Sustainability Management Plan

250806 CAULFIELD GRAMMAR SHELFORD SPORTS

Client:
Co-Op Studio

Revision:
D

Date:
31/03/2026

REPORT INFORMATION

Project	Caulfield Grammar Shelford Sports
Title	Sustainability Management Plan
Client	Co-Op Studio
Revision	D
Revision Date	31/03/2026
Prepared By	LCI Consultants Melbourne Office Level 17, 242 Exhibition Street Melbourne, VIC 3000
ABN / ACN	92 124 107 973 / 124 107 973
Author	Thorsten Padeffke

REVISION SCHEDULE

Revision	Date	Issue Name	Author	QA	Authorised
A	13/03/2026	Draft for Review & Comment	TP		TP
B	19/03/2026	Client comments addressed	TP	IL	TP
C	31/03/2026	Final	TP		TP

CONTENTS

ACKNOWLEDGEMENT OF COUNTRY

LCI acknowledges the Wadawurrung people as the Traditional Owners and original custodians of the land, on which this project is being built, and Wurundjeri Woi-wurrung and Bunurong / Boon Wurrung peoples of the Kulin as the Traditional Owners of the land where our office sits. We pay our respects to Elders past, present and emerging and we celebrate the stories, culture and traditions of all Aboriginal and Torres Strait Islander People.

LCI commissioned Emma Stenhouse to create this unique art piece. Under one sky, this bespoke artwork narrates the invigorating and inspiring story of LCI.

1 Executive Summary

LCI has been commissioned by Co-Op Studio to formulate a sustainability strategy for the proposed new Caulfield Grammar School Sports Facility at their Shelford campus, with the intent to deliver a facility that exceeds the sustainability requirements of a typical modern equivalent facility.

This Sustainability Management Plan (SMP) identifies the objectives and the City of Glen Eira's sustainability requirements for the proposed facility and provides a compliant response to each.

To ensure a holistic approach that addresses all aspects of sustainability, the proposed development is being assessed against the Green Star Buildings v1 tool, targeting a 4-star equivalence.

The Green Star pathway assesses sustainability initiatives under the following eight Green Star categories:

- **Responsible** – initiatives that ensure the building is designed, procured, built, and handed over in a responsible manner.
- **Health** – Indoor Environment Quality initiatives that centre around occupant health and wellbeing.
- **Resilient** – addressing risks that threaten the short- and long-term performance of the building.
- **Positive** – the reduction or elimination of emissions caused by the development.
- **Places** – integration of the building into the urban fabric with the intent to increase social cohesion, activity and placemaking while reducing transport-related emissions.
- **People** - addressing the social health of the community through consideration of diversity & gender equity, inclusion, and mental health.
- **Nature** – reducing the impacts to nature whilst bringing nature and biodiversity back into cities.
- **Leadership** - the implementation of innovative practices, processes, and strategies

The project is currently targeting 34 points, significantly exceeding the 4-star threshold of 15 points. An additional 3 points are earmarked for further investigation (TBC points). This strategy ensures a good buffer, exceeding the 15-point threshold for a 4-star certification by > 200%.

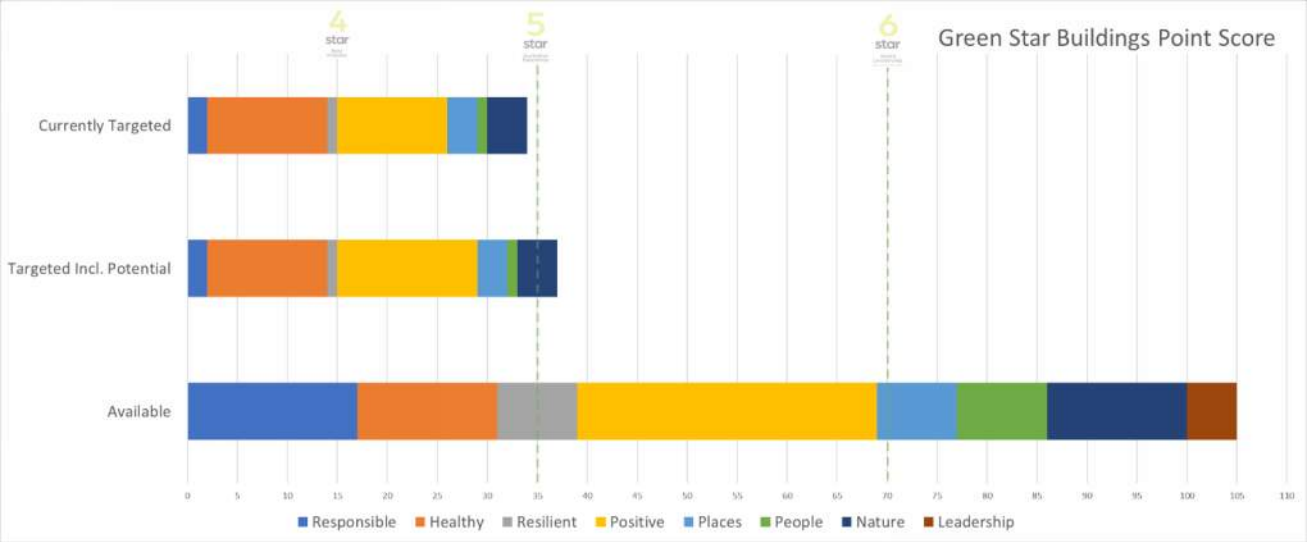


Figure 1 – Current Green Star Score

2 Introduction

2.1 Project Details

This SMP covers the proposed development of the new Sports facility. The works include the demolition of the existing pavilion and two of the four multi-purpose courts currently on site.

Project Details	
Project Name	Caulfield Grammar School, Shelford Campus Sports Facility
Project Address	3 Hood Crescent, Caulfield VIC 3161
NCC Climate Zone	Climate Zone 6
Relevant Code	NCC 2022 Volume 1
Building Classification	Class 9b
Site Area	3,200.7 m^2 (4,818 m^2 less 1,617.5 m^2 existing court)
Proposed Building Footprint	1,283.5 m^2
Proposed Soft Landscape	~841.4 m^2 (17.5%)

Table 1 – Building overview

Figure 2 – Site extent highlighted

2.2 Sources of Information

The scope of the analysis is based on the below listed project documentation which was current at the date of this report.

Document No.	Title	Date	Revision
100402-A101	Site Plan	-	-
100402-SK003	General Arrangement Plan – Option 3	-	-
100402-A401	Elevations	-	-
SK100	Landscape Site Plan	20/01/2026	P1
MEL25155	Building Services CD report	29/10/2025	01
295983-C001	Stormwater Concept Arrangement	Nov 2025	P3

Table 2 - Summary of documentation used in the assessment

Figure 3 – Entry, West Elevation

3 ESD Strategy

3.1 Sustainability Vision and Commitment

Caulfield Grammar School's Sustainability Vision for the Shelford Sports Facility is to create a high-performance, environmentally responsible, and educationally transformative space that reflects the school's commitment to reducing emissions, integrating environmentally sustainable design, and fostering student connection with nature. The facility will embrace principles demonstrated across existing CGS initiatives—such as renewable energy generation, water harvesting, low-impact materials, and biophilic, wellbeing-focused design—to align with the school's broader sustainability strategy and pathway toward net-zero emissions. It will serve not only as a resilient, efficient, and future-ready sports environment, but also as a living learning platform that empowers students to engage with sustainable systems and strengthens the school's leadership in sustainable education.

3.2 ESD Principles

Sustainability is an imperative throughout the entire design process, considering environmental and social impacts, value for money, capital cost and operational costs. The design team also ensures that the proposal fully complies with selected sustainability assessment tools as per the requirements of the local city council.

The following principles have influenced the decision-making process in the early design process and shall guide the design throughout the remaining stages:

3.2.1 First: Passive Design

The development adopts best-practice passive design principles to minimise operational energy and water demand while maintaining a high level of Indoor Environment Quality (IEQ). This Fabric First or Passive First approach prioritises building performance through form, orientation and envelope design, ensuring long-term relevance and resilience to future climate change, natural events and other adverse conditions.

3.2.2 Second: Equipment Efficiencies

Once an appropriate balance between building energy demand (including heating, cooling and lighting), water consumption and IEQ has been achieved, attention is directed toward the efficiency and emissions performance of building systems and equipment. Energy assessments place primary emphasis on operational carbon emissions rather than energy consumption alone, ensuring system selection supports long-term decarbonisation outcomes.

3.2.3 Third: Financial Viability

Where practicable, sustainability initiatives are assessed for capital cost, operational and maintenance expenses, and end-of-life implications. Payback periods of up to 15 years are generally considered acceptable for most energy-related systems. Water efficiency initiatives may present longer payback periods, in some cases extending beyond economic life; however, they are still evaluated for their wider benefits, including reduced energy use and associated carbon emissions.

3.3 Key Performance Indicators

The Shelford Sports Facility will be delivered in alignment with Caulfield Grammar School's commitment to achieving a 4-star Green Star Buildings rating, ensuring the project meets national Best Practice benchmarks in sustainability, resilience, and occupant wellbeing. The following key performance indicators reflect the mandatory and targeted outcomes identified in the Green Star pathway for this project.

- Green Star Equivalence: Achieve a minimum 4-Star Green Star Buildings equivalence, with points significantly above the certification baseline.
- Construction and Commissioning Performance: Deliver ≥90% construction and demolition waste diversion, supported by ISO 14001-aligned environmental management, contractor sustainability induction, comprehensive commissioning, and 12-month building tuning.
- Water Efficiency & Stormwater Management: Achieve ≥45% potable water reduction and meet stormwater performance targets of ≥40% annual flow reduction plus pollutant removal targets: 85% TSS, 90% gross pollutants, 45% nitrogen, and 65% phosphorus, confirmed through MUSIC modelling.
- Indoor Environmental Quality: Provide high-performance indoor environmental quality through natural ventilation, mechanical ventilation assuring CO_2 levels ≤700 ppm, best-practice lighting design, ≥40% daylight coverage, acoustic compliance, and low-VOC materials.
- Biodiversity & Heat-Island Mitigation: Enhance on-site biodiversity with ≥15% soft landscape including >60% indigenous species, supported by a Biodiversity Management Plan, and achieve heat-island mitigation across ≥75% of site area using vegetation, cool roofs, shading, and high-SRI surfaces.

3.4 Statutory and Regulatory Requirements

New school sports facility constructed in the city of Glen Eira must meet sustainability-related statutory and regulatory requirements under the Glen Eira Planning Scheme, the Planning and Environment Act 1987, and the Building Regulations 2018, which collectively mandate environmentally responsible land-use, energy-efficient building performance, and compliance with national construction standards. Key requirements include:

- Planning-permit sustainability obligations: Proposals must demonstrate alignment with Glen Eira's environmental and sustainable-development policies, addressing land-use impacts, stormwater, and overall environmental performance.
- State legislative requirements: Under the Planning and Environment Act 1987, applicants must outline how environmental effects—such as energy, water, waste and landscape—are responsibly managed as part of the planning permit process.
- BCA/NCC Section J – Energy Efficiency: Building-permit compliance requires meeting Section J energy-efficiency standards for thermal performance, HVAC, building fabric, glazing and lighting, supporting reduced energy demand.
- BCA/NCC Section F – Health & Amenity: The building must provide compliant ventilation, daylight, indoor air quality and moisture control, aligning environmental health measures with sustainability outcomes.
- Stormwater and drainage management: Projects must meet Glen Eira requirements for drainage performance, infrastructure protection and on-site water management, ensuring sustainable stormwater outcomes.

The proposed sustainability strategy responds adequately to the relevant requirements listed above. In many cases, the minimum standards are exceeded to ensure the that the proposed development will set a benchmark for sustainability in its category.

4 Local Climate

The local climate data was mostly sourced from the Bureau of Meteorology and represents an average over past years.

4.1 Temperature[1]

4.1.1 Maximum Temperature

The monthly mean maximum temperature is the average of all available daily maxima for the month. The daily maximum air temperature is nominally recorded at 9 am local clock time. It is the highest temperature for the 24 hours leading up to the observation and is recorded as the maximum temperature for the previous day.

Temp	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Mean Maximum Temp. (°C)	26.6	26.6	24.3	20.4	16.7	13.7	13.2	14.5	16.8	19.5	22.1	24.6	19.9
Lowest Maximum Temp. (°C)	13.9	13.5	12.7	11.7	8.0	6.2	5.7	6.5	8.2	10.4	11.6	13.0	5.7
10th %ile Maximum Temp. (°C)	19.7	19.8	18.2	15.5	13.3	11.1	10.6	11.5	12.8	14.4	15.9	18.2	-
90th %ile Maximum Temp. (°C)	35.6	34.8	31.5	26.1	20.8	16.3	15.6	17.9	21.2	25.5	29.6	32.7	-
Highest Temp. (°C)	46.0	46.8	40.8	34.5	27.0	21.8	22.7	25.6	30.2	36.0	41.6	44.6	46.8

Table 3 – Summary statistics of maximum temperature taken from years 1970-2024

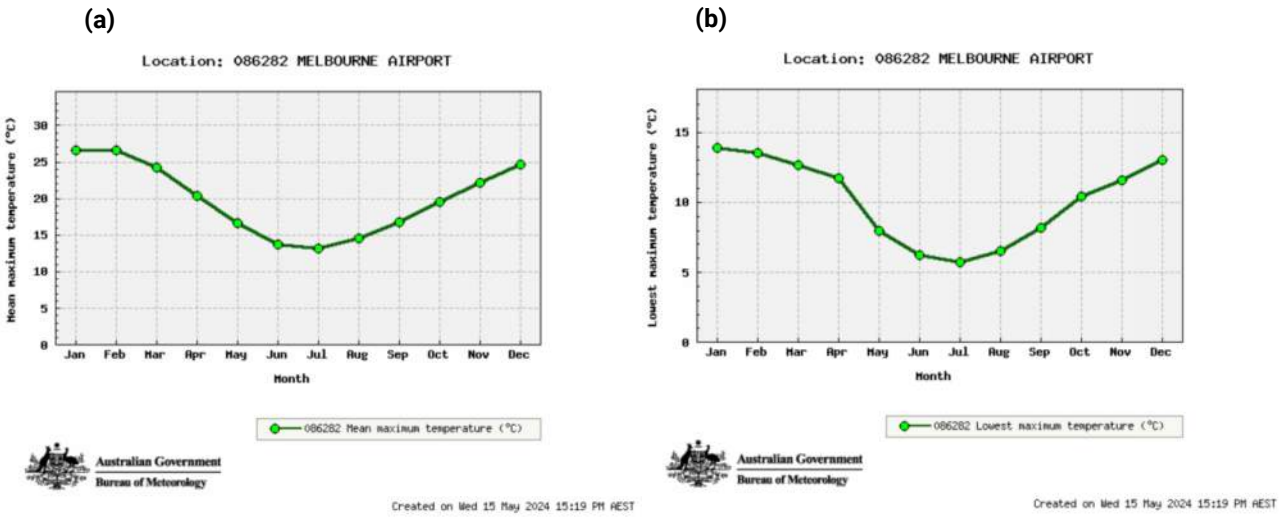


Figure 4 – Summary statistics of (a) maximum and (b) lowest maximum temperatures from years 1970-2024

[1] Data taken from bureau station: Melbourne Airport (Source: www.bom.gov.au)

4.1.2 Minimum Temperature

The monthly mean minimum temperature is the average of all available daily minima for the month. The daily minimum air temperature is nominally recorded at 9 am local clock time. It is the minimum temperature for the 24 hours leading up to the observation and is recorded as the minimum temperature for the previous day.

