

St Matthews Catholic High School, Mudgee

ESD Report for SSDA

**Catholic Education Diocese
of Bathurst**

By Cundall

Level 1, 48 Alfred Street

Milsons Point, NSW 2061

Ph (02) 8424 7000

Fax (02) 8424 7099

Please contact: Julian Bott

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Executive Summary

This report describes how the new St Matthews Catholic High School will address the Ecologically Sustainable Development (ESD) requirements set out in clause 8 of Secretary's Environmental Assessment Requirements (SEARs) dated 1 March 2019.

The ESD principles set out in clause 7(4) of Schedule 2 of the Environmental Planning and Assessment Regulations 2000 – the precautionary principle, inter-generational equity, conservation of biological diversity and ecological integrity, and improved valuation, pricing and incentive mechanisms – are all achieved through a range of design and operation initiatives described in this report.

A range of measures will be implemented to minimise the consumption of energy, water and resources, and to enhance health & wellbeing and biodiversity. These are set out under the following sustainability framework for the project.

	Energy Efficiency	Making buildings and infrastructure energy efficient and supplying all energy with renewables.
	Water	Using water efficiently, protecting local water resources and reducing flooding, drought and water pollution.
	Health & Wellbeing	Encouraging active, social, meaningful lives and providing the buildings, infrastructure and spaces to support good health and wellbeing for all ages.
	Materials & Supply Chain	Using materials from sustainable sources, applying circular economy principles and prioritising products with transparent, ethical supply chains.
	Waste	Reducing consumption and re-using and recycling to work towards zero waste to landfill.
	Land & Nature	Restore, preserve and protect land, biodiversity and natural capital for the benefit of people and wildlife.
	Community & Culture	Nurturing local identity and heritage, empowering communities and promoting a culture of sustainable living.
	Travel & Transport	Reducing the need to travel and encouraging walking, cycling and low carbon transport.
	Climate Risk & Adaptation	Applying practical actions to manage risks from climate impacts, protecting communities and strengthening the resilience of the local economy.
	Equity & Economy	Creating safe, just and equitable places to live, work, learn & trade, and supporting local prosperity and fair trade.
	Sustainable Food	Promoting sustainable humane farming and healthy diets high in local, seasonal organic food and vegetable protein.
	Pollution	Minimising air, noise, land, water and night sky pollution.

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Figure 1 St Matthews Catholic High School - Artist impression of the project

1.0 Project Overview

Introduction

St Matthews Catholic School is an existing Kindergarten to Year 12 School located in the heart of Mudgee CBD. The school has outgrown the existing school campus and is considered inadequate in its capacity to cater for the anticipated enrolment growth, necessary facilities and open space.

The new 12.14ha site is located on the corner of Broadhead and Bruce Roads in South Mudgee. This is a relatively flat Greenfields site, which provides the opportunity for appropriate built and landscaped spaces to cater for the schools' aspirations.

This proposal is for the construction of a new Secondary school, (Years 7-12) component of the school, with the Primary school remaining at the existing Lewis Street site. Masterplanning includes for the provision of future stages to allow capacity and flexibility for future direction.

The school has identified their vision as: *"At St Matthews Catholic School we believe that all in our community can learn at high levels in a Christ-centred, engaging, collaborative, and nurturing environment"*.



Figure 2 Project location.

Project Description

The SSD DA seeks consent for the construction of a new multi-purpose secondary education facility within the Mudgee Region that meets future demands for the developing region.

