# Sustainability Report for SSDA

## 220362 REDFERN NORTH EVELEIGH – CHIEF MECHANICAL ENGINEER'S BUILDING

**Client**:
Transport for NSW

**Revision**:
B

**Date**:
09/12/2022

## REPORT INFORMATION

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|---|---|
| **Project** | Redfern North Eveleigh – Chief Mechanical Engineer's building |
| **Title** | Sustainability Report for SSDA |
| **Client** | Transport for NSW |
| **Revision** | B |
| **Revision Date** | 09/12/2022 |
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## REVISION SCHEDULE

| Revision | Date | Issue Name | Author | Authorised |
|---|---|---|---|---|
| A | 05/12/2022 | For Information | PI | MW |
| B | 09/12/2022 | For Issue | PI | MW |

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# 1 Executive Summary

This report has been prepared by LCI consultants for the proposed refurbishment of the Chief Mechanical Engineer's building (CME) at Redfern North Eveleigh precinct. This Report provides an overview of the Ecological Sustainable Design (ESD) initiatives considered and to address the ESD requirements of the Secretary's Environmental Assessment Requirements (SEARs). This report will be included within the Environmental Impact Statement (EIS) that will accompany a State Significant Development Application (SSDA).

# 2 Introduction

This report supports State Significant Development (SSD) Development Application (DA) No. SSD-39971796 for the heritage conservation and adaptive reuse of the former Chief Mechanical Engineer's Building (CME Building) in North Eveleigh, which is submitted to the Minister for Planning pursuant to Part 4 of the *Environmental Planning and Assessment Act 1979* (EP&A Act).

Transport for NSW is the proponent for the SSDA.

# 3 Site Description

The site comprises the former CME Building (Figure 1) and immediate surrounds (Figure 2). The site is identified as 505 Wilson Street, and forms part of Lot 5 in Deposited Plan 1175706.

Originally constructed in 1887 and subsequently extended to keep pace with the expansion of the NSW railways and demand for engineering services, the CME Building is of State heritage significance. The CME Building is listed on the NSW Heritage Register (SHR No. 5014147) and Transport for NSW's s170 Register. The statement of significance provided on the NSW Heritage Inventory outlines the significance of the site:

> The building is a very fine late Victorian railways office on a scale above all other such structures in the State. The building reflects the importance of the railway engineers in the development of the State and its closeness to the Eveleigh workshops (mainly under the control of the Mechanical Branch) indicates the confidence in railway construction. The building is in a style not often seen in Sydney and is a rare survivor. More often this form of building is in evidence in the country where the pressure of development is less. It is an important element in the town and streetscape of Wilson St, Redfern, particularly to close proximity to the railway workshops.

The CME Building is located within the Redfern North Eveleigh Precinct (Figure 3). The Redfern North Eveleigh Precinct is located within the wider Redfern-Waterloo Authority Sites SSP. The Redfern North Eveleigh Precinct is 10 hectares of land owned by Transport Asset Holding Entity (TAHE) at the southern edge of Redfern Station, located between the rail corridor and Wilson Street.

The Redfern North Eveleigh Precinct, including the CME Building, is the subject of an approved Part 3A Concept Plan (MP08_0015) which continues to apply to the land pursuant to Schedule 2 of Environmental Planning and Assessment (Savings, Transitional and Other Provisions) Regulation 2017. Transport for NSW is currently preparing a SSP Study for the Paint Shop Sub-Precinct within the wider Redfern North Eveleigh Precinct, which was exhibited between 26 July and 25 August 2022. It is noted that the SSP Study indicates that the Concept Approval would be surrendered should rezoning of the Paint Shop Precinct occur.


*Figure 1: Site plan – Chief Mechanical Engineer's Building (existing), viewed from Wilson Street*


*Figure 2: Site plan – Aerial showing extent of works, Source: Nearmap/Ethos Urban*