Temp	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Mean Minimum Temp. (°C)	13.9	14.1	12.8	10.2	8.3	6.2	5.5	5.9	7.1	8.5	10.5	12.1	9.6
Lowest Temp. (°C)	6.0	4.8	3.7	1.2	0.6	-0.9	-2.5	-2.5	-1.1	1.0	0.9	3.5	-2.5
10th %ile Minimum Temp. (°C)	9.6	10.0	8.7	6.2	4.5	2.5	2.1	2.8	3.4	4.4	6.3	8.1	-
90th %ile Minimum Temp. (°C)	18.2	18.5	16.9	14.3	12.0	9.4	8.5	9.1	11.0	12.8	15.0	16.4	-
Highest Minimum Temp. (°C)	30.5	26.9	26.2	21.7	16.5	14.1	12.7	13.5	18.5	21.8	23.6	26.3	30.5

Table 4 – Summary statistics of minimum temperature taken from years 1970-2024

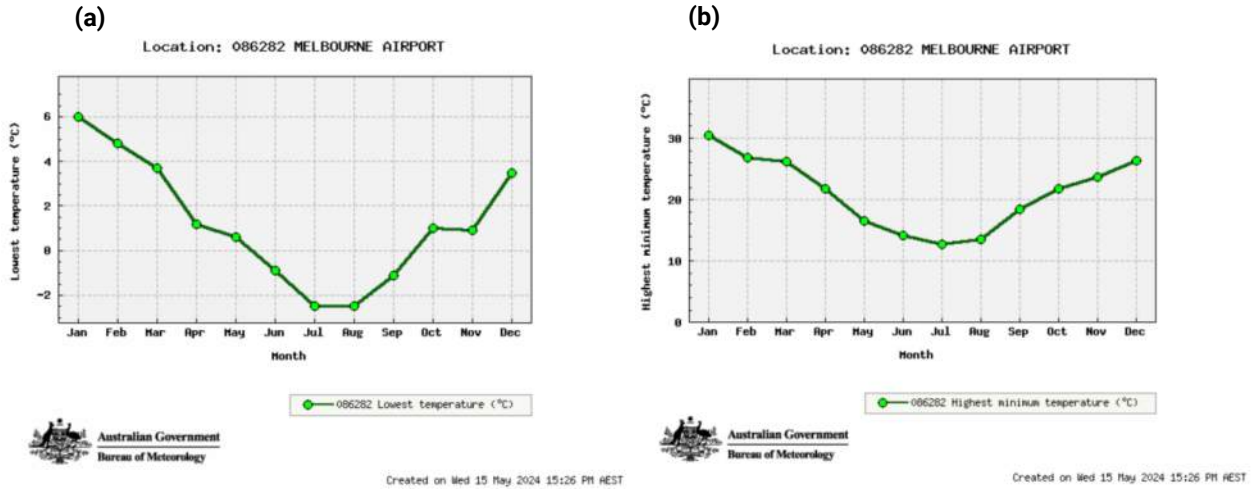


Figure 5 – Summary statistics of (a) lowest and (b) highest minimum temperatures from years 1970-2024

4.2 Rainfall[2]

Observations of daily rainfall are nominally made at 9am local time and record the total for the previous 24 hours. Rainfall includes all forms of precipitation that reach the ground, such as rain, drizzle, hail and snow.

Rainfall	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Mean (mm)	43.2	39.0	37.1	44.9	40.2	40.3	34.6	44.2	45.8	55.9	61.7	51.9	538.8
Lowest (mm)	1.6	1.0	2.0	4.8	8.0	10.4	7.0	15.4	8.2	5.6	18.2	1.6	310.2
Highest (mm)	106.4	200.6	142.2	141.6	155.5	126.0	94.4	97.1	127.0	146.0	158.0	139.0	820.8

Table 5 – Summary statistics of monthly mean, lowest and highest rainfall from years 1970-2024

Figure 6 – Mean monthly rainfall from years 1970-2024

[2] Data taken from bureau station: Melbourne Airport (Source: www.bom.gov.au)

4.3 Sun Hours and Exposure

4.3.1 Sun Hours

Two values are of interest for the sustainability strategy of the development:

- Mean daily sunshine hours, representing the time between sunrise and sunset; and
- The number of clear days

Mean Daily Sunshine	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
Mean (hrs)	8.7	8.1	7.2	6.0	4.6	4.1	4.4	5.4	6.2	7.2	7.4	8.4	6.5

Table 6 – Summary statistics of mean daily (visible) sunshine hours from years 1997-2024

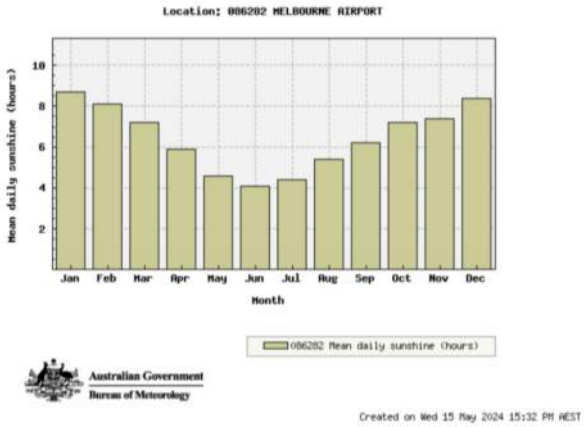


Figure 7 – Mean daily sunshine hours from years 1999-2024

Mean daily clear days, representing the number of days (in a month) of clear sunshine not obstructed by clouds.

Mean Number of Clear Days	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual
	5.1	5.4	5.5	4.7	3.1	2.8	2.8	2.5	2.9	3.3	3.3	4.1	45.5

Table 7 – Summary statistics of mean number of clear days (in a month) from years 1970-2010

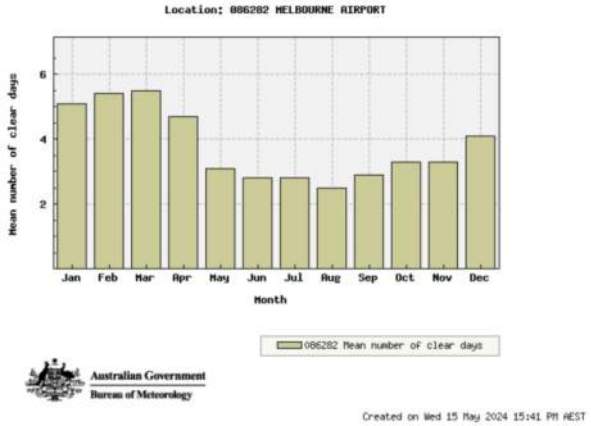


Figure 8 – Mean number of clear days (in a month) from years 1970-2010

4.3.2 Solar Exposure[3]

The daily global solar exposure is the total solar energy for a day falling on a horizontal surface. It is measured from midnight to midnight. The values are usually highest in clear sun conditions during the summer and lowest during winter or very cloudy days.

Solar Exposure (MJ/m^2)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Average
Mean	24.2	21.1	16.5	11.4	7.7	6.2	6.9	10.0	13.5	17.8	21.4	23.9	15.1

Table 8 – Summary statistics for daily mean solar exposure from years 1990-2017

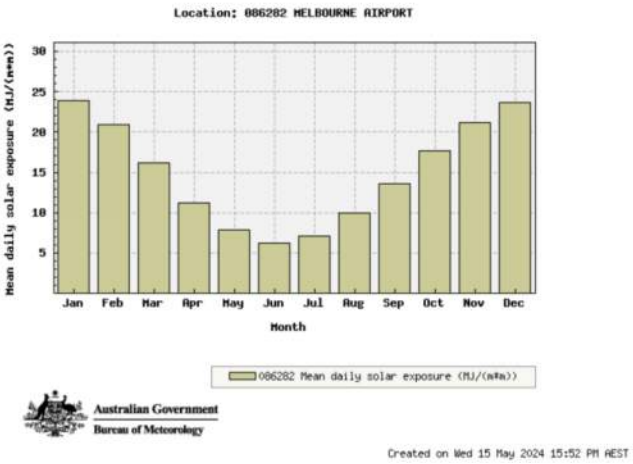


Figure 9 – Mean daily solar exposure from years 1990-2017

[3] Data taken from bureau station: Melbourne Airport (Source: www.bom.gov.au)

4.4 Wind[4]

Wind roses summarise the occurrence of winds at a location, showing their strength, direction and frequency. The wind roses presented in this report have been constructed in the following way:

The percentage of calm conditions is represented by the size of the centre circle - the bigger the circle, the higher is the frequency of calm conditions.

Each branch of the rose represents wind coming from that direction, with north to the top of the diagram. Eight directions are used.

The branches are divided into segments of different thickness and colours, which represent wind speed ranges from that direction. Speed ranges of 10km/h are used in these wind roses. The length of each segment within a branch is proportional to the frequency of winds blowing within the corresponding range of speeds from that direction.

4.4.1 Summer

Figure 10 – Summer wind speed and direction at 9am and 3pm

[4] Data taken from bureau station: Melbourne Airport (source: http://www.bom.gov.au)