The new secondary school to be known as St Matthews Catholic High School Mudgee School will cater for 680 secondary school students (4-Stream Year 7-12) and will comprise of a cluster of five low-rise school buildings (1-2 storeys) including:

- Block A - Professional Hub (office and administration)
- Block B - Spiritual Hub (Chapel)
- Block C - Community Hub (Multi-purpose hall, Music/Dance Studio and canteen)
- Block D - STEM Research Hub (teaching spaces)
- Block E - Knowledge and Learning Hubs (General Teaching spaces)
- Yarning Circle (Outdoor learning area)

- Outdoor Student Assembly Area and COLA
- Student free play area
- Staff and student amenities
- Associated site landscaping and public domain improvements
- On-site parking and access arrangements off Bruce Road, including:
 - On-grade car park for staff, students and visitors (75 spaces – including 2 accessible spaces)
 - A 12 bay student drop-off and pick-up area
 - A 3-bay bus drop-off and layover area
 - Bus turning area and servicing access
 - Dedicated separate driveway for service vehicles
 - Bicycle parking for 30 bicycles
- Associated earthworks, civil works, perimeter roadworks, fencing, services and utilities connections and augmentation, including:
 - Roadworks to Broadhead Road and Bruce Road to the full extent of the site frontages
 - Roadworks to the Broadhead Road and Bruce Road intersection to cater for bus movements
 - Footpath along the site frontage of Broadhead Road and suitable pedestrian crossing to connect to existing footpath.
 - Stormwater infrastructure upgrades adjacent to and within the site, including new culverts and drains, levee, and bioswale.
 - Connection to existing sewer line within the site
 - Electrical and water connections into the site



Figure 3 Proposed Site Plan

2.0 Secretary's Environmental Assessment Requirements

This report supports a State Significant Development application (SSD Application) by addressing Section 8 - Ecologically Sustainable Development (ESD) of the Secretary's Environmental Assessment Requirements (SEARs), dated 1 March 2019, following requirements:

- *Detail how ESD Principles (as defined in clause 7(4) of Schedule 2 of the EPA Regulation) will be incorporated in the design and ongoing operation phases of the development.*
- *Include a framework for how the future development will be designed to consider and reflect national best practice sustainable building principles to improve environmental performance and reduce ecological impact. This should be based on a materiality assessment and include:*
 - *waste reduction design measures*
 - *future proofing*
 - *use of sustainable and low-carbon materials*
 - *energy and water efficient design (including water sensitive urban design)*
 - *and technology and use of renewable energy*
- *Include preliminary consideration of building performance and mitigation of climate change, including consideration of Green Star Performance.*
- *Include details of the initiatives that would enable the future development to achieve a minimum of 4 Star Green Star rating in accordance with the rating system of the Green Building Council Australia.*
- *Provide a statement regarding how the design of the future development is responsive to the CSIRO projected impacts of climate change, specifically:*
 - *hotter days and more frequent heatwave events*
 - *extended drought periods*
 - *more extreme rainfall events*
 - *gustier wind conditions*
 - *how these will inform landscape design, material selection and social equity aspects (respite/shelter areas).*

Relevant Policies and Guidelines: NSW and ACT Government Regional Climate Modelling (NARClIM) climate change projections.

3.0 ESD Principles

This section addresses the principles of ecologically sustainable development in relation to the Secretary's Environmental Assessment Requirements dated 1 March 2019.

Clause 7(4) of Schedule 2 of the *Environmental Planning and Assessment Regulation 2000*, defines the principles of ecologically sustainable development as follows:

- (a) **the precautionary principle**, namely, that if there are threats of serious or irreversible environmental damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation. In the application of the precautionary principle, public and private decisions should be guided by:
 - i) careful evaluation to avoid, wherever practicable, serious or irreversible damage to the environment, and
 - ii) an assessment of the risk-weighted consequences of various options,
- (b) **inter-generational equity**, namely, that the present generation should ensure that the health, diversity and productivity of the environment are maintained or enhanced for the benefit of future generations,
- (c) **conservation of biological diversity and ecological integrity**, namely, that conservation of biological diversity and ecological integrity should be a fundamental consideration,
- (d) **improved valuation, pricing and incentive mechanisms**, namely, that environmental factors should be included in the valuation of assets and services, such as:
 - i) polluter pays, that is, those who generate pollution and waste should bear the cost of containment, avoidance or abatement,
 - ii) the users of goods and services should pay prices based on the full life cycle of costs of providing goods and services, including the use of natural resources and assets and the ultimate disposal of any waste,
 - iii) environmental goals, having been established, should be pursued in the most cost effective way, by establishing incentive structures, including market mechanisms, that enable those best placed to maximise benefits or minimise costs to develop their own solutions and responses to environmental problems.