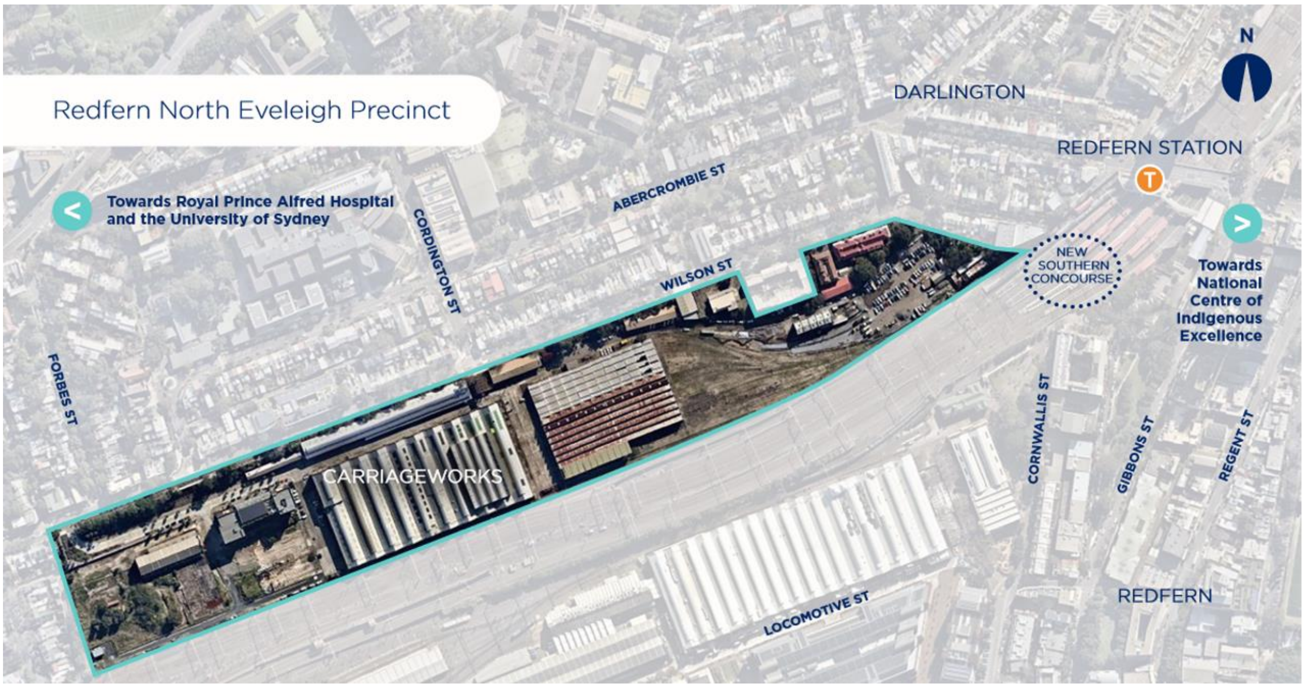


*Figure 3: Redfern North Eveleigh Precinct (CME Building outlined in red), Source: TfNSW*

## 3.1 Overview of Proposed Development

The application seeks consent for the heritage conservation and adaptive reuse of the CME Building, which includes:

- Internal and external heritage conservation works to make the building suitable for adaptive reuse, including painting, repairs and refurbishment of the existing building (primarily internally) and installation of services to support future usage for offices or the like.
- Building upgrades to ensure compliance with the Building Code of Australia, including accessibility and fire safety requirements.
- Removal of any hazardous building materials; and
- Minor landscaping works.

No significant additions (except those necessary to facilitate suitable access and fire egress) or substantive demolition of external heritage fabric is envisaged as part of the project. Internal changes comprise the removal of some internal walls and alterations to building fabric to create suitable spaces and compliant paths of travel.

## 3.2 Assessment Requirements

The Department of Planning and Environment have issued Secretary's Environmental Assessment Requirements (SEARs) to the applicant for the preparation of an Environmental Impact Statement for the proposed development. This report has been prepared having regard to the SEARs as follows:

- Ecological Sustainable Design (ESD) initiatives

## 3.3 Ecologically Sustainable Development (ESD) Requirements

| SEAR | |
|---|---|
| **9. Ecologically Sustainable Development (ESD** | **Report Reference** |
| Identify how ESD principles (as defined in section 193 of the EP&A Regulation) are incorporated in the design and ongoing operation of the development. | Refer to **Section 5.0** in response to Section 193 of the EP&A Regulation |
| Demonstrate how the development will meet or exceed the relevant industry recognised building sustainability and environmental performance standards. | See **Section 4.0** for how the project has incorporated ESD in the design, construction, and operation of the development.<br>See **Section 6.0** for details regarding the proposed ESD initiatives |
| 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. | See **Section 4.0** for details regarding the proposed Energy and GHG emissions reduction strategies. These strategies will contribute to the Government's goal of net zero emissions by 2050 by reducing the demand side consumption (building energy demand) and supporting transition to full electrification and elimination of fossil fuel (except for minor use i.e., backup diesel generator).<br><br>Refer to **section 6.0** for initiatives relating to water conservation and site treatments.<br><br>Refer **Section 6.2** for details relating to Water Sensitive urban design as part of the broader DRAFT Paint Shop Sub Precinct Design Guide July 2022.<br><br>Refer **section 6.3** for initiatives on material resources |

