environment of the site with materials with low volatile organic compound and formaldehyde content preferred to help minimise respiratory issues for building occupants.

#### **3.4.1 Environmentally Friendly Refrigerants**

Where required, the use of Environmentally friendly refrigerants, such as hydrofluorocarbons (HFC's), will be considered within the project to minimise global warming potential and ozone depletion potential

#### **3.4.2 Low Impact**

Embodied energy will be reduced by avoiding unnecessary use of materials and procuring materials with a low carbon footprint where appropriate options are available. This will be managed in line with Charter Hall's Embodied Carbon standards for industrial projects.

### **3.5 Sustainable Transport**

#### **3.5.1 End of Trip Facilities**

End of trip facilities, including bicycle racks, will be provided to encourage walking, and cycling by staff and visitors.

### **3.6 Water Efficiency**

A strong focus has been put on the effective management of water within the building with the following initiatives being included in the design in all areas throughout the project. It is expected that these initiatives will reduce the sites potable water demand by more than 50% compared to a standard practice building.

#### **3.6.1 Water efficient fixtures and fittings**

Water Efficient fixtures and fitting will reduce the water consumption of the site. As an indication, the following should be targeted:

- Wash hand basin taps 6-star WELS
- General taps 6-star WELS
- Toilets dual flush 5-star WELS
- Urinals 0.8 L per flush 6-star WELS
- Shower heads 7-9 L per minutes 5-star WELS

#### **3.6.2 Water Sensitive Urban Design**

The project will look to incorporate a strong focus on water sensitive urban design with the external landscape design assisting to minimise water use for irrigation. The inclusion of landscaped area will also assist in the reduction of site stormwater discharge and assist in the management of the projects broader impact on urban stormwater flows.

#### **3.6.3 Rainwater capture and reuse**

A large rainwater capture and reuse system is required for installation to offset the sites water usage for washdown, toilet flushing and irrigation. This system would have the ability to offset most of the sites potable water usage.

### **3.7 Improved Ecology**

Through planting native vegetation and promoting improved interaction with the natural environment, the project will look to improve the site's ecology and minimise the ongoing environmental impact of the project. The project is currently implementing the following:

- Incorporation of a site vegetation.
- Minimisation of light spill from the facility which impacts on migratory animals and insects; and
- Reduced dissolved pollutants in stormwater discharged from the site.

### **3.8 Waste Management**

Effective waste management throughout construction and operation of the site will help to promote resource efficiency and minimise the adverse environmental impacts of the project. The following are being considered as part of the design process.

#### **3.8.1 Waste Management Plan**

A Waste Management Plan will be prepared with the following key objectives:

1. To minimise the environmental impacts of the operations of the development
2. To minimise the impact of the management of waste within the development
3. To ensure waste is managed so as to reduce the amount landfilled and to minimise the overall quantity generated

These objectives will be achieved through strategies such as the integration of recycling bins and back-of-house separation areas, which will encourage recycling and separation of cardboard/paper waste, glass, food waste and comingled recycling and general waste.

### **3.8.2 Separated Waste and Recycling Streams**

The provision of separated waste and recycling streams could allow for more effective recycling of the project's operation waste. Providing separate bins for cardboard/paper waste, glass, food wastes, comingled recycling and general waste will improve the buildings operational efficiency and result in significant environmental benefits.

### **3.8.3 Construction Waste Minimisation**

The project should look to minimise the construction waste associated with the project and can aim to divert over 90% of waste from landfill to recycling or reuse facilities.

## **3.9 Green Infrastructure**

Green infrastructure will be integrated into the project to provide urban cooling, slowing, and filtering of rainwater, climate resilience, strengthen biodiversity and improved community nature connection.

## 4. Climate Change Projections

As part of the design review the project has completed a risk assessment for the sites climate adaption risks based on the CSIRO climate change projections for Western Sydney. This risk assessment reviewed the following three elements:

- Consequence: what will be the effect of the development should the impact occur?
- Likelihood: how likely is it that the impact will occur?
- Risk Rating: what is the associated risk of the development when the likelihood of it happening is measured against the possible consequence of the impact?

Key risks posed to the site which will be addressed as part of this process and high-level issues are outlined below with comment on how these are addressed within the current design; further detail will be developed within the projects detailed design development stages.