4.4.2 Autumn

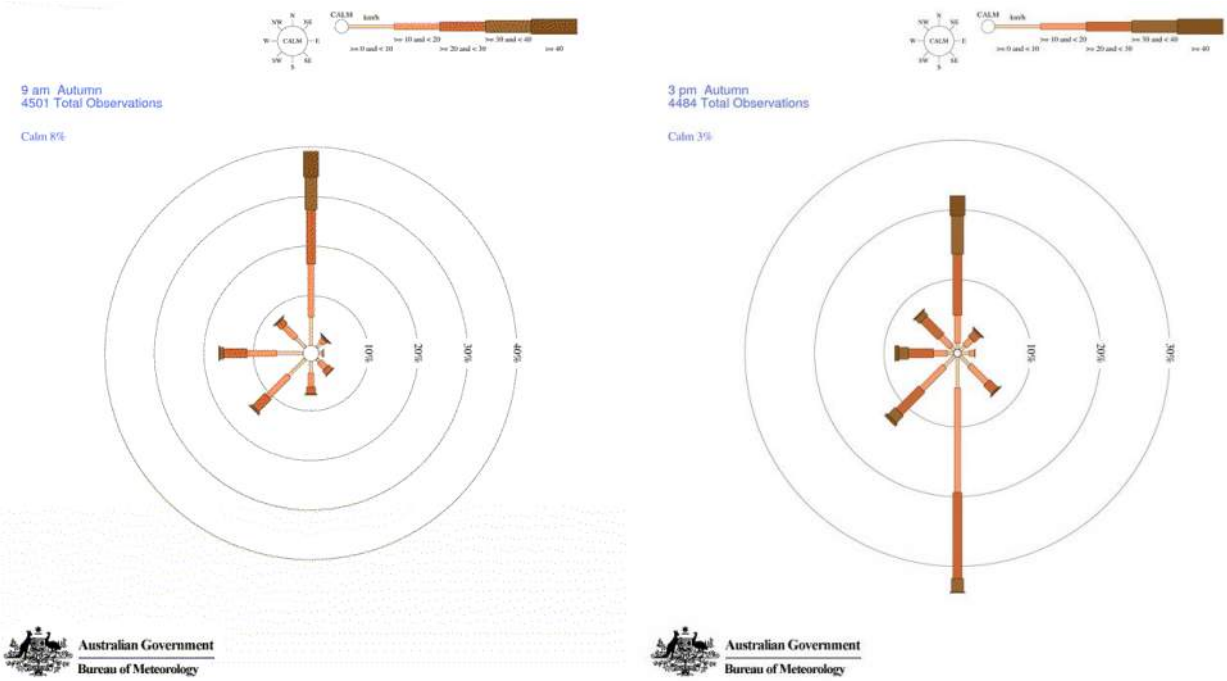


Figure 11 – Autumn wind speed and direction at 9am and 3pm

4.4.3 Winter

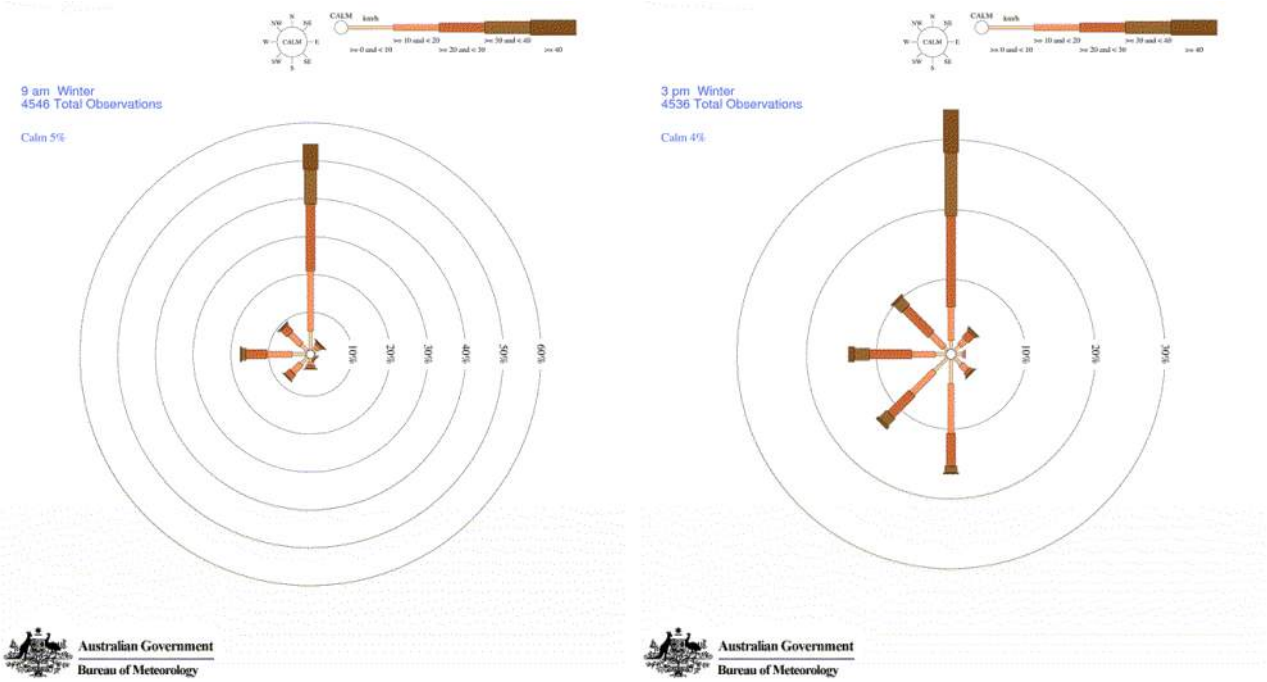


Figure 12 – Winter wind speed and direction at 9am and 3pm

4.4.4 Spring

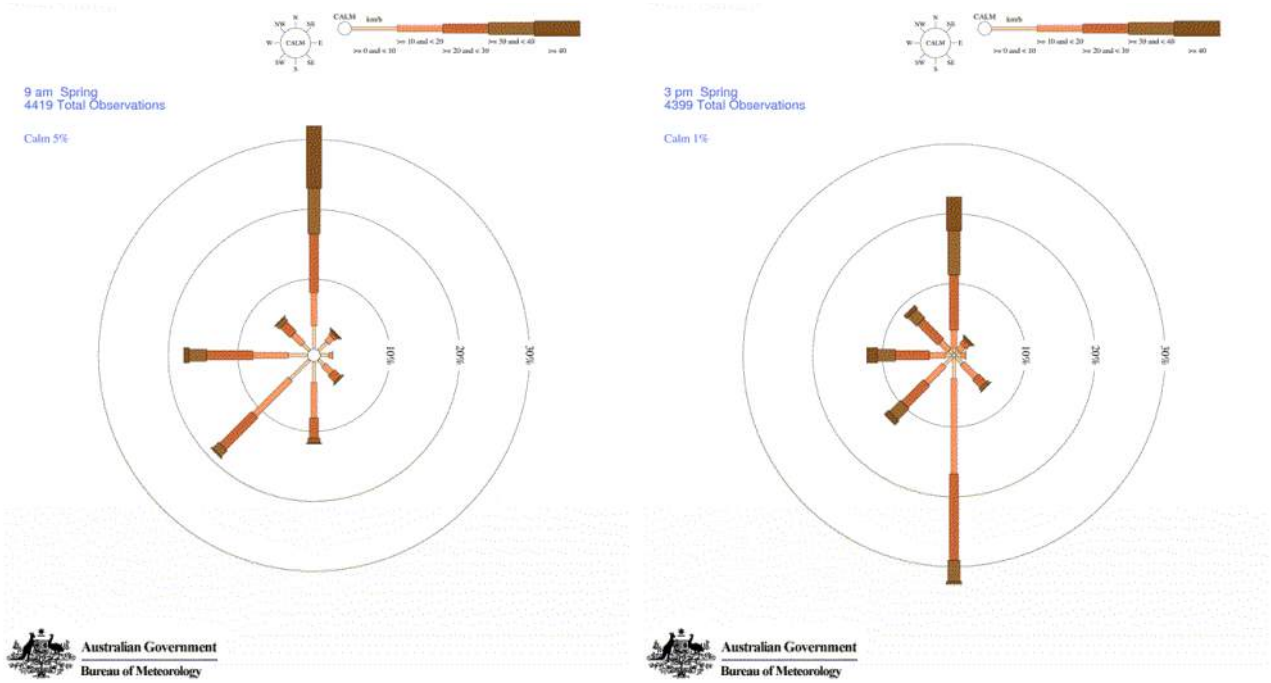


Figure 13 – Spring wind speed and direction at 9am and 3pm

5 Sustainability Initiatives

The following section outlines a description of the major ESD initiatives included in the development. The initiatives are organised into the eight Green Star Buildings categories to allow for reference with the Green Star Pathway outlined in Appendix A Green Star Scorecard

- **Responsible** – initiatives that ensure the building is designed, procured, built, and handed over in a responsible manner.
- **Health** – Indoor Environment Quality initiatives that centre around occupant health and wellbeing.
- **Resilient** – addressing risks that threaten the short- and long-term performance of the building.
- **Positive** – the reduction or elimination of emissions caused by the development.
- **Places** – integration of the building into the urban fabric with the intent to increase social cohesion, activity and placemaking while reducing transport related emissions.
- **People** – addressing the social health of the community through consideration of diversity & gender equity, inclusion, and mental health.
- **Nature** – reducing the impacts to nature whilst bringing nature and biodiversity back into cities.
- **Leadership** – the implementation of innovative practices, processes and strategies

5.1 Responsible

5.1.1 Environmental Management Plan (EMP)

Description	Environmental Management Plans (EMPs) are an important tool for minimisation of adverse environmental impacts during any construction project. Prior to construction commencing, the contractor is to develop a project and site-specific EMP, covering items such as environmental risks, air quality, noise, soil contamination, water quality, impacts to flora and fauna and waste management.
Environmental Benefits	- protection of immediate environment
Performance Targets	The contractor is required to provide a comprehensive and site specific construction EMP and should be ISO14001 accredited.
Reference Standard	Green Star Buildings Credit 2 – *Responsible Construction*
Commitment	Committed

5.1.2 Construction and Demolition Waste

Description	Large volumes of waste materials are often generated from building demolition and construction activities. Most of these waste materials have the potential to be reused or recycled, including common materials such as timber, concrete, steel, bricks and plasterboard.
Environmental Benefits	- Reduction of volume and toxicity of waste going to landfill - Recycling of valuable materials
Performance Targets	At least 90% of construction and demolition waste is diverted from landfill
Reference Standard	Green Star Buildings Credit 2 – *Responsible Construction*
Commitment	Committed

5.1.3 Post Occupancy ESD Evaluation and Building Tuning

Description	Building tuning over the first 12 months of a building's occupancy can provide significant improvements in a building's energy and water efficiency, and help to identify any issues or problems with the building systems that were not captured during commissioning
Environmental Benefits	- Maximum system efficiencies, reducing operational costs - Reduced carbon footprint, water use and emissions
Performance Targets	Regular building performance evaluation and building-tuning will be required to assure optimal operation of the facility. The following is recommended: - Building performance evaluation to be performed on an annual basis. - Building tuning 12 months after commissioning.
Reference Standard	Green Star Buildings Credit 3 – Verification and Handover
Commitment	Committed

5.1.4 Building Users Guide (BUG)

Description	The contractor is required to provide a simple and easy to use Building Users Guide. It shall include at minimum the following information relevant for facility staff and maintenance personnel: - ESD Objectives and Strategy; - Performance Targets; - A brief description of the building services, including • Simplified systems diagrams; • Simplifies operational instructions including “do’s and don’ts”; • and • Signs of system malfunctioning or failure. - Materials / pool chemicals procurement policies; - Adaptability, expansion and refit considerations; and - References and links for further information.
Environmental Benefits	Building users that understand the environmental design philosophy and operations of individual systems are key to ensuring efficient operation of the building and a low environmental footprint.
Performance Targets	A draft BUG will be developed in consultation with all relevant consultants.
Reference Standard	Green Star Buildings Credit 3 – Verification and Handover
Commitment	Committed

5.2 Health

5.2.1 Indoor Air Quality Monitoring

Description	Mechanical ventilation is a key component to providing a healthy indoor environment. Outdoor air intakes will be adjusted in response to CO2 concentration, with close monitoring of the Allied health tenancy, multi-purpose, program and gym rooms.
Environmental Benefits	- Fresh outside air supply - Improved building occupant health and wellbeing
Performance Targets	The mechanical systems will be designed to accommodate additional outdoor air intakes of 50% greater than AS1668:2012 minimum (equivalent to 800ppm CO2). Outside air to the multi-purpose room shall be controlled via a CO2 sensor that is set to 700ppm under normal conditions, with an allowance to reach 800ppm under full occupancy.
Reference Standard	Green Star Buildings Credit 10 – Clean Air
Commitment	Committed

5.2.2 VOCs and Formaldehyde

Description	Paints, Adhesives, Sealants, Flooring Materials and Engineered Timber products used in the construction and fitout of the development will adhere to strict VOC and Formaldehyde limits provided by the Green Star Buildings tool. Operational procurement policies will include strict VOC limits on any product or material introduced to the facility including consumables and pool equipment.
Environmental Benefits	- Improved building occupant health and wellbeing
Performance Targets	At least 95% of all internally applied paints, adhesives, sealants and carpets to meet stipulated 'Total VOC Limits' set out in the relevant Green Star credit. At least 95% of all engineered wood products to meet stipulated formaldehyde limits set out in the relevant Green Star credit.
Reference Standard	Green Star Buildings Credit 13 – Exposure to Toxins
Commitment	Committed

5.2.3 Thermal Comfort

Description	Thermal comfort plays an important role in the health and wellbeing of all building users. Maintaining optimal thermal comfort conditions can be achieved by providing an efficient building envelope and a well-designed mechanical heating and cooling system to cope with peak hot and cold conditions.
Environmental Benefits	- Improved building occupant comfort, health, and wellbeing
Performance Targets	A high degree of thermal comfort will be provided to occupants in the conditioned spaces, equivalent to 80% of all occupants being satisfied in the space.
Reference Standard	-
Commitment	Committed

5.2.4 Daylight Quality

Description	Sufficient levels of daylight are required to achieve energy savings and enhance the health and wellbeing of staff and facility users. High quality daylight shall be as natural as possible, i.e. toned glazing is to be avoided. Colour rendering of roof glazing and translucent building elements will also be considered if adopted. A daylight analysis has confirmed that currently around 98% of the regularly occupied spaces achieve at least 160 lux due to daylight during 80% of the nominated hours, as calculated using the Daylight Autonomy methodology, which is equivalent for 1 point under Green Star Building Tool. Refer to Section 6 Daylight Modelling
Environmental Benefits	Providing building occupants with good exposure to natural daylight is beneficial to health, well-being and visual comfort. In addition, regular exposure to daylight aids the body's circadian rhythms and thus supports the natural wake-sleep cycle.
Performance Targets	At least 40% of the nominated area (Indoor court, office, multi-purpose room) to achieve high levels of daylight
Reference Standard	Green Star Buildings Credit 11 – Light Quality
Commitment	Committed

5.2.5 Acoustic Comfort

Description	Acoustic comfort is essential to support the health, wellbeing, and productivity of building occupants. The design minimises intrusive noise and reverberation, especially in sensitive and quiet areas.
Environmental Benefits	Enhances occupant wellbeing, reduces stress, and improves cognitive performance. Particularly important in teaching environment.
Performance Targets	Indoor court, office and multi-purpose room to meet acoustic criteria for internal noise levels, reverberation time, and sound insulation.
Reference Standard	Green Star Buildings Credit 12 – Acoustic Comfort
Commitment	Committed

5.3 Resilient

5.3.1 Climate Change Resilience

Description	Climate resilience is the ability to anticipate, prepare for, and respond to hazardous events, trends, or disturbances related to climate. During the design process potential impacts from climate change are considered including, but not limited to: - Direct damage or failure of project components - Accelerated deterioration of project components or reduced design life - Reduced operating capacity - Climate hazard impacts to surrounding areas impacting access/ egress - Impacts to the health and wellbeing of building occupants - Indirect risks from impacts to other interdependent systems and services (e.g., transport networks, power, water, telecommunications) The project team has completed a review against the Green Star climate change pre-screening checklist with no significant areas of concern identified.
Environmental Benefits	Adaption to climate change makes the building more resilient and helps its occupants to cope with the changes. To survive and thrive, humanity needs to adapt as the climate changes. Prudent risk management requires preparation for a range of negative outcomes associated with varying degrees of warming and to effectively manage unexpected concurrent threats, such as the recent COVID-19 crisis.
Performance Targets	Project team to review the climate change pre-screening checklist and address areas of concern in the design response.
Reference Standard	Green Star Buildings Credit 16 – Climate Change Resilience
Commitment	Committed Refer Appendix D Climate Change Pre-Screening Checklist

5.3.2 Heat Island Effect

Description	Heat islands are urbanized areas that experience higher temperatures than rural areas. Structures such as buildings, pavements, and other infrastructure absorb and re-emit the sun's heat more than natural landscapes such as forests and water bodies. As a result temperatures in urban areas are typically 2°C to 5°C higher than in outlying areas. The mitigation strategy adopted so far includes: - highly reflective roof finishes with a three-year SRI≥64 - extensive soft landscaping and canopy cover Existing external multi-purpose court is likely exempt and excluded from the calculations.
Environmental Benefits	External temperature reduction, increasing thermal comfort for building users and reducing thermal load on the HVAC system
Performance Targets	Roof surface three-year SRI ≥64
Reference Standard	Green Star Buildings Credit 19 – Heat Resilience (full compliance not required)
Commitment	Committed Refer Appendix E Heat Island Analysis