# 4 Overall Ecological Sustainable Design Strategies

It is noted that CME is a part of the Paint Shop Sub Precinct master plan, and the main precinct has established a sustainability design guide for the broader precinct redevelopment. The Paint Shop sub-precinct aims to target a Green Communities rating for the public realm between the buildings and rating those Buildings to 5-Star Green Star. The design guide has laid out sustainable objectives to be met by the individual buildings within the precinct redevelopment.

It is crucial to consider the heritage nature and the limitations of the Chief Mechanical Engineer's building development. It is challenging to evaluate this heritage building against the same sustainability framework used for a typical new build standard construction. Thus, the sustainable strategies reviewed for this development focuses on specific considerations and opportunities the heritage building can address without disturbing its heritage character, façade and constraints.

The building structure has withstood the test of the environment for about 100 years, with only a restoration project undertaken in 2016 to maintain the heritage fabric and character of the building. Therefore, there is a limitation on any treatment or upgrade to the building envelope. The project design will instead focus on a highly efficient mechanical system to reduce energy use and greenhouse gas emissions. The Chief Mechanical Engineer's building will consider opportunities for fossil fuel-free building services systems aiming for complete electrification. By transitioning away from gas use, it will then be possible for Transport for NSW to procure 100% renewable energy at some future point and achieve Net Zero Carbon in operation.

The sustainability strategies are guided by the Green Star and NABERS rating schemes discussed in section 4.2. The project has already initiated the application for the Green star certification. Further, since Transport NSW is a government agency that is a proponent of the development, it is required to meet the NSW Government Resource Efficiency Policy (GREP), which requires a NABERS rating once the building is fully occupied and operational.

### 4.1.1 Sustainability NSW Government Resource Efficiency Policy (GREP)

The NSW government agencies are required to meet the NSW Government Resource Efficiency Policy GREP Requirements. The aim of the NSW Government Resource Efficiency Policy (GREP) is to reduce the NSW Government's operating costs and lead by example in increasing the efficiency of the resources it uses.

Under the GREP requirements the Chief Mechanical Engineer's building must target:

- 5 Star NABERS Office (Without Green Power)
- 4 Star NABERS Water

## 4.2 Framework to Reflect Best Practice Sustainable Design Principles

The Chief Mechanical Engineer's Building redevelopment will consider undertaking the following Sustainable performance standards.

### 4.2.1 NABERS Energy

NABERS Energy is a well-established and popular rating scheme that compares energy consumption of select buildings using a clear standardized methodology and a well-maintained database of ongoing operational energy consumption. In this instance, a NABERS Energy Office rating would be applicable. It is administered by the NSW Office of Environment and Heritage (NSW OEH) and has clear and transparent rules that are followed by certified assessors. Like Green Star, NABERS follows a 0 to 6 Star range with 0.5 Star increments.

Since NABERS is based on measured operational performance, the rating cannot be formally achieved until the building is fully occupied but the project will be designed to be capable of achieving at least a 5 Star rating based on typical operation.

### 4.2.2 NABERS Water

Like NABERS Energy, the NABERS Water Rating scheme is well understood by the market and regularly used by building owners, even though there is no compulsory reporting requirement. The building will be designed to achieve a high NABERS Water rating with sufficient metering to identify leaks and water efficient fixtures and landscape irrigation systems.

### 4.2.3 Green Star Buildings v1

In line with broader precinct commitments, the Chief Mechanical Engineer's building Redfern will target the Green Star Buildings v1 rating tool as a framework to guide the project in aligning with 'Australian Best Practice' and targeting initiatives that exceed relevant industry sustainability and environmental performance standards, such as the National Construction Code 2019 Section J Energy Efficiency Provisions.

The Green star Buildings rating system provides a framework to assess how a building reduces its impact on the environment while meeting the economic and social needs for its occupants and surrounding communities. Green Star's goal is to "lead the sustainable transformation of the built environment", by encouraging practices that:

- Reduce the impact of climate change
- Enhance health & quality of life
- Restore and protect our planet's biodiversity and ecosystems
- Drive resilient outcomes for buildings, fit outs, communities, and homes
- Contribute to market transformation and a sustainable economy.