- Changing Surface Temperatures should be addressed through the following.
  - Use of high reflectivity roofing to minimise heat gain and heat island effects.
  - Integration of solar panels to provide shading to areas of the roof and provide increased power to the site when peak energy use for cooling is required.
  - Incorporation of heating, ventilation, air conditioning (HVAC) systems designed to modulate in the event of changing outside air temperatures. Equipment will be rated to continue operating during higher temperatures.
- An increase in rainfall intensity should be managed through the following.
  - Inclusion of rainwater and stormwater storage systems to modulate flows exiting the site.
  - Ability to provide increased finished floor level (FFL) designed to be 0.30 m above freeboard requirement to account for increased flooding potential at the site.
  - Inclusion of awnings to the entry access points to promote allow continued operation during adverse conditions.
- An increase to wind speed intensity should be addressed through the following.
  - The metal roof design incorporating roof bracing to fasten the roof onto the building structure to account for increasingly strong winds on site and prevent damage to the roof due to prevailing winds.
  - Improved structural integrity to ensure that the building is not significantly impacted in the event of high intensity wind loads. This includes wind loading on loading dock awnings and doors.
- Decrease in humidity and increased drought conditions will be addressed through the following.
  - Increased capacity within the fire safety systems to assist in the management of bushfire risk associated with dryer conditions.
  - Additional non potable water supply for irrigation needs and the integration of native and drought tolerant vegetation.

Overall, the current design incorporates significant measures to address key projections for climate change in the near term. The project will incorporate further initiatives to address all high and extreme risks posed to the site as per the Climate Adaption Credit within the targeted Green Star rating.

## 5. Green Star Design & As-Built v1.3

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### 5.1 Overview

The Green Building Council of Australia's provides an internationally recognised system to assess sustainable outcomes throughout the life cycle of the built environment. It was developed by the Australian Building Industry through the Green Building Council of Australia (GBCA), which is now the nation's leading authority on sustainable buildings and communities.

This section provides a summary of elements drawn from the Green Star tool that may be applied at the proposal.

The Green Star system incorporates ESD principals across nine major categories:

- Management
- Indoor Environment Quality
- Energy
- Transport
- Water
- Materials
- Land Use and Ecology
- Emissions
- Innovation

It is noted that a **Certified Six (6) Star Green Star Design & As-Built v1.3 Rating** is being targeted.

### 5.2 Management

The credits within the Management category promote the adoption of environmental principles from project inception, design, and construction phase, to commissioning, tuning and operation of the building and its systems. The following credits are currently being targeted:

- 1.1 Green Star Accredited Professional
- 2.0 Environmental Performance Targets
- 2.1 Services & Maintainability Review
- 2.2 Building Commissioning
- 2.3 Building Systems Tuning
- 2.4 Independent Commissioning Agent
- 3.1 Implementation of a Climate Adaptation Plan
- 4.1 Building Information
- 5.1 Environmental Building Performance
- 5.2 End of Life Waste Performance
- 6.0 Metering
- 6.1 Monitoring Systems
- 7.0 Environmental Management Plan
- 7.1 Formalised Environmental Management System
- 7.2 High Quality Staff Support
- 8B Operational Waste

### **5.2.1 Green Star Accredited Professional**

Northrop has been engaged with as the Green Star Accredited Professional to provide advice, support and information related to sustainability principles and processes, at all stages of the project.

### **5.2.2 Environmental Performance Targets**

The project team will set and document environmental performance targets for the project. This will involve the detailed targeting of energy and water consumption at a minimum, which will be measured through the metering and monitoring system.

### **5.2.3 Services and Maintainability Review**

The project team will perform a comprehensive services and maintainability review led by the head contractor or the owner's representative (or the Independent Commissioning Agent) during the design stage and prior to construction.

The services and maintainability review will include input from the design team, the facilities manager and operations staff, and any relevant suppliers and subcontractors. The review looks to address the following aspects of the project:

- Commissionability;
- Controllability;
- Maintainability;
- Operability, including 'Fitness for Purpose'; and
- Safety.

### **5.2.4 Building Commissioning**

The project team will demonstrate that the pre-commissioning and commissioning activities have been performed based on the approved standards and guidelines. This will involve an air permeability test by a suitably qualified practitioner, ensuring compliance with AS/NZS 9972:2015 Thermal Performance of Buildings. This process will also involve the development and implementation of a commissioning plan.

### **5.2.5 Building Systems Tuning**

The project will include a commitment to a tuning process for all nominated building systems. At a minimum, this includes quarterly adjustments and measurement for the first 12 months of occupation.

### **5.2.6 Independent Commissioning Agent**

An Independent Commissioning Agent (ICA) will be appointed to advise, monitor, and verify the commissioning and tuning of the nominated building systems throughout the design, tender, construction, commissioning and tuning phases.

### **5.2.7 Adaption and Resilience**

The project will consider the impacts of climate change by identifying and addressing all high and extreme risks posed over the expected lifecycle of the project based on two time scales, relevant to the project' anticipated lifespan.