Response to ESD Principles

Precautionary Principle

The project presents no threat of serious or irreversible environmental damage. The project will deliver ecological restoration and habitat creation to improve the site, implement climate change adaptation principles, and apply industry best practice ESD initiatives.

Inter-Generational Equity

The buildings will provide healthy internal and external environments for teaching students today and in the future. The landscaping principles of ecological restoration and habitat creation will deliver benefit to current and future generations.

Conservation of Biological Diversity and Ecological Integrity

The landscape design will aim to maintain or enhance the biological diversity and ecological integrity of the site.

Improved Valuation, Pricing and Incentive Mechanisms

The design and operation of the school will reduce energy and water consumption and greenhouse gas emissions. Life Cycle Costing will be used throughout the design process to justify capital investment and reduce ongoing impacts.

4.0 Sustainability Initiatives

The following principles and initiatives were reviewed and are included in the Sustainability Framework for the St Matthews Catholic High School development:

- St Matthews Catholic School Mudgee Vision and Mission
- One Planet Living Principles
- UN The Sustainable Development Goals
- Climate Change Adaptation
- Green Star Design and As Built equivalency initiatives

4.1 School Vision and Mission

The two fundamental values of St Matthews Catholic School are 'Truth' and 'Excellence', which forms the basis of the school motto: "Truth and Excellence will Prevail". School vision and mission are driven from these fundamental beliefs.

St Matthews Catholic School vision is a belief that all in our community can grow in their learning at high levels in a Christ-centred, engaging, collaborative, and nurturing environment. School mission is developed from the collective commitments as a school community to ensure that school values and vision are visible in 'all we say and do'.



4.2 One Planet Living Principles

One Planet Living, developed by BioRegional and WWF, is a global initiative based on ten guiding principles of sustainability: health and happiness, equity and local economy, culture and community, land and nature, sustainable water, local and sustainable food, travel and transport, materials and products, zero waste, and zero carbon energy. Due to this sustainable model, BioRegional has achieved worldwide acclaim and is one of the most globally respected environmental charities.

One Planet Living is unlike formal prescriptive certification systems, as it is flexible in implementation, and much wider in scope. Thanks to provision of simple principles that cover all aspects of social, environmental and economic sustainability it was adapted as a baseline for establishing a sustainability framework for the St Matthews Catholic High School new development.



4.3 UN Sustainable Development Goals

The Sustainable Development Goals (SDGs) were established at the United Nations Conference on Sustainable Development in Rio de Janeiro in 2012. The objective was to produce a set of universal goals that meet the urgent environmental, political and economic challenges facing our world. The SDGs replace the Millennium Development Goals (MDGs), which started a global effort in 2000 to tackle the indignity of poverty.

SDGs are a universal call to action to end poverty, protect the planet and ensure that all people enjoy peace and prosperity. These 17 Goals include areas such as climate change, economic inequality, innovation, sustainable consumption, peace and justice, among other priorities. The goals are interconnected – often the key to success on one will involve tackling issues more commonly associated with another.

Alignment with 13 out of 17 UN Sustainable Development Goals were identified within the framework for the St Matthews Catholic High School new development.



4.4 Green Star



Green Star, developed and administered by the Green Building Council of Australia (GBCA), is a set of rating tools that deliver independent verification of sustainable outcomes throughout the life cycle of the built environment.