The Green Star Design Buildings v1 rating system assessing buildings through the following categories:

- Responsible
- Healthy
- Resilient
- Positive

- Places
- People
- Nature
- Leadership

Points are awarded for a building project's ability to secure as many credits as possible from each category. Each credit targets the environmental impact of a specific design feature. The total number of points awarded determines if the level of certification (star rating) as shown in figure 4.


*Figure 4: Green Star Buildings v1 – Rating Scale*

# 5 SEAR 8 | Ecologically Sustainable Development (ESD)

## 5.1 Section 193

The ESD principles that are to be incorporated into the proposed development must be aligned with Section 193– Environmental Planning & Assessment Regulation (2021).

### 5.1.1 The Precautionary Principle

The proposed Chief Mechanical Engineer's (CME) building will be a refurbishment project and therefore should not have any new adverse environmental impact and therefore alleviates concern of serious or irreversible environmental damage. Proactive measures to prevent environmental degradation have been included within the renovation, construction, and operational phases of the proposed development. During the design and construction phases the main contractor will be required to implement an Environmental Management System that follows NSW Environmental Management System Guidelines. The project will target sustainability initiatives that will drive efficient operation of the building, which ensures environmental risks are actively managed across the site.

### 5.1.2 Inter-Generational Equity

To uphold inter-generational equity, the proposed development minimises the consumption of energy and water resources while reducing waste.

The ESD principles incorporated into the proposed Chief Mechanical Engineer's (CME) building will be the conservation of energy and water resources through energy and water efficiency measures. Energy reduction has been considered in the design of the building, through passive and active measures. The reduction in water use has been considered through high WELS equivalent water fixtures and fittings, low water demand landscaping and use of non-potable water sources (harvested rainwater) where appropriate.

Waste generated during the construction and operational phases will be diverted from landfill to be recycled. An Environmental Management System (EMS) will be utilised to throughout construction. Operational waste streams will be separated to maximise waste diversion and recycling once the building is occupied.

Reducing energy, water and waste ensures that the health, diversity, and productivity of the environment is maintained for the benefit of future generations.

### 5.1.3 Conservation of Biological Diversity and Ecological Integrity

The project's ESD principles to reduce energy, water and waste consumption have an indirect impact to conserve biodiversity and ecological integrity to the surrounding area. By minimising demand on energy and water resources, the pollution generated from the Chief Mechanical Engineer's (CME) building Centre to support the surrounding area will be minimised. The redevelopment of the Chief Mechanical Engineer's building will minimise the building's light pollution. In addition, the project development does not impact any land of high biodiversity value.

### 5.1.4 Improved Valuation

The redevelopment of the Chief Mechanical Engineer's building will revitalise an ageing asset and bring it up to modern standards of energy efficiency and comfort. Construction costs will be lower in comparison to a similar new building by retaining and reusing existing fabric. Modern HVAC and lighting equipment will be cheaper to run than old ageing plant and therefore lower greenhouse gas emissions.

### 5.1.5 NCC 2019 Section J

As instructed, no changes or updates can be made to the heritage envelope, so NCC 2019 Section J requirements will be followed wherever possible.

The design of the project will be designed to meet or exceed the NCC Section J 2019 (Energy Efficiency Provisions) and benchmarked against relevant industry sustainability rating tools/frameworks guidelines which will provide environmental goals for the project. Project requirements stipulate design teams are contractually required to deliver targeted ESD initiatives for the project.

# 6 Sustainable Design Strategies

Considering the heritage nature of the building and noting the limitations of the building development the following sustainable strategies are reviewed for the development of Chief Mechanical Engineer's Building. The strategies are guided by the Green Star and NABERS rating and can be addressed through the categories outlined within the respective sustainability rating system framework.

## 6.1 Energy

The purpose of energy reduction is to reduce greenhouse gas emissions. In order to have an energy efficient building the strategies considered for this project are as follows:

- Mixed Mode ventilation mechanical system.
- Highly energy efficient mechanical system under MEPS guidelines.
- Targeting fossil fuel free operation using all-electric systems like heat pumps for both heating and domestic hot water. No gas will be used in the building for heating, hot water generation or cooking.
- Transition to full renewable energy to reduce the building's greenhouse gas emissions as much as possible.
- Application of energy efficient measures like LED lighting for internal and external spaces with motion sensors.
- A Net Zero action plan will be developed for the building's on-going operation to operate as net zero carbon.