### **5.2.8 Metering**

Energy and water metering will be provided, , which will be at a minimum on a floor-by-floor basis. Items with energy usages greater than 5% of annual consumption, or 100 kW, will be independently metered.



### 5.2.9 Monitoring

Energy and water systems will be monitored in the interest of achieving the energy and water performance targets defined, as well as for commissioning and tuning purposes to ensure maximum efficiency on a building scale.

### 5.2.10 Formalised Environmental Management System

A formalised systematic and methodical approach to planning, implementing and auditing will be in place during construction, to ensure compliance with the Environmental Management Plan. An Environmental Management System will be in place and independently certified to a recognised standard, such as AS/NZS ISO 14001.

### 5.2.11 High Quality Staff Support

High quality staff support practices will be in place that promote positive mental and physical health outcomes of site activities and culture of site workers. Training will be provided to enhance site workers' knowledge on sustainable practices through on-site, off-site, or online education programs.

### 5.2.12 Operational Waste

A qualified waste auditor will prepare a Operational Waste Management Plan (OWMP) for the project in accordance with best practice approaches and will be reflected in the building's design. The plan will address compliance requirements and alignment to best practice standards and will be submitted with this SMP.

## 5.3 Indoor Environment Quality

The credits within the Indoor Environmental Quality category promote the provision of high-quality interior spaces within projects. These spaces are recognised based upon their Air Quality, Lighting, Acoustic and Thermal Comfort. The following credits are currently being targeted:

- 9.1 Ventilation System Attributes
- 9.2 Provision of Outdoor Air
- 9.3 Exhaust or Elimination of Pollutants
- 10.1 Internal Noise Levels
- 10.2 Reverberation
- 10.3 Acoustic Separation
- 11.1 General Illuminance & Glare Reduction
- 12.0 Glare Reduction
- 12.1 Daylight
- 12.2 Views
- 13.1 Paints, Adhesives, Sealants & Carpets
- 13.2 Engineered Wood Products
- 14.1 Thermal Comfort

### 5.3.1 Ventilation System Attributes

The entry of outdoor air pollutants will be mitigated – building services will be designed to comply with ASHRAE standard 62.1:2013 in regard to minimum separation distances between pollution sources and outdoor air intakes

### 5.3.2 Provision of Outdoor Air

Outdoor air will be provided at a rate 100% greater than the minimum required by AS 1668.2:2012, or CO2 concentrations are maintained below 700ppm.

### 5.3.3 Exhaust or Elimination of Pollutants

At least 95% of all internally applied paints, adhesives, sealants and carpets will meet the below stipulated 'Total VOC Limits' (TVOC). Maximum TVOC limits for paints, adhesives and sealants are detailed in the table below.

**Table 1: Maximum TVOC Limits for Paints, Adhesives and Sealants**

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

To demonstrate compliance for the use of carpets all products will be certified under a recognised Product Certification Scheme or other recognised standards. Acoustic Separation

Noise transmission will be reduced between enclosed spaces within the nominated area.

### 5.3.4 Minimum Lighting Comfort

Interior lighting will be flicker free and accurately address the perception of colour in the space.

Flicker-free lighting refers to luminaires that have either:

- A minimum Class A1 & A2 ballast;
- High frequency ballasts for all fluorescent lamps; or
- Electronic ballasts in High Intensity Discharge (HID) lighting.

### 5.3.5 General Illuminance and Glare Reduction

Lighting levels will comply with best practice guidelines for Office Spaces; corresponding to Table 3.1 of AS 1680.2. and that glare is eliminated using baffles, louvers, translucent diffusers, ceiling design, or other means that obscures the direct light source from all viewing angles of occupants.

### 5.3.6 Daylight

High Levels of daylight will be provided for 60% of the nominated area, achieving a daylight factor of above 2.0% for all spaces, except living rooms and dining rooms in residential primary spaces, where threshold will be a 1.5% daylight factor.

### 5.3.7 Views

At least 60% of the nominated area will have a clear line of sight to a high quality internal or external view. All floor areas within 8m from a compliant view can be considered to meet this credit criterion. A high quality external view must extend to the outside towards natural elements such as large bodies of vegetation, a body of water, frequent movement of (people, vehicles, or animals) or sky.

### 5.3.8 Thermal Comfort

Indoor conditioned spaces will be thermally comfortable space for occupants, equivalent to 80% of all occupants being comfortable in the space.