The GBCA’s mission is to “lead the sustainable transformation of the built environment” and it aims to achieve this by encouraging practices that:

- Reduce the impact of climate change
- Enhance the health and quality of life of inhabitants and the sustainability of the built environment
- Restore and protect the planet’s biodiversity and ecosystems
- Ensure the ongoing optimum operational performance of buildings
- Contribute to market transformation and a sustainable economy

Green Star - Design & As Built scheme assesses the sustainability outcomes from the design and construction of new buildings or major refurbishments and rates them on a scale from 4 (Best Practice) to 6 Stars (World Leadership).

Green Star Design & As Built rating tool includes requirements across the following nine holistic impact categories:



- **Management** Aims to encourage and reward the adoption of practices and processes that support best practice sustainability outcomes throughout the different phases of a project’s design, construction and ongoing operation.



- **Indoor Environment Quality** Aims to encourage and reward initiatives that enhance the comfort and well-being of occupants. The credits within this category address issues such as air quality, thermal comfort and acoustic comfort.



- **Energy** Aims to reward projects that are designed and constructed to reduce overall greenhouse emissions from operations by addressing energy demand reduction, use efficiency and generation from alternative sources.



- **Transport** Aims to reward projects that facilitate a reduction on the dependency of private car use as an important means of reducing overall greenhouse gas emissions, as well as to encourage the provision of alternative forms of transportation.



- **Water** Aims to encourage and reward initiatives that reduce the consumption of potable water through measures such as the incorporation of water efficient fixtures and building systems and water re-use.



- **Materials** Aims to address the consumption of resources for the project, by encouraging the selection of low-impact materials.



- **Land Use and Ecology** Aims to reduce the negative impacts on sites' ecological value as a result of urban development and reward projects that minimise harm and enhance the quality of local ecology.



- **Emissions** Aims to assess the environmental impacts of 'point source' pollution generated by projects and reduce their effects on the atmosphere, watercourse and native animals.



- **Innovation** Aims to recognise the implementation of innovative practices, processes and strategies that promote sustainability in the built environment.

4.4.1 Green Star equivalency approach

St Matthews Catholic High School will be developed and constructed to a standard equivalent to a 4 Star Green Star Design & As Built v1.3 rating - Industry Best Practice, but the actual GBCA full certification will not be sought.

A Preliminary Green Star Pathway for the project is provided in Appendix A showing the targeted credits. As the design develops, these may be modified however sufficient credits will be targeted to a minimum score of 45 points - equivalent to 4 Star rating.

There are approximately 45 relatively readily achievable points. Additional 6 TBC points will be reviewed in the further design development stage to allow for targeting approx. 50 points in total. Table 2 below provides summary of the Targeted and TBC credits.

Table 1 Green Star Targeted and TBC Credits

Credit Code	Credit Category	Target Credit (Points)	TBC Credits (Points)
Management			
1	Green Star Accredited Professional	1	
2	Commissioning and Tuning	2	
3	Adaptation and Resilience		
4	Building Information	1	
5	Commitment to Performance	2	
6	Metering and Monitoring	1	
7	Responsible Building Practices	2	
8	Operational Waste	1	
Indoor Environment Quality			
9	Indoor Air Quality	2	
10	Acoustic Comfort		3
11	Lighting Comfort	2	
12	Visual Comfort		
13	Indoor Pollutants	2	
14	Thermal Comfort		
Energy			
15	Greenhouse Gas Emissions	6	2
16	Peak Electricity Demand Reduction	1	
Transport			
17	Sustainable Transport	1	
Water			
18	Potable Water	5	
Materials			
19	Life Cycle Impacts	4	
20	Responsible Building Materials	2	
21	Sustainable Products		
22	Construction and Demolition Waste		
Land Use & Ecology			
23	Ecological Value	1	

24	Sustainable Sites		
25	Heat Island Effect	1	
	Emissions		
26	Stormwater	2	
27	Light Pollution	1	
28	Microbial Control	1	
29	Refrigerant Impacts	-	
	Innovation		
30	Innovation Challenge	4	1
	Total	45	6

4.5 Climate Change Adaptation

St Matthews Catholic High School development addresses the projected impacts of climate change. The following projections are based on data available on the ‘Climate Change in Australia’ as developed by the CSIRO and were reviewed by the design team as a part of the design development process:

Hotter days and more frequent heatwave events

Temperatures have increased over the past century, with the rate of warming higher since 1960. Mean temperature increased between 1910 and 2013 by around 0.8 °C. The recent decades have been the warmest on record for both daily minimum and daily maximum temperatures in the cluster.