5.4 Positive

5.4.1 Building Sealing

Description	Building sealing prevents uncontrolled infiltration of outdoor air (or vice versa). A relatively airtight building envelope not only saves a significant amount of heating energy but also prevents interstitial condensation and related issues with corrosion. Attention to detail will be required for detailed design of the façade system, openings in walls and all entrances/exits.
Environmental Benefits	- Increased energy efficiency - Increased thermal comfort - Improved indoor air quality
Performance Targets	-
Reference Standard	Green Star Buildings Credit 3 *Verification and Handover*
Commitment	Committed

5.4.2 Passive Solar Design

Description	Passive solar design principles have been addressed in the current proposal where possible under the given site constraints. The building footprint is relatively compact with a reasonable A/V ratio. External shading devices have been developed to mitigate summer heat loads: - A horizontal overhang, 1.25 m in projection, installed above the north-facing glazing will achieve complete solar cut-off between 3 November and 7 February. Beyond this period, the device continues to deliver high-efficacy partial shading, maintaining substantial attenuation of direct solar radiation through to the equinox. - A 3.25 m horizontal overhang above the west-facing glazing provides significant attenuation of late-afternoon solar gains during peak summer conditions, reducing reliance on mechanical cooling. The depth of the projection effectively limits direct beam penetration from low-angle western sun, supporting overall thermal performance and improved summer comfort outcomes. - No east facing glazing - A low solar heat gain coefficient (SHGC = 0.3) is specified for glazing not protected by external shading elements.
Environmental Benefits	- Reduces energy demand on air-conditioning and lighting - Improves thermal comfort
Performance Targets	-
Reference Standard	-
Commitment	Committed

5.4.3 High Performance Building Envelope

Description	A high-performance building envelope is designed to minimise the heat transfer into and out of the conditioned areas. A wholistic approach has been adopted, including the following initiatives: - **Thermal insulation and fenestration** significantly exceeding the BCA Section J minimum requirements. Refer Section 7 BCA Section J - **Airtight building envelope** – refer Section 5.4.1 *Building Sealing* - **Reduced thermal bridging** - Custom **shade devices/overhangs** on North and West facades, reducing summer heat loads.
Environmental Benefits	- Decreases cooling loads in summer and heating loads in winter & mid-seasons. - Provides thermal comfort for building occupants by reducing radiant heat (positive or negative) on the façade.
Performance Targets	Building energy use 20% less than a reference building.
Reference Standard	Green Star Buildings Credit 22.1 *Energy Use*
Commitment	Committed

5.4.4 Solar PV

Description	The roof of the development is suitably sized and positioned to accommodate a solar PV system exceeding 100 kW_{peak}. While current budget constraints do not allow for the installation of a solar PV system, the project will include all necessary infrastructure to enable a straightforward future retrofit. This will include installing conduits, allocating space for inverters, providing capacity within the main switchboard, and supplying a dedicated power outlet and tap on the roof to support cleaning and maintenance activities.
Environmental Benefits	- reduced CO2 emissions - reduced reliance on grid electricity
Performance Targets	-
Reference Standard	-
Commitment	Committed

5.4.5 Water Efficient Fixtures and Fittings

Description	Water fittings and fixtures including basin taps, shower heads and toilets are supplied with a WELS rating, which rates the water consumption of these devices and converts it into a star rating system. Higher WELS rated devices use less water (measured in litres per minute or litres per flush). Using higher efficiency devices (where the device is supplied by potable mains water) helps a building reduce its overall potable water use.
Environmental Benefits	Reduction of potable water use Energy demand reduction (less demand for hot water)
Performance Targets	The following WELS rating will be adopted at minimum:
Reference Standard	WELS and Green star Buildings Credit 25 *Water Use*
Commitment	Committed

Fixture of Fitting	WELS Rating
Toilets	5 Stars
Taps	6 Stars
Showers	3 Stars (≤7.5l/min)

5.4.6 Efficient Artificial Lighting Systems

Description	LED throughout, dimmable lights, daylight sensors, lighting control via automatic lighting control system with manual override where required, PIR sensors and a mix of direct / indirect lighting to reduce differential glare.
Environmental Benefits	- CO2 emissions reduction - Visual Comfort
Performance Targets	Maximum illumination power density (W/m2) at least 20% lower than required by Table J7D3a of the NCC BCA 2022 Vol 1
Reference Standard	NCC BCA 2022 Section J7
Commitment	Committed

5.5 Places

5.5.1 Sustainable Transport

Description	Sustainable transport refers to modes of travel that minimise negative impacts on both the environment and society. These include public mass transport (buses, trams and trains), low-emission private transport (bicycles and electric vehicles), and human-powered transport (walking and cycling). The following measures promote sustainable transport for this facility: - Pedestrian movement is prioritised throughout the site, with motorised vehicle access permitted only under specific exemptions. - Adequate end-of-trip facilities, including bicycle parking spaces, are provided on the main Shelford Campus to support active travel. - The area's Walk Score of 67 indicates reasonable walkability, while a Transit Score of 72 reflects excellent access to public transport services.
Environmental Benefits	- Reduction in carbon emissions, air pollution, and reliance on fossil fuels associated with the travel to the site.
Performance Targets	Compliance with Green Star credit 27 Movement and Place
Reference Standard	Green Star Buildings Credit 27 *Movement and Place*
Commitment	Committed

5.6 People

5.6.1 Inclusive Construction Practices

Description	Inclusive Construction Practices ensures that the contractor promotes diversity while reducing physical and mental health impacts of all onsite staff. This includes policies that increase awareness and reduce instances of discrimination, racism, and bullying. For a successful program the contractor will have to: - undertake a needs analysis of potential site workers and sub-contractors at tender - introduced programs and solutions to address at least five of the following: • Suicide prevention • Healthy eating and active living • Reduce alcohol and tobacco consumption and avoid drug use • Increased social cohesion, community, and cultural participation • Understanding depression • Preventing violence and injury • Decreased psychological stress • Finding fulfilment at work or mindful meditation • Other issues identified in the Needs Analysis - provide an evaluation report at construction completion
Environmental Benefits	Improved mental and physical health outcomes for site personnel
Performance Targets	Full credit compliance
Reference Standard	Green Star Buildings Credit 31 *Inclusive Construction Practices*
Commitment	Committed

5.7 Nature

5.7.1 Light Pollution

Description	Ecological light pollution is the effect of artificial light on individual organisms and on the structure of ecosystems as a whole. It is widely recognised as being a major threat to birds, nocturnal wildlife and insect species. External lighting that emits direct light-beams beyond the site boundary and into the night sky is also considered wasteful as this portion of the light does not fulfil a purpose. Well-designed external lighting only provides illumination where required, when required and ensures that no direct light beam is directed into the night sky or beyond the site boundary.
Environmental Benefits	- Reduced impact on nocturnal fauna and human neighbours - Reduced energy use
Performance Targets	External lighting to prevent direct light beams onto neighbouring properties and into the night sky
Reference Standard	Green Star Buildings Credit 35 *Impacts to Nature*
Commitment	Committed

5.7.2 Water Sensitive Urban Design (WSUD)

Description	Water Sensitive Urban Design (WSUD) is the approach taken to minimise the impacts on a precinct's stormwater system due to urban development, with the aim of reducing the peak flows and total volume of stormwater leaving a site. In addition WSUD ensures cleaner, better quality stormwater that reduces the levels of pollution in local rivers and bays. WSUD can use many different techniques depending on the type of site. The first approach is to maximise the site permeability to reduce the total volume of stormwater generated. Other strategies to reduce flow rates or pollution levels include rainwater harvesting, raingardens, swales, wetlands and infiltration trenches. A detailed WSUD strategy has been developed for this project to ensure sufficient peak flow reductions and a high level of stormwater quality. Modelling has confirmed that the performance targets will be achieved or exceeded. Refer Appendix C Stormwater Management
Environmental Benefits	- Reduction of stormwater leaving the site during a storm event - Improved quality of stormwater leaving the site
Performance Targets	- Annual average flow reduction of 40% compared to pre-development. - Reduced water pollution: • Total Suspended Solids = 90% • Gross Pollutants = 95% •Total Nitrogen = 60% • Total Phosphorus = 70%
Reference Standard	Green Star Buildings Credit 39.1 *Waterway Protection*
Commitment	Committed

6 Daylight Modelling

The proposed development is committed to provide a high level of amenity and energy efficiency through design for daylight. In order to quantify this, daylight modelling has been undertaken in accordance with Green Star Buildings' guidelines. As per Green Star Buildings' guidelines, rooms having at least 160 lux due to the daylight during 80% of the nominated hours (08:00 AM to 18:00 PM) are deemed to have high levels of daylight.

As the analysis is based on preliminary documentation with no final glazing specification, a Visible Light Transmittance (VLT) of 50% has been assumed to allow for flexibility in the final glazing specification. The finishes as well as the shading were also configured for the analysis based on the reflectance values tabulated below.

Table 9 – Reflectance values for finishes

Construction	Reflectance
External Walls	0.50
Internal Partitions	0.70
Floors	0.30
Roofs	0.50
Ceilings	0.80
Doors	0.70
Pavements	0.40
Landscaping	0.25

The analysis uses the statistical sky, the daylight coefficients and Perez All Weather Sky model, at a finished floor level.

The results of the daylight modelling are tabulated below.

Table 10 – Daylight modelling results

Space	Floor Area (m^2)	Compliant Area (m^2)	%Area above sDA threshold
Office	16.6	0.0	0%
Indoor Court	843.0	841.5	99.8%
Multi-Purpose Room	98.5	94.8	96.2%
Total	**958.1**	**936.3**	**97.7%**

The above results show that approximately 97.7% of nominated floor area for the proposed building achieves 160 Lux or more for 80% of the nominated hours. The nominated spaces are defined by the Green Star Buildings guidelines as regularly occupied spaces and includes offices and front of house areas for this development.

Refer Appendix B Daylight Modelling Map

7 BCA Section J

The building fabric plays a key role in enhancing thermal comfort by passively reducing reliance on mechanical heating and cooling systems. It is proposed to exceed the minimum NCC 2022 Volume One requirements for building fabric as this provides a range of benefits, including lower peak radiant temperatures that enhance occupant comfort, reduced heating and cooling loads enabling smaller mechanical plant, decreased fan energy consumption, lower overall energy use for space conditioning, and a corresponding reduction in operational greenhouse gas emissions.

The building fabric improvement from the NCC 2022 volume 1, J1V3 requirements are summarised below for the proposed development:

Building Element(s)	Reference Building Total System R-value [m^2K/W]	Proposed Building Total System R-value [m^2K/W]	Proposed Added Insulation R-value [m^2K/W]	Notes
Roof(s) / Exposed Ceiling(s) (where roof or unconditioned space(s) above)	$R_T \geq 3.2$ (Downward) SA[5] ≤ 0.45	$R_T \geq 4.5$ (Downward) SA ≤ 0.45	R5.0	Refer to appendix A for detailed J1V3 report.
Ground Floor (concrete slab on ground)	$R_T \geq 2.0$	$R_T \geq 2.0$	Nil	
Envelope Walls	$R_T \geq 1.4$	$R_T \geq 1.4$	R2.5	

Table 11 – Fabric requirements for the development

Building Elements	Reference Building Total System Values	Proposed Building Total System Values	Notes
External Glazed Doors/Windows	$U_w \leq 5.8$ $SHGC_w \leq 0.55$	$U_w \leq 3.5$ $SHGC_w$ 0.45 ± 5%	Total system values are for whole of window system including framing and glazing. Values may change when compliance assessment is finalized.
Skylights	-	-	

Table 12 – Glazing requirements for the development

[5] Solar absorptance of the upper surface of a roof

8 Green Star Buildings

The project is committed to delivering environmental performance equivalent to a minimum 4-Star rating under the Green Star Buildings v1 environmental assessment tool. This commitment reflects alignment with recognised Australian Best Practice standards for environmentally sustainable design, encompassing energy and water efficiency, indoor environmental quality, responsible material selection, and reduced environmental impact across the building lifecycle. The development will significantly exceed baseline regulatory requirements and incorporates sustainability initiatives consistent with state and local policy objectives for high-quality, resilient and environmentally responsible built outcomes.

8.1 Current Point Score

The Green Star Buildings v1 pathway assessment identifies 14 targeted credits, delivering a total score of 34 points. This significantly exceeds the 15-point threshold required for a 4-Star rating, providing a buffer of approximately 19 points. This approach demonstrates that the project can comfortably achieve 4-Star Green Star equivalence with a robust contingency margin, consistent with Australian Best Practice and appropriate for planning approval purposes. Refer Appendix A Green Star Scorecard

Category & Credits		Minimum Expectation	Points Available	Points Targeted	Points Potential
Responsible			17	**2**	**0**
1	Industry Development		1	**1**	0
2	Responsible Construction	✓	1	**1**	0
3	Verification and Handover	✓	1	**0**	0
4	Operational Waste	✓	-	**-**	-
5	Responsible Procurement		1	**0**	0
6	Responsible Structure		5	**0**	0
7	Responsible Envelope		4	**0**	0
8	Responsible Systems		2	**0**	0
9	Responsible Finishes		2	**0**	0
Healthy			14	**12**	**0**
10	Clean Air	✓	2	**2**	0
11	Light Quality	✓	4	**4**	0
12	Acoustic Comfort	✓	2	**2**	0
13	Exposure to Toxins	✓	2	**0**	0
14	Amenity and Comfort		2	**2**	0
15	Connection to Nature		2	**2**	0
Resilient			8	**1**	**0**
16	Climate Change Resilience	✓	1	**0**	0
17	Operations Resilience		2	**0**	0
18	Community Resilience		1	**0**	0
19	Heat Resilience		1	**1**	0
20	Grid Resilience		3	**0**	0

Category & Credits		Minimum Expectation	Points Available	Points Targeted	Points Potential
Positive			30	**11**	**3**
21	Upfront Carbon Emissions	✓	6	**0**	0
22	Energy Use	✓	6	**3**	3
23	Energy Source	✓	6	**0**	0
24	Other Carbon Emissions		4	**2**	0
25	Water Use	✓	6	**6**	0
26	Life Cycle Impacts		2	**0**	0
Places			8	**3**	**0**
27	Movement and Place	✓	3	**3**	0
28	Enjoyable Places		2	**0**	0
29	Contribution to Place		2	**0**	0
30	Culture, Heritage and Identity		1	**0**	0
People			9	**1**	**0**
31	Inclusive Construction Pract	✓	1	**1**	0
32	Indigenous Inclusion		2	**0**	0
33	Procurement & Workforce Inclusio		3	**0**	0
34	Design for Inclusion		3	**0**	0
Nature			14	**4**	**0**
35	Impacts to Nature	✓	2	**0**	0
36	Biodiversity Enhancement		4	**2**	0
37	Nature Connectivity		2	**0**	0
38	Nature Stewardship		2	**0**	0
39	Waterway Protection		4	**2**	0
	TOTAL SCORE		100	**34**	**3**