## 6.2 Water

For water conservation and efficient use of water the strategies that will be reviewed for the project are:

- Low flow water fixtures having high WELS rating system.
- Undertaking Water sensitive urban design strategies (**WSUD**) like rainwater harvesting integrated into the broader stormwater strategies for the broader precinct as per DRAFT Paint Shop Sub Precinct Design Guide July 2022.
- The harvested rainwater will be treated and reused for Irrigation.
- The stormwater plan to consider reducing the average annual stormwater discharge.

## 6.3 Material Resources

This project provides a great environmental value due it its nature of development. Refurbishment not only reduces the construction waste but overall reduces the embodied carbon for the project life cycle by reusing existing materials. The additional strategies that will be considered for the project are:

- Undertaking upfront carbon emission analysis and life cycle assessment to measure the savings of reusing building elements.
- Materials proposed for replacement (for e.g., floor ceiling) to be procured from responsible sources.
- To consider surface finishes, planting, shading to minimise the urban heat island effect and maximise thermal comfort for the public realm.

## 6.4 Healthy

The project is designed to encourage occupant comfort and wellbeing by considering the following design strategies.

- Levels of indoor pollutants are minimised
- A high level of outdoor air is provided.
- Good lighting levels suitable for the typical tasks in each space are available using high quality LED fittings with high Colour Rendering Index (CRI).
- Acoustic design will be considered to minimise plant noise and nuisance noise sources.
- The building's engineered wood products are low in formaldehyde and paints adhesives, sealants, and carpets to be low in Total Volatile Organic Compounds and/or non-toxic.
- Currently the Chief Mechanical Engineer's building does not have a parking provision and therefore the building includes the end of trip facilities like showers and changing facilities for building occupants.
- Design to be inclusive for all physical and cognitive abilities and consider ways to make the building easy to navigate, including wayfinding, lighting, and other visual/auditory/olfactory outcomes.

## 6.5 Waste

The project design will address the waste produced during construction and the operational phase through following strategies.

- Diversion of construction and demolition waste from landfill via offsite sorting and separation by the waste contractor. The reuse of existing fabric will assist in reducing the volume of waste generated
- The building will be designed for the collection of separate waste and resource streams with a dedicated and adequately sized waste and resource storage area.

## 6.6 Resilience

The chief mechanical engineer's building has already withstood the test of the environment for about 100 years however it is important to ensure it continues to be resilient for future adaptive reuse and the changing climate. As part of broader Paint Shop Precinct, the design of the refurbishment will consider the following strategies for future proofing the building.

- Project team to consider supported services in the case of an electricity grid failure.
- Selection of roof and hard landscaping/paving finishes to maximise solar reflection to reduce heat island effect (subject to heritage constraints).
- The project will assess operational resilience against potential shocks and stresses that could influence future building operations and develop an Operations Resilience Plan.
- Through the community engagement process identify any resilience-related risks and opportunities and where appropriate incorporate elements into the design and activation strategy or ongoing operations.

### 6.6.1 Design for Climate Change Resilience.

The proposed Chief Mechanical Engineer's building (CME) project will be refurbished to future-proof itself from the potential impacts of climate change.

- The project has undertaken a Climate Change Risk and Adaptation (CCRA) workshop to identify climate change risks for the project. The mitigation strategies will be prepared during the detailed design development stage of the project.
- The design of the development is responsive with the CMIP6 climate modelling projected impacts of climate change.

CMIP6 GCMs is the most recent Intergovernmental Panel on Climate Change's Sixth Assessment Report. CMIP6 represents an advancement on earlier generations of GCMs in terms of the larger numbers of participating modelling groups, available future greenhouse gas (GHG) concentration scenarios, and with an incremental increase in spatial resolution and some improvements in the simulation of the current climate.

For the CMIP6 models, the mean temperature is projected to increase by + 1.6 degrees in the near future, and up to + 4.15 degrees in the long term. This includes an increase in both the minimum and maximum temperature. The rainfall is expected to decrease by in the near future and far future, however the number of consecutive dry days is expected to increase, showing the disparity across the annual variation. The relative humidity is expected to decrease slightly, and evapotranspiration is seen to increase.

The detailed design phase will investigate the climate change design initiatives to mitigate the effect of future climate change while maximising efficiency in energy, water and material use. The investigated mitigation strategies should allow the project to meet the difficulties predicted by the climate change projections while maintaining occupancy comfort and operational efficiency.

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