There is very high confidence in continued substantial increases in projected mean, maximum and minimum temperatures in line with our understanding of the effect of further increases in greenhouse gas concentrations. For the near future (2030), the annually averaged warming across all emission scenarios is projected to be around 0.5 to 1.3 °C above the climate of 1986–2005. By late in the century (2090), for a high emission scenario (RCP8.5) the projected range of warming is 2.9 to 4.6 °C. Under an intermediate scenario (RCP4.5) the projected warming is 1.3 to 2.5 °C.

Extreme temperatures are projected to increase at a similar rate to mean temperature, with a substantial increase in the temperature reached on hot days, the frequency of hot days, and the duration of warm spells (very high confidence).

Extended drought periods

Potential evapotranspiration is projected to increase in all seasons as warming progresses and time spent in drought is projected to increase over the course of the century.

More extreme rainfall events

Understanding of the physical processes that cause extreme rainfall, coupled with modelled projections, indicate with high confidence a future increase in the intensity of extreme rainfall events, although the magnitude of the increases cannot be confidently projected.

Gustier wind conditions

The increase in temperatures is expected to see the severity of storms increasing, including the intensity of rainfall and wind periods.

4.5.1 General Design Philosophy

The CSIRO climate change predictions and impacts have been reviewed by the design team and the following design philosophy was established:

- The project design has been founded on the consideration of site contextual and climatic concerns
- Solar orientation, overshadowing, prevailing seasonal winds patterns and temperatures have all been considered
- The building aggregation, floor planning, window orientation, shading and operation, cross ventilation strategies, and insulation levels respond to those considerations
- The proposed design allows capacity for climate control systems to be expanded, with materials selections including lightweight options and flexible construction allowing for possible further adaptation strategies if required

- The landscaping proposal responds to the local conditions, with a preference for endemic local species, and drought-tolerant plants
- The proposed design is alert to possible further climatic mitigation requirements and proposes a light touch with open ends which can best respond or adapt to future changes

In relation to specific climate considerations, the future development has adapted as follows:

Hotter days and more frequent heatwave events

- Heating and cooling systems are proposed to accommodate a margin of external temperature change throughout their lifecycle. Efficiencies in the built form, architectural design, building construction and NCC BCA 2019 energy efficiency requirements also contribute to higher performing, more efficient heating and cooling systems which reduce energy consumption and the system's ability to respond to periodic changes in outlying conditions
- All plant spaces are external to the building and capable of expansion in size should higher system capacities be required upon replacement to accommodate current climate projects at the time. Similarly, the building construction and decentralised nature of the site provides adequate access to install additional services to accommodate sudden changes in internal or external environmental and operational conditions as may be needed due to climate change
- Monitoring systems are proposed to record some facets of building use to enable data-driven decisions on future replacements to meet climate adaptation needs. This will also include recording of site temperature with a capacity to integrate additional environmental monitoring devices in the future which can facilitate comparisons between climate and building system demands
- Energy supply systems have spare capacity factored in to accommodate future increase in electrical load
- Rooftop PV systems will assist to decrease energy demand during peak solar irradiation periods of the day with capacity for expansion in future to meet any other increased to load, whether driven by climate change response/adaptation or operational reasons
- All building services equipment and devices will be selected to accommodate appropriate expected operating temperature ranges throughout their lifecycle