Leadership			5	**0**	**0**
40	Market Transformation		5	**0**	0
41	Leadership Challenges		∞	**0**	0
	Score incl. Leadership			**34**	**3**

Figure 14 - Green Star Point Score

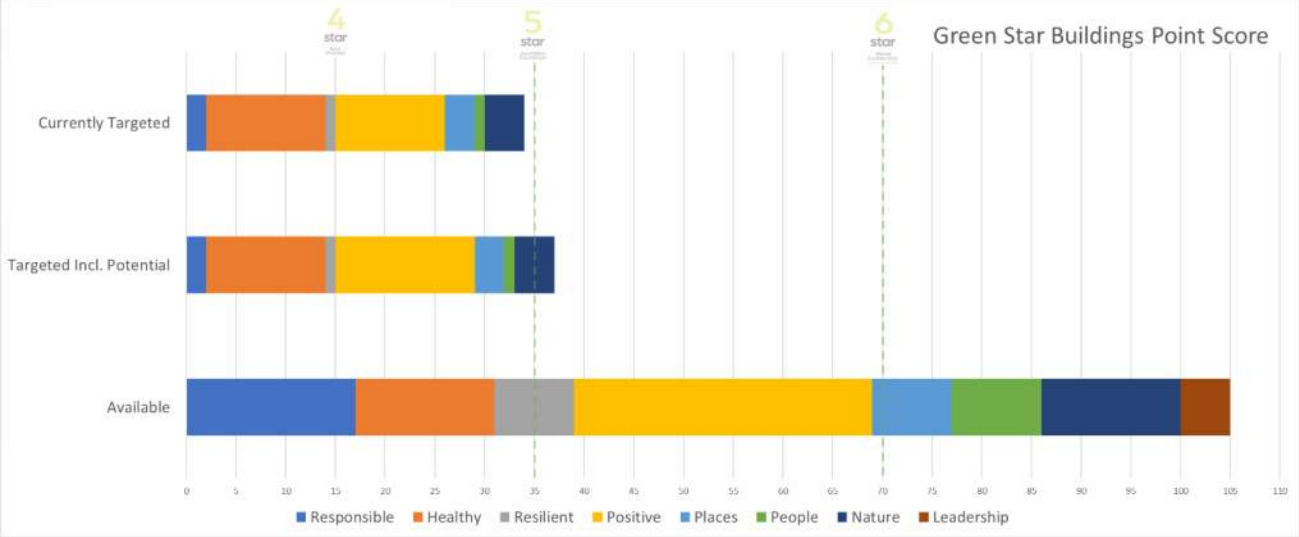


Figure 15 - Green Star Point Score Bar Chart

Appendix A Green Star Scorecard

(blank page)

Green Star Pathway Summary

Project: CGS Shelford Sports
Tool: Buildings v1
Target: 4 Stars
Revision: 7
Date: 31/03/2026

Current Rating

4 Stars - 34 Points

★★★★

Australian Best Practice

Potential Rating

5 Stars - 52 Points

★★★★★

Australian Excellence

	Available	Targeted	To Be Confirmed
	17	2	7
	14	12	2
	8	1	0
	30	11	9
	8	3	0
	9	1	0
	14	4	0
	100	**34**	**18**
	0	0	0
	5	0	0
	105+	**34**	**18**

Notes

Minimum Thresholds

4 Stars = 15 Points

5 Stars = 35 Points

6 Stars = 70 Points

Minimum Expectations - Must be met to achieve Green Star certification. No points available.

Credit Achievement - Best practices that the building must meet to be awarded at least one point (pass or fail - no partial points will be provided).

Exceptional Performance - Points awarded in addition to the Credit Achievement.

Credits marked required for 5-star rating must be met to achieve Green Star certification

Credit No.	Title	Credit Requirements Summary	Points Available	5 Star	TBC	Comments
Responsible						
1.1	Industry Development *Credit Achievement*	**GSAP** GSAP engaged in the project team from the time of registration	1	1		LCI Engagaed
		Financial Transparency Building owner or developer to submit the costs of sustainable building practices of the project including design, construction and documentation.				Not required for a desktop assessment
		Marketing Building owner or developer to complete a Case Study template, detail how the building will market its sustainability achievements to stakeholders and Green Star signage to be prominently displayed in a public/ visitor location				Not required for a desktop assessment
2.0	Responsible Construction *Minimum Expectations*	**Environmental Management System (EMS)** Head Contractor has an Environmental Management System (EMS) with AS/NZS ISO 14001 certification.	Minimum Expectation			Contract Item
		Environmental Management Plan (EMP) Head Contractor to develop an Environmental Management Plan (EMP) specific to the project site to prevent / manage environmental impacts arising from demolition, excavation and construction.				Contract Item
		80% Diversion of Construction and Demolition Waste The builder diverts at least 80 % of construction and demolition waste from landfill				Contract Item
		Contractor Education The head contractor provides training on the sustainability targets of the building.				Contract Item
2.1	Responsible Construction *Credit Achievement*	90% Diversion of Construction and Demolition Waste	1	1		Recycling rates > 90% are common now
3.0	Verification and Handover *Minimum Expectations*	**Metering and Monitoring** The building must: - have accessible energy and water metering for all common uses, major uses, and major sources. - be connected to a monitoring system capable of capturing and processing the data produced by the meters.	Minimum Expectation			Currently not targeted
		Commissioning and Tuning - Environmental Performance Targets				ESD Return Brief / SMP will outline performance targets
		Commissioning and Tuning - Services and Maintainability Review				Erbas, Co-Op and CGS FM team to perform review.
		Commissioning and Tuning - Design for Airtightness				LCI to undertake red-line assessment
		Commissioning and Tuning - Commission the building				Specification Item
		Commissioning and Tuning - Engage building tuning service provider				Specification Item
		Commissioning and Tuning - Test for airtightness				Initiative is not of great value to this project, nice to have
		Building Information The project team create and deliver operations and maintenance information to the facilities management team at the time of handover				Contract Item (Building Users Guide not proposed)
3.1	Verification and Handover *Credit Achievement*	**Independent Commissioning Agent (ICA)** Independent level of verification is provided to the commissioning and tuning activities through an Independent Commissioning Agent	1			ICA might not be worthwhile - to be discussed
		Soft Landings The project uses a soft landings approach that involves the future facilities management team.				
		For large projects (building services value >$20m) both requirements must be met.				
4.0	Responsible Resource Management *Minimum Expectations*	**Separation of Waste** Separate waste streams for any stream representing >5% of annual operational waste	Minimum Expectation			Waste consultant to advise.
		Waste Storage Area The building provides a dedicated and adequately sized waste storage area				
		Signoff by Waste Specialist and/or Contractor - Safe Access to Waste Storage The building ensures safe and efficient access to waste storage areas for both occupants and waste collection contractors.				
5.1	Responsible Procurement *Credit Achievement*	Compliance with this credit is a prerequisite for the Leadership Challenge 'Circular Economy' (if targeted)				
		ISO 20400 Procurement Process The building's design and construction procurement processes to follow ISO 20400 Sustainable Procurement.	1			Currently not targeted
		Procurement Risk Assessment				
		Responsible Procurement Plan				
6.1	Responsible Structure *Credit Achievement*	**RPV of 10 for 50% of Structural Components** 50% of all structural components (by cost) meet a Responsible Products Value of at least 10.	3		3	Currently not targeted
6.2	Responsible Structure *Exceptional Performance*	**Higher RPV** 10% of all products in the structure (by cost) meet a Responsible Products Value score of at least 15 **OR** 30% of all products in the structure (by cost) have an average Responsible Products Value score of at least 10	2			Currently not targeted
7.1	Responsible Envelope *Credit Achievement*	**RPV of 10 for 30% of Building Envelope** 30% of all building envelope components (by cost) meet a Responsible Products Value score of at least 10	2		2	Currently not targeted
7.2	Responsible Envelope *Exceptional Performance*	**Higher RPV** 10% of all products in the envelope (by cost) meet a Responsible Products Value score of at least 15 **OR** 60% of all products in the envelope (by cost) have an average Responsible Products Value score of at least 10	2			Currently not targeted
8.1	Responsible Systems *Credit Achievement*	**RPV of 6 for 20% of Building Systems** 20% of all active building systems (by cost) meet a Responsible Products Value score of at least 6	1		1	Currently not targeted
8.2	Responsible Systems *Exceptional Performance*	**Higher RPV** 5% of all active building systems (by cost) meet a Responsible Products Value score of at least 11 **OR** 35% of all active building systems (by cost) have an average Responsible Products Value score of at least 6	1			Currently not targeted
9.1	Responsible Finishes *Credit Achievement*	**RPV of 7 for 60% of Building Finishes** 40% of all internal building finishes (by area) meet a Responsible Products Value score of at least 7	1		1	Currently not targeted
9.2	Responsible Finishes *Exceptional Performance*	**Higher RPV** 10% of all internal building finishes (by area) meet a Responsible Products Value score of at least 12 **OR** 60% of all internal finishes (by area) have an average Responsible Products Value score of at least 7	1			Currently not targeted
Responsible Totals			**17**	**2**	**7**	

Credit No.	Title	Credit Requirements Summary	Points Available	5 Star	TBC	Comments
Healthy						
10.0	Clean Air *Minimum Expectations*	**Indoor Pollutants** Levels of indoor pollutants are maintained at acceptable levels. Impacts separation distance between supply and exhaust air intakes. The ventilation system must comply with ASHRAE Standards 62.1:2013 or AS 1668:2012 Duct work to be cleaned prior to occupation.	**Minimum Expectation**			Erbas to include
		Outdoor Air A high level of fresh air is provided. 50% higher rates of Outside Air, or CO2 monitoring to 800ppm				This is also a CGS Design Guide requirement
		Reduction of Pollutants Pollutants entering the building are minimised. Pollutants from kitchens or printing equipment is exhausted directly to the outside.				N/A - no kitchen or photo copiers. Note to CGS that any desktop printers used in the office should be low-emission printers.
10.1	Clean Air *Credit Achievement*	**Ventilation Systems Maintenance** The building's ventilation systems allow for easy maintenance.	**2**	2		Erbas to include
		High Levels of Outdoor Air - Provide outdoor air 100% greater than the minimum AS 1668.2:2012 standard **OR** - CO2 levels must be maintained at maximum 700 ppm with a sensor in each enclosed space. **OR** - CO2 and temperature sensor per 500 m2 maximum. Nat vent spaces must meet requirements of AS 1668.4:2012 for all likely weather conditions.				Propose CO2 sensors in all conditioned spaces, set to 700ppm. System designed to deliver ≤800ppm at full capacity.
11.0	Light Quality *Minimum Expectations*	**Minimum Lighting Comfort** Lighting within the building meets minimum comfort requirements. Impacts quality of lighting selection, and glare reduction.	**Minimum Expectation**			Glare reduction essential in indoor courts. Glare analysis required.
		Adequate Daylight The building provides adequate levels of daylight.				Confirmed through daylight modelling.
11.1	Light Quality *Credit Achievement*	**Option 1: Best Practice Artificial Lighting** Artificial Lighting solutions	**2**	2		Artificial lighting system to comply
		Option 2: Best Practice Access to Daylight The building provides best practice access to daylight.				Confirmed through daylight modelling.
11.2	Light Quality *Exceptional Performance*	**Both Lighting Options are Achieved** Best Practice Artificial Lighting and Best Practice Access to Daylight are achieved.	**2**	2		
12.0	Acoustic Comfort *Minimum Expectations*	**Acoustic Comfort Strategy** Qualified consultant to prepare an Acoustic Comfort Strategy	**Minimum Expectation**			
12.1	Acoustic Comfort *Credit Achievement*	**Comply with ALL of the following** A selection of the following options needs to be achieved: - The building achieves maximum internal noise levels. (AS/NZS 2107:2016) - The building achieves minimum internal noise levels. (AS/NZS 2107:2016) - The building provides acoustic separation. (Dw = LAeqT > X) - The building minimises impact noise transfer. (ISO 16283-2) - The building is designed with reverberation control. (AS/NZS 2107:2016) Acoustic separation: address either privacy OR sound insulation	**2**	2		Acoustic consultant to confirm GS thresholds are met
13.0	Exposure to Toxins *Minimum Expectations*	**Paints, sealants, adhesives and carpets** 95% of internal **paints, adhesives, sealants (by volume) and carpets (by area) must have low VOC as p**er Technical Manual	**Minimum Expectation**			Specification Item
		Engineered wood products 95% by area of wood products meet specified formaldehyde emission limits as per Technical manual.				Specificatrion Item
		Lead, Asbestos and PCBs hazardous material survey carried out on any existing buildings or structures onsite in accordance with OH&S legislation				HazMat survey required
13.1	Exposure to Toxins *Credit Achievement*	**On-site tests verify the building has low VOC and formaldehyde levels.** TVOC and formaldehyde levels must be tested to be 0.27ppm and 0.02ppm respectively. Sample measurements must be taken from regularly occupied spaces and follow either ISO 16000-6, ASTM D5197 or EPA TO-17	**2**		2	Optional - cost ~$10k
14.1	Amenity and Comfort *Credit Achievement*	**Project includes at least one room (parent, relaxation, meditation, prayer or exercise room**) with the size 1m2/ 10 people. The room must be accessible to all staff and occupants, be separated from bathrooms, showers, lockers and active facilities. The room MUST meet the following credits: - Light Quality - Acoustic Comfort - Equal Access to the Building criterion from Design for Inclusion	**2**	2		Multi purpose room fits the criteria
15.1	Connection to Nature *Credit Achievement*	**Access to Views** The building provides views. 60% of NLA has views to high quality internal or external environments	**1**	1		Complies
		Option 1: Indoor Plants The building includes indoor plants and incorporates nature-inspired design. - 500cm² of indoor plants for every 15m² of floor space. [3.5% of floor space] - Requires 5 additional biophilic design elements.				Only applies to offices and multi-purpose room. Also need to include biophilic design elements. Total area 114 sqm = 3,800 cm^2 plants = 6 x 30cm dia pots
		Option 2: NLA Allocation to Nature 5% of the building's floor area or site area (whichever is greater) is allocated to nature in which occupants can directly engage with. -Includes green facades or gardens.				Nature-based play area will comply
15.2	Connection to Nature *Exceptional Performance*	**Options 1 & 2 are Achieved**	**1**	1		
Healthy Totals			**14**	**12**	**2**	One additional point
Resilient						
16.0	Climate Change Resilience *Minimum Expectations*	**Climate Change pre-screening checklist:** The project team completes the climate change pre-screening checklist. The project team communicates the building's exposure to climate change risks to the applicant.	**Minimum Expectation**			
16.1	Climate Change Resilience *Credit Achievement*	**Climate Adaptation Plan** Climate Adaptation Plan (CAP) developed by qualified professional including medium term and long term time scales. All extreme and high risks must be addressed through design (minimum 2 risks)	**1**			Currently not targeted
17.0	Operations Resilience *Credit Achievement*	**Review of Acute Shocks** The project team undertakes a comprehensive review of the acute shocks and chronic stresses likely to influence future building operations. This credit builds on the CAP	**2**			Currently not targeted
		Risk Response The building's design and future operational plan addresses any high or extreme system-level interdependency risks.				Currently not targeted
		Blackout Survivability The building's design maintains a level of survivability and design purpose in a blackout.				Currently not targeted
18.0	Community Resilience *Credit Achievement*	**Community Resilience** Qualified professional must develop a Community Resilience Plan and undertake at least one community capacity building activity prior to or during construction.	**1**			Currently not targeted
19.0	Heat Resilience *Credit Achievement*	**Reduction of Heat Island Effect** At least 75% of the whole site comprises of one or a combination of strategies that reduce heat island effect.	**1**	1		Roof 3-year SRI ≥64 Existing external multi-purpose court likely to be exempt.
20.0	Grid Resilience *Credit Achievement*	**Option 1: active generation and storage systems** The building has the infrastructure to deliver an appropriate demand response strategy.	**3**			Currently not targeted
		Option 2: demand response The building has the infrastructure to deliver an appropriate demand response strategy.				Currently not targeted
		Option 3: passive design solutions: The building has reduced its electricity consumption through passive design.				Currently not targeted
Resilient Totals			**8**	**1**	**0**	