## 5.4 Energy

The 'Energy' category aims to facilitate reductions in greenhouse gas emissions by facilitating efficient energy usage and encouraging the utilisation of energy generated by low-emission sources. The project is targeting the following credits:

- 15E.1 Greenhouse Gas Emissions Reduction - Comparison to a Reference Building Pathway
- 16B Peak Electricity Demand Reduction – Performance Pathway

### 5.4.1 Greenhouse Gas Emissions – Comparison to a Reference Building Pathway

The design target will be a 30% reduction in the predicted energy consumption and GHG emissions compared to a 2019 National Construction Code Section J compliant building.

Prediction of the building performance against this benchmark will be confirmed using building performance modelling that assesses potential energy use for base building services systems including:

- Mechanical Services
- Electrical Services
- Communications, AV and security systems
- Hydraulic Services
- Vertical Transportation Systems

### 5.4.2 Peak Electricity Demand Reduction – Reference Building

The design target will be a reduction in the annual peak electricity demand by at least 20% compared to a 2019 National Construction Code Section J compliant building.

## 5.5 Sustainable Transport

Sustainable transport criteria aim to provide design and operational measures that reduce the carbon emissions arising from occupant travel to and from the project, when compared to a benchmark building. In addition, it also promotes the health and fitness of commuters, and the increased accessibility of the location.

A Travel Plan will be provided which demonstrates an increased use of active and low emissions travel, based on the Sustainable Transport Calculator.

## 5.6 Water

The aim of this category is to encourage building design that minimises potable water consumption in operations. For this credit area, the performance pathway is currently being targeted, however the following initiatives will be included in the final development.

### 5.6.1 Sanitary Fixture Efficiency

Water use flow and flush fixtures, and appliances will achieve WELS ratings within one star of those stated in the table below.

**Table 2: Sanitary Fixture Efficiency**

Fixture / Equipment Type	WELS Rating
Taps	6 Star
Urinals	6 Star
Toilet	5 Star
Showers	3 Star (> 4.5 but <= 6.0)
Clothes Washing Machines	5 Star
Dishwashers	6 Star

### 5.6.2 Landscape Irrigation

The landscaping system will be designed to reduce the consumption of potable water required for irrigation through use of drip irrigation with a moisture sensor override. Fire System Test Water

The fire protection system will include temporary storage for 80% of the routine fire protection system test water and maintenance drain-downs for reuse on-site calculated on the basis that any single zone is drained down annually. Each floor will be fitted with isolation valves or shut-off points for floor-by-floor testing.

## 5.7 Materials

The materials category recognizes the use of building materials that are responsibly sourced or have a sustainable supply chain. The following credits are targeted:

- 19B.1 Life Cycle Impacts – Concrete
- 19B.2 Life Cycle Impacts – Steel
- 20.1 Structural & Reinforcing Steel
- 20.2 Timber Products
- 20.3 Permanent Formwork, Pipes, Flooring, Blinds and Cables
- 21.1 Product Transparency & Sustainability
- 22B Construction & Demolition – Percentage Benchmark

### 5.7.1 Concrete

At least 50% of the mix water used for all concrete are either captured or reclaimed water, and at least 40% of coarse aggregate in the concrete will be crushed slag aggregate or another alternative material, or at least 25% of fine aggregate (sand) inputs in the concrete will be manufactured sand or other alternative materials.

### 5.7.2 Steel

The mass of reinforcing bar and mesh used in concrete reinforcement in the building structure will be reduced by at least 5% when compared to standard practice.

### 5.7.3 Structural & Reinforcing Steel

95% of the building's steel (by mass) will be sourced from a Responsible Steel Maker; and at least 60% (by mass) of all reinforcing bar and mesh will be produced using energy-reducing processed in its manufacture (measured by average mass by steel maker annually).

### 5.7.4 Timber Products

At least 95% (by cost) of all timber used in the building and construction works will be certified by a forest certification scheme that meets the GBCA's 'Essential' criteria for forest certification or will be from a reused source.

### 5.7.5 Permanent Formwork, Pipes, Flooring, Blinds and Cables

Of all permanent formwork, pipes, flooring, blinds and cables, 90% (by cost) will not contain PVC or will meet GBCA's Best Practice Guidelines.

### 5.7.6 Product Transparency & Sustainability

At least 1% of all materials used in the project will meet transparency and sustainability requirements under one of the following initiatives: A. Reused Products; B. Recycled Content Products; C. Environmental Product Declarations; D. Third-Party Certification; or E. Stewardship Programs.

### 5.7.7 Construction and Demolition Waste – Percentage Benchmark

This project will target 90% of the waste generated during construction and demolition being diverted from landfill, excluding excavation waste and hazardous waste.