Credit No.	Title	Credit Requirements Summary	Points Available	5 Star	TBC	Comments
Positive						
21.0	Upfront Carbon Emissions *Minimum Expectations*	**≥10% Reduction of Embodied Carbon** Building upfront carbon emissions reductions must occur through good design and material selection. Carbon offsets cannot be used to show compliance against the 10% reduction in the *Credit* or *Exceptional Credit* . Demolition works are excluded from the *Minimum*. Either: - model the proposed and reference building following the Lifecycle Impacts credit **OR** - complete the Upfront Carbon Emissions Calculator	**Minimum Expectation**			Currently not targeted
21.1	Upfront Carbon Emissions *Credit Achievement required for 5 & 6-star rating*	**20 % Reduction of Embodied Carbon** Reduce the upfront carbon according to the materials and products in the scope to achieve at least 20% reduction (added by GBCA). The Calculator uses A1-A3 to calculate compliance.	3			Currently not targeted
		Offsetting Demolition Works Where an existing building is <30 years old and has been partially or fully demolished, an embodied carbon calculation must be done for the demolished portion and these emissions offset. If the building is 30-50 years old the contribution is calculated and discount at 10% for every 2 additional years past 30.				Currently not targeted
21.2	Upfront Carbon Emissions *Exceptional Performance*	**40 % Reduction of Embodied Carbon** 40 % Reduction of Embodied Carbon Criteria used to be "Offset all remaining upfront carbon emissions from Modules A1-A5 using the Life cycle Assessment pathway" but now 40% reduction.	3			Currently not targeted
22.0	Energy Use *Minimum Expectations*	**Building energy use is 10% less than a reference building, following NCC 2022.** Each system and façade must comply with Section J requirements in NCC. No system or façade can perform worse than the reference building even if the overall energy use reduction is 10% or more. On-site renewables connected behind the meter **CANNOT** be used in the *Minimum* , **ONLY** in the *Credit* and *Exceptional* .	**Minimum Expectation**			Achievable if following performance measures are adopted: - Wall insulation R2.5 - Roof Insulation R5.0 - Glazing U-Value U3.5, SHGC 0.45 Values to be refined/confirmed during next design phase
22.1	Energy Use *Credit Achievement required for 5-star rating*	**The building's energy use is at least 20% less than a reference building.**	**3**	3		
22.2	Energy Use *Exceptional Performance*	**The building's energy use is at least 30% less than a reference building.**	**3**		3	Modelling to confirm once mechanical and lighting systems have been selected
23.0	Energy Source *Minimum Expectations*	**Zero Carbon Action Plan** Develop a Zero Carbon Action Plan for the building, signed off by the building owner/ developer. Must include a target date by when the building is expected to operate as net zero carbon. Procuring renewable energy fuels can not be its only solution.	**Minimum Expectation**			Not required for a fully electric building
23.1	Energy Source *Credit Achievement required for 5-star rating*	**100% of the building's electricity comes from renewable electricity.**	**3**		3	CGS to confirm, noting that this would be a mandatory requirement for 5-star certification.
23.2	Energy Source *Exceptional Performance required for 5-star rating*	**100% of the building's energy comes from renewables.** All energy under the control of the building owner/operator and all non-electricity energy provided for uses that are not under the building owner's control must be sourced from renewables (onsite OR offsite).	**3**		3	
24.0	Other Carbon Emissions *Credit Achievement required for 5-star rating*	All refrigerants from the building systems and appliances provided by the building must be captured in the credit. Comply with one of the two pathways:				
		Option 1: Eliminate Refrigerants	**2**	2		
		Option 2: Offsetting Refrigerants - emissions are calculated by multiplying the total refrigerant charge by its GWP for each type and adding them together.				Reasonably low refrigerant volume expected, not a significant cost impact. Contractor to arrange off-sets.
24.1	Other Carbon Emissions *Exceptional Performance required for 6-star rating*	**All other emissions not captured in the Positive category are eliminated or offset.** Address emissions that have not been addressed through other credits, if the credit has been claimed the emissions to offset in this credit are lower: - Emissions relating to the Grid Emissions Factor - Upfront Carbon Emissions - Life Cycle Impacts - Emissions from construction equipment use and utilities - Construction waste emissions	2			Currently not targeted
25.0	Water use *Minimum Expectations*	Follow either of the following pathways:				
		Option 1: Prescriptive Comply with minimum WELS ratings	**Minimum Expectation**			Taps 5-star WELS Showers 3-star WELS Toilets 4-star WELS Urinals 5-staqr WELS (if any)
		Option 2: Performance				Option 2 not targeted
25.1	Water Use *Credit Achievement*	**The building uses 45% less potable water compared to a reference building**, using the Potable Water Calculator.	**3**	3		
		Infrastructure for recycled water connection: The building must have infrastructure for recycled water in a district or location where local council (or similar) have planned for installation of recycled water infrastructure				No recycled water infrastructure present 5kL Rainwater Tank for toilet flushing and landscape irrigation.
25.2	Water Use *Exceptional Performance*	**The building uses 75% less potable water compared to a reference building**.	**3**	3		The building demonstrates an 89% reduction in potable water consumption, as verified through the Green Star Potable Water Calculator. This performance outcome is achieved by supplying most of the building water demand (toilet flushing and landscape irrigation) via the onsite rainwater harvesting system, thereby substantially reducing reliance on potable water sources.
26.0	Life Cycle Impacts *Credit Achievement*	**The project demonstrates a 30% reduction in life cycle impacts when compared to standard practice.**	2			Currently not targeted
Positive Total			**30**	**11**	**9**	
Places						
27	Movement and Place *Minimum Expectations*	**End of Trip facilities incl. Changing Facilities**	**Minimum Expectation**			Assume school has sufficient EoT facilities
		Accessible, inclusive, and located in a safe and protected place				Compliance assumed
27.1	Movement and Place *Credit Achievement*	**Cyclist Facilities**	**3**	3		Assume CGS has sufficient cyclist facilities
		Sustainable Transport				It is assumed that sustainable transport is addresses on a precinct basis - not applicable for this project.
		Reducing Private Vehicle Use				Carpark not in scope
		Encourage Walkability				Walkscore is 67 but more than 10 amenities close by Excellent Transit score of 72
28.1	Enjoyable Places *Credit Achievement*	**Enjoyable Places** - Publicly Accessible Places - Activation Strategy	2			Currently not targeted
29.1	Contribution to Place *Credit Achievement*	**Option 1: Urban Context Analysis** The building's design contributes to the livability of the wider urban context and enhances the public realm.	2			Currently not targeted
		Option 2: Independent Design Review Independent reviews are held during the development of the design.				Currently not targeted
30.1	Culture, Heritage and Identity *Credit Achievement*	**Option 1: Community Led Design Response** The building's design reflects and celebrates local demographics and identities, the history of the place, and any hidden or minority entities.	1			Currently not targeted
		Option 2: Independent Design Review This outcome was arrived through meaningful engagement with community groups early in the design process.				Currently not targeted
Places Total			**8**	**3**	**0**	

	Credit No.	Title	Credit Requirements Summary	Points Available	5 Star	TBC	Comments
People							
People	**31.0**	Inclusive Construction Practices *Minimum Expectations*	**Inclusive Construction Practices** During the building's construction, the head contractor provides gender inclusive facilities and protective equipment. The head contractor also installs policies on-site to increase awareness and reduces instances of discrimination, racism, and bullying.	**Minimum Expectation**			Contract item
	31.1	Inclusive Construction Practices *Credit Achievement*	**Inclusive Construction Practices** - Policies and programs implemented are relevant to construction workers on site. - The head contractor provides high quality staff support on-site to reduce at least five key physical and mental health impacts. - The effectiveness of the interventions is evaluated.	**1**	1		Contract item
	32.1	Indigenous Inclusion *Credit Achievement*	**Option1: Reconciliation Action Plan**	2			Not targeted
			Option 2: Inclusion of Indigenous Design				Not targeted
	33.1	Procurement and Workforce Inclusion *Credit Achievement*	**Social Procurement Strategy**	**2**			Not targeted
			Employment Opportunities				Not targeted
	33.2	Procurement and Workforce Inclusion *Exceptional*	**Social Procurement Strategy and increased workforce inclusion**	**1**			Not targeted
	34.1	Design for Inclusion *Credit Achievement*	**The building is designed and constructed to be inclusive to a diverse range of people with different needs.**	**2**			Not targeted
	34.2	Design for Inclusion *Exceptional Performance*	**Engagement with target groups has informed the inclusive design.**	**1**			Not targeted
People Total				**9**	**1**	**0**	
Nature							
Nature	**35**	Impacts to Nature *Minimum Expectations*	**Site Ecological Value** The building was not built on, or significantly impacted, a site with a high ecological value.	**Minimum Expectation**			Brownfield site with little apparent ecological value. Landscape architect to confirm.
			Managing Light Pollution Impacts The building's light pollution has been minimised.				Erbas to include
			Wetland Management Plan There is ongoing monitoring, reporting, and management of the site's wetland ecosystem.				No wetlands
	35.1	Impacts to Nature *Credit Achievement*	**Protecting Ecological Values** The building's design and construction conserves existing natural soil, hydrological flows, and vegetation elements.	2			Not targeted
			Retaining High Biodiversity Values If deemed necessary by an Ecologist, at least 50% of existing site with high biodiversity value is retained.				Not targeted
	36.1	Biodiversity Enhancement *Credit Achievement*	**Landscape Area** external landscape provided at a ratio of either 15% of site area or 1:500 of the GFA (whichever is larger)	**2**	2		Soft Landscape = 17.5% of site
			Diversity of Species >60% of plants must be indigenous and include at least 1 significant (nesting) tree or equivalent habitat provision per 500m2 of landscape area				Landscape consultant to confirm
			Biodiversity Management Plan				Landscape Consultant
	36.2	Biodiversity Enhancement *Exceptional Performance*	**Landscape Area** external landscape provided at a ratio of either 30% of the site area or 1:300 of GFA (whichever is larger)	2			Not targeted
			Diversity of Species >80% of plants must be indigenous and include at least 1 significant (nesting) tree or equivalent habitat provision per 250m2 of landscape area				
	37.1	Nature Connectivity *Credit Achievement*	The site must be built to encourage species connectivity through the site, and to adjacent sites. If the project sits within a blue or green grid strategy it must contribute to the goals of the strategy.				
			Option 1: Landscaping conservation area must make up at least 25% of the total external area within the buildings site boundary	2			Not targeted
			Option 2: Infrastructure design features such as canopy bridge, wildlife tunnels, green roofs etc..				
	38.1	Nature Stewardship *Credit Achievement*	**Biodiversity is restored beyond the building site. Project to meet all of the following criteria:**	2			Not targeted
			Eligibility				
			Area of Respiration				
			Location of Restoration				
			Activities to Protect or Restore				
			Legislated Requirements				
	39.1	Waterway Protection *Credit Achievement*	**Stormwater Volume** Demonstrate an annual average flow reduction of 40% compared to pre-development levels.	**2**	2		civil proposal complies
			Pollution Reduction Targets				civil proposal complies
	39.2	Waterway Protection *Exceptional Performance*	**Stormwater Volume**	2			Not targeted
			Pollution Reduction Targets				
Nature Total				**14**	**4**	**0**	2 additional points
Sector Specific							
Sector Specific Total				**0**	**0**	**0**	
Leadership							
	40	Market Transformation	Project must demonstrate for each credit: - how a building solution or process is considered leading in their targeted sector, nationally or globally **OR** - that the technology or process is not commonly used within Australia's building industry; or globally depending on the context	**max. 5**			no innovations proposed at this point
	41	Leadership Challenge	The project meets a Leadership Challenge developed by the GBCA	**un-limited**			no innovations proposed at this point
Leadership Total				**5+**	**0**	**0**	