## 5.8 Land Use and Ecology

The 'Land Use & Ecology' category aims to reduce the negative impacts on sites' ecological value because of urban development and reward projects that minimise harm and enhance the quality of local ecology. The following credits are currently being targeted:

- 23.0 Endangered, Threatened or Vulnerable Species
- 24.0 Conditional Requirement
- 25.0 Heat Island Effect Reduction

### 5.8.1 Endangered, Threatened or Vulnerable Species

At the date of site purchase or date of option contract, the project site did not include old growth forest or wetland of 'High National Importance' or did not impact on 'Matters of National Significance'.

### 5.8.2 Heat Island Effect Reduction

At least 75% of the whole site area will comprise of one or combination of vegetation; green roofs; light coloured roof SRI >64.

## 5.9 Emissions

The 'Emissions' category aims to assess the environmental impacts of 'point source' pollution generated by projects. Negative impacts commonly associated with buildings include damage to the environment through refrigerant leaks or disturbances to native animals and their migratory patterns as a result of light pollution. The following credits are currently being targeted by the project:

- 26.1 Stormwater Peak Discharge
- 26.2 Stormwater Pollution Targets
- 27.1 Light Pollution to Night Sky

### 5.9.1 Stormwater Peak Discharge

The project is aiming to achieve a post-development peak event discharge from the site which does not exceed the pre-development peak event discharge using the design Average Recurrence Interval (ARI) that corresponds to the associated flooding risk identified in the Climate Change and Adaption Assessment.

### 5.9.2 Stormwater Pollution Targets

All stormwater discharged from the site will meet the pollution reduction targets in the table below.

**Table 3: Minimum Pollution Reduction Targets**

Pollutant	Reduction Target (% of the Typical Urban Annual Load)
Total Suspended Solids (TSS)	90%
Gross Pollutants	95%
Total Nitrogen (TN)	60%
Total Phosphorus (TP)	70%
Total Petroleum Hydrocarbons	90%
Free Oils	98%

### 5.9.3 Light Pollution to Night Sky

Outdoor lighting will be designed to achieve control of upward light output ratio (ULOR) by demonstrating that no external luminaire on the project has a ULOR that exceeds 5%, relative to its actual mounted orientation.



## **5.10 Innovation**

The 'Innovation' category aims to recognise the implementation of innovative practices, processes and strategies that promote sustainability in the built environment. The following credits are currently being targeted for the project:

- 30A Innovative Technology or Process – On-site Renewable Energy
- 30C Improving on Green Star Benchmarks – Stormwater Pollution Targets
- 30D Innovation Challenge – Financial Transparency

### **5.10.1 On-site Renewable Energy**

The installation of a large scale PV solar array on site will significantly reduce energy consumption of the development past Green Star benchmarks, and is considered innovative.

### **5.10.2 Improving on Green Star Benchmarks**

The project will achieve additional points for exceeding the stringent requirements for credit achievement in several areas. The project will achieve additional points for achieving additional reductions in pollution load targets through the stormwater systems.

The project will also exceed Green Star Benchmarks through the use of ultra-low VOC paints for at least 50% of paint (by volume) and through the provision of a bicycle maintenance station will increase the support for sustainable transport and exceed the sustainable transport goals set out in the Green Star Framework.

### **5.10.3 Innovation Challenge**

The project is also looking to innovate on current construction methods and will be targeting points for meeting challenges set out by the Green Star Framework. The project will be looking to provide financial transparency, by providing to the GBCA extensive details regarding the costs of construction and management of the project. Furthermore, the project will also look to ensure that the temporary site office is high performance, minimising operational energy usage during construction and reducing the carbon footprint of the project.

## 6. Conclusion

This report has addressed the ESD and Greenhouse Gas requirements to support the SSDA for the Development of Lot 1 – Eastern Creek Drive

Specific sustainability initiatives proposed for the building include, but are not limited to:

- Space efficient building layout.
- Water Sensitive urban design principles
- High Efficiency Electrical Systems
- Large scale on-site renewable energy generation
- Increased use of daylighting to reduce power usage
- Installation of a rainwater capture and reuse system for all buildings on-site
- Energy Efficient heating, ventilation and air conditioning including natural ventilation to open spaces.
- Waste Minimisation strategies.

Overall, through the implementation of the initiatives noted within this report the project clearly demonstrates the site's commitment to ESD principles throughout the design, construction, and operation. Additionally, the project design team has worked to optimise the sites energy performance, address key climate related risks posed to the site, and align to the NSW Government's commitment to carbon neutrality by 2050.

Additionally, through the project's commitment to Green Star and an outcomes focused approach to sustainability the project commitments exceed the required ESD measures required under the site-specific SEARs and demonstrate Global Leadership in sustainability.