Appendix B Daylight Modelling Map

(blank page)

ADVERTISED PLAN

				Hours (%)			
Level	Zone	Area m²	Min %	Avg %	Max %	Pass Area m²	Contribution %
1	1. Indoor Court	842.96	71.50	95.88	99.96	841.46	87.83
1	3. Multi-Purpose	98.48	42.39	95.86	99.91	94.81	9.90
1	7. Office	16.64	0.00	0.00	0.00	0.00	0.00
						Pass	Yes

CO.OP

Shelford Campus Sports Facility

100402

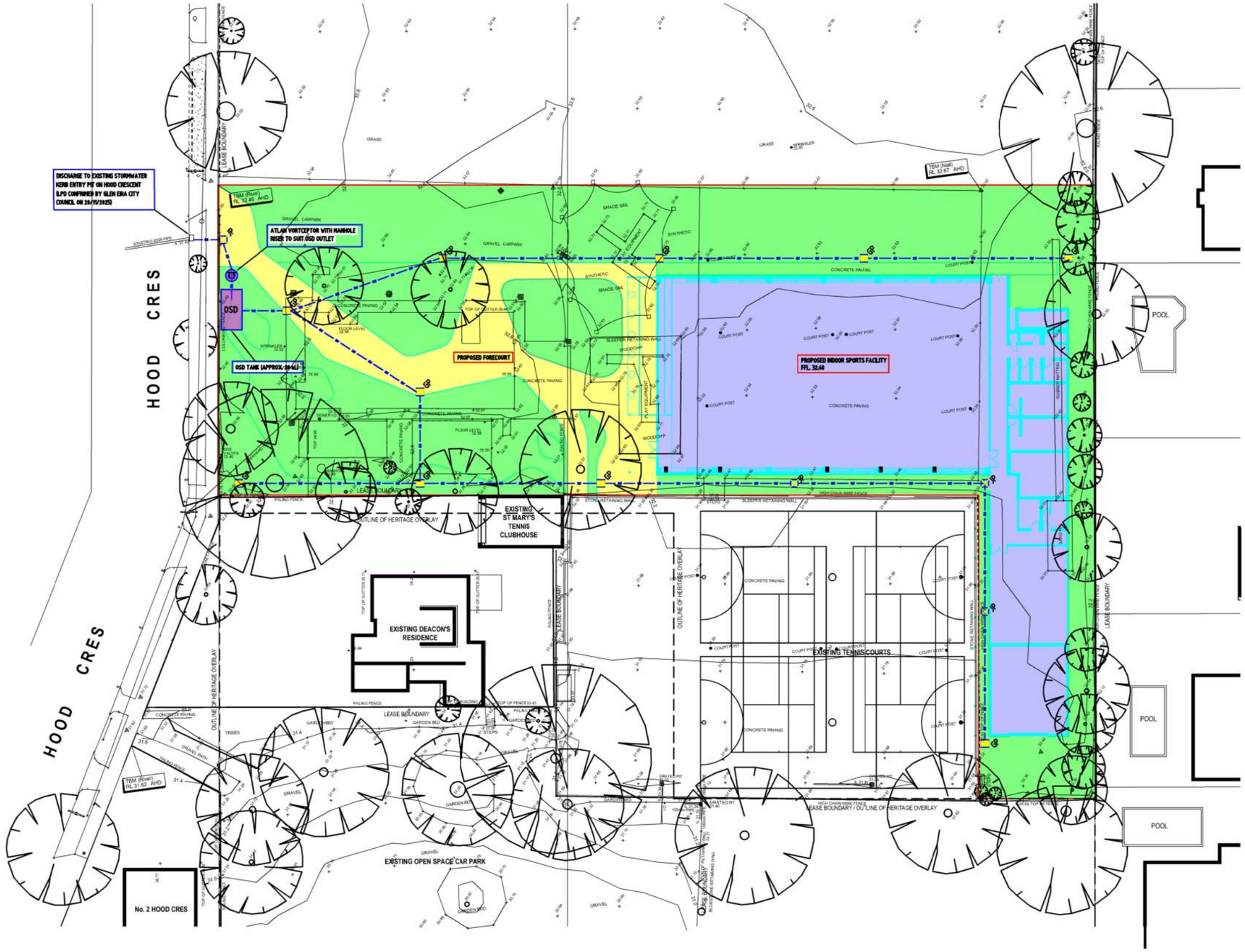
GENERAL ARRANGEMENT PLAN - OPTION 03

PRELIMINARY
NOT TO BE USED DURING CONSTRUCTION

SK003

Appendix C Stormwater Management

(blank page)



KEY

- PROPOSED STORMWATER JUNCTION PIT
- PROPOSED STORMWATER GRATED INLET PIT
- PROPOSED STORMWATER OVERFLOW PIT
- PROPOSED STORMWATER DOWNPIPE (SUBJECT TO CONFIRMATION)
- PROPOSED STORMWATER PIPEWORK
- PROPOSED DETENTION TANK
- PROPOSED ATLAN VORTCEPTOR SUBJECT TO ESD REQUIREMENTS
- PROPOSED ROOF EXTENT
- PROPOSED PAVEMENT / HARDSTAND
- PROPOSED LANDSCAPING

NOTES

1. SURVEY DATA BY OTHERS TO AUSTRALIAN HEIGHT DATUM.
2. PRELIMINARY FLOOR LEVEL FFL 32.6.
3. LEGAL POINT OF DISCHARGE (LPD) CONFIRMED BY GLEN EIRA CITY COUNCIL ON 20/11/2025.
4. FLOOD PLANNING LEVEL TO BE ADVISED BY COUNCIL.
5. PERMISSIBLE SITE DISCHARGE (PSD) - SEE SWMP DOCUMENT TO FOLLOW.
6. SITE STORAGE REQUIREMENTS (SSR) - SEE SWMP DOCUMENT TO FOLLOW.
7. DEFINED AREA USED IN STORMWATER RETENTION CALCULATIONS:
   - THE EXISTING TENNIS COURTS (TO BE RETAINED) WILL STILL DRAIN TO THE SOUTH V/A THE EXISTING UNDERGROUND SYSTEM, ASSUMED TO DISCHARGE TO GLEN EIRA ROAD (RATHER THAN OUR PROPOSED SYSTEM) AND AS SUCH FLOWS FROM THIS AREA ARE NOT APPLICABLE TO THE CALCULATIONS FOR OUR DEVELOPMENT.
   - THE EXISTING SOCCER FIELD GENERALLY DRAINS TO THE NORTH, ASSUMED TO DISCHARGE TO ARDONA ROAD (RATHER THAN OUR PROPOSED SYSTEM) AND AS SUCH FLOWS FROM THIS AREA ARE NOT APPLICABLE TO THE CALCULATIONS FOR OUR DEVELOPMENT.
   - THE EXISTING TWO STOREY HOUSE (TO BE RETAINED) WILL STILL DRAIN TO THE EXISTING SYSTEM, ASSUMED TO DISCHARGE TO HOOD CRESCENT (RATHER THAN OUR PROPOSED SYSTEM) AND AS SUCH FLOWS FROM THIS AREA ARE NOT APPLICABLE TO THE CALCULATIONS FOR OUR DEVELOPMENT.
8. IT IS ASSUMED THAT LEGAL POINT OF DISCHARGE (LPD) WILL BE ADJACENT TO THE NORTHWESTERN CORNER OF THE PROPOSED FORECOURT ENTRY ON HOOD CRESCENT. THE LPD IS YET TO BE CONFIRMED BY COUNCIL WITH LPD AND FLOOD LEVEL APPLICATIONS LODGED IN OCTOBER 2025.
9. INITIAL CALCULATIONS INDICATE THAT THERE IS NEGLIGIBLE DIFFERENCE IN THE PRE-DEVELOPMENT AND POST-DEVELOPMENT DISCHARGES FROM WITHIN OUR DEFINED DEVELOPMENT AREA, WITH LITTLE (OR NO) SITE DETENTION APPLICABLE FOR THE DEVELOPMENT. HOWEVER, TO ACHIEVE A 40% REDUCTION IN PRE-DEVELOPMENT FLOWS FOR THE POST-DEVELOPMENT CONDITION, WE NEED TO INCORPORATE A DETENTION TANK. PRELIMINARY CALCULATIONS INDICATE THAT A DETENTION TANK WITH A VOLUME OF APPROXIMATELY 20 kL WOULD BE REQUIRED. THIS STORAGE VOLUME IS BASED ON REDUCING THE 1:100 YEAR ARI PRE-DEVELOPMENT FLOW BY 40% FOR THE PROPOSED 1:100 YEAR ARI POST-DEVELOPMENT FLOW, BASED ON OUR DEFINED DEVELOPMENT AREA.
10. TO ACHIEVE POLLUTION REDUCTION TARGETS, ALL THE SURFACE RUNOFF FROM HARDSTANDS WOULD BE CONVEYED INTO FILTER BASKETS PRIOR TO DISCHARGING TO THE UNDERGROUND SYSTEM. TO ACHIEVE THE REQUIRED LEVEL OF TERTIARY TREATMENT, AN ATLAN VORTCEPTOR (OR SIMILAR) COULD BE INSTALLED WHICH ACHIEVES THE FOLLOWING PERCENTAGE OF POLLUTANTS REDUCTIONS FROM THE ANNUAL URBAN LOAD:
    - 93% REDUCTION IN TOTAL SUSPENDED SOLIDS
    - 100% REDUCTION IN GROSS POLLUTANTS
    - 49% REDUCTION IN TOTAL NITROGEN
    - 86% REDUCTION IN TOTAL PHOSPHORUS
11. TYPICAL MINIMUM POLLUTION REDUCTION TARGETS FOR TERTIARY TREATMENT ARE AS ASSUMED TO BE AS FOLLOWS:
    - 80% REDUCTION IN TOTAL SUSPENDED SOLIDS
    - 90% REDUCTION IN GROSS POLLUTANTS
    - 45% REDUCTION IN TOTAL NITROGEN
    - 60% REDUCTION IN TOTAL PHOSPHORUS
12. ALL STORMWATER PIPEWORK NOMINAL Ø225 UPVC @ 0.5% MINIMUM.

STORMWATER CONCEPT ARRANGEMENT

SCALE 1:500

ADVERTISED PLAN

REV	DESCRIPTION	DATE	INT	APP
P3	LPD NOTES REVISED	20.11.2025	TM	TM
P2	REVISE STREET NUMBER ONLY	19.11.2025	TM	TM
P1	PRELIMINARY ISSUE	13.11.2025	TM	TM

FMG 50 YEARS ENGINEERING FORWARD THINKING
ADELAIDE MELBOURNE SYDNEY BRISBANE
fmgengineering.com.au | P 1300 975 879 | ABN 58 083 071 185
ISO 9001 Quality Management System | ISO 45001 OH&S Management System

SIGNATURE

CLIENT: CAULFIELD GRAMMAR SCHOOL

PROJECT TITLE: PROPOSED SPORTS FACILITY

SITE ADDRESS: CAULFIELD GRAMMAR SHELFORD CAMPUS
4 HOOD CRESCENT, CAULFIELD NORTH, VIC 3161

DRAWING TITLE: STORMWATER CONCEPT ARRANGEMENT

DESIGNED: TM	DRAWN: TM
CHECKED: -	No. OF SHEETS: 1 OF 1
SCALE: 1:500 @ A3	DATE UPDATED: NOVEMBER 25
SITE ID & JOB No.: 22263	REV:
DRAWING No.: C001	P3

Appendix D Climate Change Pre-Screening Checklist

(blank page)

Climate Change Pre-screening Checklist

Introduction

Version control

Version	Date	Description
Version 1	20/08/2021	Initial release
Version 2	9/11/2023	Re-released in editable format
Version 3	25/02/2026	Updated for use with Green Star Buildings v1.1

Purpose

This checklist is completed as part of the *Climate Change Pre-screening Checklist* criterion in *Minimum Expectations* in the *Climate Resilience* credit in Green Star Buildings v1.1. and the *Climate Change Resilience* credit in Green Star Buildings v1 and Green Star Performance v2.

Instructions

Complete the below table in this document. If the pre-screening item does not apply to the project, the questions in the remaining five columns do not need to be checked off or completed.

For projects registered under Green Star Buildings v1 and Green Star Performance v2, the new columns added in this version (signified by an asterisk *) are optional but are highly recommended to be completed.

The checklist is submitted with the project's Green Star submission. Converting the file to a pdf is recommended.

Architect Response

Pre-screening item	Applies to project	Has data regarding historic climate exposure been reviewed?*	Has data regarding future climate exposure been reviewed?	Has a risk to the project been identified?	Describe the risk and the data source used to identify this*	Has a risk treatment been identified?
The project area has previously been impacted by extreme climate events (e.g. storms/tropical cyclones, extreme rainfall and flooding, damaging winds, damaging hail, bushfires, heatwaves, drought, or coastal inundation).	Choose an item.	Choose an item.	Choose an item.	Choose an item.		Choose an item.
The project is located in a cyclone zone.	No	Choose an item.	Choose an item.	Choose an item.		Choose an item.
The project is located in or adjacent to a bushfire prone area.	No	Choose an item.	Choose an item.	Choose an item.		Choose an item.
The project is located in or adjacent to a flood prone area. 1)	Yes	NA	NA	Yes	Climate Response Strategy	Yes
The project is located at or adjacent to the coastline or tidally influenced waterway. 2)	Yes	NA	NA	Yes	Climate Response Strategy	Yes
The project will accommodate occupants vulnerable to the impacts of climate extremes (e.g. children, elderly, low mobility, seeking medical treatment).	Yes	NA	NA	Yes	Climate Response Strategy	Yes

Refer to *Adapting to a Changing Climate in Glen Eira*, page 15 of the attached Glen Eira CC Climate Emergency Response Strategy 2025-2029 for key climate risks in Glen Eira.

1) The area was historically swampy, and parts still follow natural runoff paths when drainage systems are overwhelmed.
2) Shelford Campus is within the Elster Creek Catchment, and Elster Creek *is* a tidally influenced waterway.

Review Confirmation

Date:10/03/2026 Name: Kingsley Cheung

Position: Senior Associate Company: CO.OP Studio

Building Services Engineer Response

Pre-screening item	Applies to project	Has data regarding historic climate exposure been reviewed?*	Has data regarding future climate exposure been reviewed?	Has a risk to the project been identified?	Describe the risk and the data source used to identify this*	Has a risk treatment been identified?
The project area has previously been impacted by extreme climate events (e.g. storms/tropical cyclones, extreme rainfall and flooding, damaging winds, damaging hail, bushfires, heatwaves, drought, or coastal inundation).	Choose an item.	Choose an item.	Choose an item.	Choose an item.		Choose an item.
The project is located in a cyclone zone.	No	Choose an item.	Choose an item.	Choose an item.		Choose an item.
The project is located in or adjacent to a bushfire prone area.	No	Choose an item.	Choose an item.	Choose an item.		Choose an item.
The project is located in or adjacent to a flood prone area. 1)	Yes	NA	NA	Yes	Climate Response Strategy	Yes
The project is located at or adjacent to the coastline or tidally influenced waterway. 2)	Yes	NA	NA	Yes	Climate Response Strategy	Yes
The project will accommodate occupants vulnerable to the impacts of climate extremes (e.g. children, elderly, low mobility, seeking medical treatment).	Yes	NA	NA	Yes	Climate Response Strategy	Yes

Refer to *Adapting to a Changing Climate in Glen Eira*, page 15 of the attached Glen Eira CC Climate Emergency Response Strategy 2025-2029 for key climate risks in Glen Eira.

1) The area was historically swampy, and parts still follow natural runoff paths when drainage systems are overwhelmed.
2) Shelford Campus is within the Elster Creek Catchment, and Elster Creek *is* a tidally influenced waterway.

Review Confirmation

Date:06/03/2026 Name: Sergey Khmelevskiy

Position: Associate Mechanical Engineer Company: Erbas

Civil Engineer Response

Pre-screening item	Applies to project	Has data regarding historic climate exposure been reviewed?*	Has data regarding future climate exposure been reviewed?	Has a risk to the project been identified?	Describe the risk and the data source used to identify this*	Has a risk treatment been identified?
The project area has previously been impacted by extreme climate events (e.g. storms/tropical cyclones, extreme rainfall and flooding, damaging winds, damaging hail, bushfires, heatwaves, drought, or coastal inundation).	No	NA	NA	NA	NA	NA
The project is located in a cyclone zone.	No	NA	NA	NA	NA	NA
The project is located in or adjacent to a bushfire prone area.	No	NA	NA	NA	NA	NA
The project is located in or adjacent to a flood prone area. 1)	Yes	Yes	NA	Yes	Project designed with freeboard above known flood planning levels to be confirmed by Council	Yes
The project is located at or adjacent to the coastline or tidally influenced waterway. 2)	Yes	NA	NA	NA	Awaiting Council's further response	NA
The project will accommodate occupants vulnerable to the impacts of climate extremes (e.g. children, elderly, low mobility, seeking medical treatment).	Yes	Yes	NA	Yes	Project designed with freeboard above known flood planning levels to be confirmed by Council	Yes

Refer to *Adapting to a Changing Climate in Glen Eira*, page 15 of the attached Glen Eira CC Climate Emergency Response Strategy 2025-2029 for key climate risks in Glen Eira.

1) The area was historically swampy, and parts still follow natural runoff paths when drainage systems are overwhelmed.
2) Shelford Campus is within the Elster Creek Catchment, and Elster Creek *is* a tidally influenced waterway.

Review Confirmation

Date: 6/03/2026 Name: Anthony Masters

Position: Principal Engineer Company: FMG Engineering

Client Response

Pre-screening item	Applies to project	Has data regarding historic climate exposure been reviewed?*	Has data regarding future climate exposure been reviewed?	Has a risk to the project been identified?	Describe the risk and the data source used to identify this*	Has a risk treatment been identified?
The project area has previously been impacted by extreme climate events (e.g. storms/tropical cyclones, extreme rainfall and flooding, damaging winds, damaging hail, bushfires, heatwaves, drought, or coastal inundation).	No	NA	NA	NA	NA	NA
The project is located in a cyclone zone.	No	NA	NA	NA	NA	NA
The project is located in or adjacent to a bushfire prone area.	No	NA	NA	NA	NA	NA
The project is located in or adjacent to a flood prone area. 1)	Yes	No	No	No	-	No
The project is located at or adjacent to the coastline or tidally influenced waterway. 2)	Yes	No	No	No	-	No
The project will accommodate occupants vulnerable to the impacts of climate extremes (e.g. children, elderly, low mobility, seeking medical treatment).	Yes	No	No	No	-	No

Refer to *Adapting to a Changing Climate in Glen Eira*, page 15 of the attached Glen Eira CC Climate Emergency Response Strategy 2025-2029 for key climate risks in Glen Eira.

1) The area was historically swampy, and parts still follow natural runoff paths when drainage systems are overwhelmed.
2) Shelford Campus is within the Elster Creek Catchment, and Elster Creek *is* a tidally influenced waterway.

Review Confirmation

Date: 13 March 2026 Name: Richard Li

Position: Client Representative Company: Caulfield Grammar School

Glen Eira City Council

Climate Emergency Response Strategy 2025–2029

GLEN EIRA CITY COUNCIL

BENTLEIGH
BENTLEIGH EAST
BRIGHTON EAST
CARNEGIE
CAULFIELD
ELSTERNWICK
GARDENVALE
GLEN HUNTLY
MCKINNON
MURRUMBEENA
ORMOND
ST KILDA EAST

CONTENTS

THE *GLEN EIRA CITY COUNCIL CLIMATE EMERGENCY RESPONSE STRATEGY 2025–2029* WAS ADOPTED BY GLEN EIRA CITY COUNCIL AT ITS ORDINARY COUNCIL MEETING ON 28 OCTOBER 2025.

CONTENTS

NATIONAL IMPACTS OF CLIMATE CHANGE

HEALTH AND COMMUNITY

- More stress on health and emergency services
- More heat-related deaths, particularly among the elderly and disadvantaged
- Mental health effects
- Changes in disease occurrence
- Increased respiratory conditions associated with poor air quality

Example

During the 2014 heatwave, Melbourne experienced four consecutive days above 41°C. This left parts of Melbourne without electricity, thousands of commuters stuck and an estimated 167 excess deaths.

ENVIRONMENT

- Amplification of existing threats to flora and fauna
- Habitat loss, degradation and fragmentation
- Altered disturbance regimes
- Changing dynamics of invasive species
- Bushfires and smoke haze
- Altered rainfall patterns

Example

Many Australian animals are breeding and migrating earlier each decade, and the flowering times of plants are also changing – but often at different rates, threatening to disrupt delicate ecological relationships.

INFRASTRUCTURE

- Increased flood damage
- Increased maintenance costs
- Extreme heat impacts
- Increased disruption to services

Example

According to a new *Climate Change Authority Report,* back-to-back disasters have cost the Australian economy $2.2 billion in the first half of 2025 alone. The cost is projected to rise to $8.7 billion annually by 2050 without strong action.

PRIMARY PRODUCTION

- Earlier flowering and planting times
- Changed distribution of pests and diseases
- Farm businesses affected by bushfire
- Reduced water security

Example

An assessment conducted by the NSW Government found that climate change is already leading to a wide range of impacts on local farmers, including lower rainfall in winter and spring when it is most needed by food crops, floods washing away plants and the soil they depend on.

CASE STUDY

KEEPING IT BELOW 1.5 DEGREES OF WARMING IN VICTORIA

Extreme weather events are becoming more frequent and intense. Victoria has experienced significant changes in heatwave patterns since the 1950s, with these events now occurring more often, lasting longer, and beginning earlier in the season. Their intensity has also steadily increased over time. Average annual rainfall may have decreased, but extreme rainfall events, leading to localised flooding, are becoming more intense.[1]

The atmosphere can hold about seven per cent more water vapour for each degree of warming, and an atmosphere with more moisture can produce more intense precipitation events. Global warming of two degrees Celsius by 2050 and over three degrees Celsius by 2090 is will take place unless deep reductions in climate emissions occur in the coming decades.[2] This requires every part of our society to immediately reduce its reliance on combustion fuels and transition to an all-electric future.

1 *Victoria Climate Science Report 2024* climatechange.vic.gov.au

2 *Victoria Climate Science Report 2024* climatechange.vic.gov.au

ADAPTING TO A CHANGING CLIMATE IN GLEN EIRA

Locally in Glen Eira, the most immediate and serious risks of climate change include more extreme heat, worsening urban heat island effects, and increased pressure on public health, particularly for vulnerable residents. Heatwaves are one of Glen Eira's deadliest natural hazards, contributing to higher rates of heat-related illness, hospital admissions, and fatalities.

Hotter conditions will also put more pressure on infrastructure like roads and buildings and make it harder for trees and green spaces to cope with extended periods of prolonged heat.

Climate change is also affecting rainfall patterns, contributing to periods of drought interspersed with intense rainfall events, which increases the risk of flash flooding in parts of Glen Eira's urban catchment. Additionally, the impacts of climate change can intersect with broader social and economic pressures, contributing to risks such as food insecurity, rising insurance costs, and exacerbating existing inequalities.

IN GLEN EIRA, THE KEY CLIMATE RISKS INCLUDE:

FLASH FLOODING
More frequent and intense heavy downpours, leading to localised flash flooding

HEATWAVES
Higher temperatures year-round and more frequent and extreme heat waves, contributing to the urban heat island effect

DROUGHTS
Lower average rainfall and higher evaporation, exacerbating water scarcity and contributing to droughts

AIR QUALITY
Reductions in air quality, especially as bushfires become more frequent

BIODIVERSITY DECLINE
Decline in urban biodiversity and canopy cover due to heat stress

SEA LEVELS
Rising sea levels and the increased frequency and height of extreme sea level events will push seawater from the Bay into our drainage system, which reduces the capacity of these drainage systems during major flooding events

Appendix E Heat Island Analysis

(blank page)

Site Area: 4,818.2 sqm less 1,617.5 sqm existing multi-purpose court = **3,200.7 sqm**

Roof: 1,358.4 sqm
Soft Landscape & Canopy Cover: 948.5 + 185.6 + 152.3 = 1,286.4 sqm
Total Compliant Area 1,358.4+1286.4= **2,644.8 sqm (82.6%)**

FUTURE EXTENDED SOCCER PITCH (NOT PART OF SCOPE)

PROPOSED GATES. REFER ARCHITECT

LINEAR TIMBER SEAT

TEMPORARY MAINTENANCE SHEDS. REFER ARCHITECT

948.5 sq m

PLAY MOUND

GYM

MONKEY BAR

CUBBY

BALANCE COURSE

INDOOR COURT

4,818.2 sq m

1,358.4 sq m

SEATING

STORE

OFFICE

FOYER

MULTI-PURPOSE ACCESS

CHANGE 01

CHANGE 02

CLNRS

ACC. CH

REF CHANGE

WC

AMB. WC

MULTI-PURPOSE

185.6 sq m

1,617.5 sq m

153.2 sq m

RETAIN EXISTING WALL

1:15 RAMP

A.S. COMPLIANT RAMP w. HANDRAIL BOTH SIDES

TGSI TOP & BOTTOM

EXISTING LEVELS RETAINED TO EXTENT OF RESURFACING

FENCE TO NORTH SIDE OF COURTS BY ARCHITECT

FX03 SPECTATOR SEATING

REBOUND WALL

HERITAGE OVERLAY

EXISTING BUILDING

PALING FENCE

PICKET FENCE

HIGH CHAIN WIRE FENCE

CHAIN WIRE FENCE

OVERHEAD WIRE

ELECTRIC POLE

HYDRANT

SPRINKLER

LEGEND

DRAWING SYMBOLS

- EXISTING TREES TO BE RETAINED
- PROPOSED TREES
- EXISTING TREE TO BE REMOVED
- TREE PROTECTION ZONE
- TREE SRZ ZONE
- TITLE BOUNDARY
- + EX 0.00 EXISTING LEVEL
- + RL 0.00 RELATIVE LEVEL
- + FFL 0.00 FINISHED FLOOR LEVEL

SOFT LANDSCAPE

- LA01 LAWN
- GB01 GARDEN - TYPICAL
- GB02 TREE PROTECTION MULCH GARDEN
- LANDSCAPE LOG
- LANDSCAPE BOULDERS

PAVEMENT TYPES GROUND

- PV01 COLOURED CONCRETE
- PV02 MULCH SOFTFALL
- PV03 PLAY SAND

APPLIED FINISHES

- CL01 COLOUR COAT TO EXISTING HARDSTAND
- CL02 LINEMARKING

FIXTURES

- FX01 PLATFORM SEAT
- FX02 OFF FORM CONCRETE SEAT
- FX03 SPECTATOR SEAT

ADVERTISED PLAN

E S

CGS SHELFORD CAMPUS
3 HOOD CRESCENT,
CAULFIELD VIC 3161

20/01/2026
LANDSCAPE PLAN

P1
SK200

0 1.88 3.75 7.5 15 m
1:150 @ A1

PRELIMINARY
NOT FOR CONSTRUCTION

LCI
ARTELIA GROUP

Lehr Consultants International (Australia) Pty Ltd (ABN 92 124 107 973) is the evolution of a firm which began in 1969. Challenging the standard approach to Building Services engineering, LCI offers traditional and innovative consulting services worldwide, as well as access to cutting edge technological thought, applications and proprietary systems.

LCI Consultants is proudly employee-owned and in-house operated, backed by the global strength of Artelia Group.

VISIT US
www.lciconsultants.com.au

MELBOURNE
Level 17/242 Exhibition St,
Melbourne, VIC 3000
P: (03) 9230 5600

SYDNEY
Level 8/73 Miller St,
North Sydney, NSW 2060
P: (02) 9157 0570

BRISBANE
Level 1/293 Queen St,
Brisbane City, QLD 4000
P: (07) 3831 3300

PERTH
Level 9/108 St Georges Tce,
Perth, WA 6000
P: (08) 9242 5857

CANBERRA
Level 2/1 Farrell Pl,
Canberra, ACT 2601
P: (02) 9157 0570

ADELAIDE
Level 4/91 King William St
Adelaide, SA, 5000
P: (08) 7078 8896