Extended drought periods and extreme rainfall events

- The proposed site has been designed with above ground rainwater tanks to collect water from the majority of available roof area. The tanks are positioned externally and capable of expansion as needed to adapt to the increasing intensity of rainfall events and duration between events. Overflow is provided to the central inground tank which is planned for irrigation purposes, therefore prioritising the servicing of the building needs to conserve critical water resources
- Rainwater re-use is paired with the targeted 5 and 6 star WELS rated fixtures and fittings to increase the water efficiency and reduce the demand on town water supply in drought periods
- The buildings are sited to mitigate the impact of flooding and damage in extreme rainfall events
- The proposed site also has enough area to integrate future potable water storage, filtration and pumping systems should future township climate adaptations plans recommended increased public infrastructure resilience

Gustier wind conditions

- The buildings have been sited and orientated to mitigate the impact of prevailing winds and aggregated in a nesting fashion to create protected spaces to provide shelter or protection from these winds

Social Equity aspects

- The aggregation of buildings nested together provides access to a variety of areas depending on prevailing seasonal or climatic conditions; allowing staff and students to seek options for respite/shelter or access areas that provide enhanced personal comfort or safety

The above statements outline the considerations and measures adopted to ensure the future development is responsive to the projected impacts of climate change. During the design development process the project team will refine and formalise the implementation of the measures to ensure the project realises these considerations and proposed outcomes.

5.0 Sustainability Framework

The following Table 3 provides a holistic Sustainability Framework for the St Matthews Catholic High School development:

Table 2 Sustainability Framework for the St Matthews Catholic High School

Impact		Objective	Alignment with UN SDG	Green Star Design & As-Built	Potential Strategies / Sustainability Initiatives
	Education for Sustainability	Educational approach that aims to develop students, schools and communities with the values and the motivation to take action for sustainability.		<ul style="list-style-type: none"> Possible Innovaton 	<ul style="list-style-type: none"> Programs to inform on sustainability initiatives delivered on the project Diverse educational programs available for students and parents A digital Sustainability Awareness campain
	Energy Efficiency	Making buildings and infrastructure energy efficient and supplying all energy with renewables.		<ul style="list-style-type: none"> Energy Management 	<ul style="list-style-type: none"> Passive design of new buildings No fossil fuels on site Energy efficient lighting PV on roof Smart controls
	Waste	Reducing consumption and re-using and recycling to work towards zero waste to landfill.	 	<ul style="list-style-type: none"> Management Materials 	<ul style="list-style-type: none"> Ban single-use plastics Recycling and Composting Reduce packaging Compostable or biodegradable food containers
	Travel & Transport	Reducing the need to travel and encouraging walking, cycling and low carbon transport.	 	<ul style="list-style-type: none"> Transport 	<ul style="list-style-type: none"> Bicycle parking and end-of-trip facilities for staff Safe access for walking & cycling to and from Parking for Green Vehicles
	Materials & Supply Chain	Using materials from sustainable sources, applying circular economy principles and prioritizing products with transparent, ethical supply chains.		<ul style="list-style-type: none"> Materials 	<ul style="list-style-type: none"> Limit/eliminate VOC, formaldehyde etc. Third party certification Modern Slavery in the supply chain Specify durable products
	Sustainable Food	Promoting sustainable humane farming and healthy diets high in local, seasonal organic food and vegetable protein.	 	<ul style="list-style-type: none"> Possible Innovaton 	<ul style="list-style-type: none"> Active promotion and advertisement of healthier food options Vegan/vegetarian cooking classes
	Sustainable Water	Using water efficiently, protecting local water resources and reducing flooding, drought and water pollution.	 	<ul style="list-style-type: none"> Water Emissions 	<ul style="list-style-type: none"> Low flow fittings Rainwater harvesting and reuse Passive stormwater treatment System controls and sensors Water metering

Impact		Objective	Alignment with UN SDG	Green Star Design & As-Built	Potential Strategies / Sustainability Initiatives
					<ul style="list-style-type: none"> Minimal irrigation
	Land & Nature	Restore, preserve and protect land, biodiversity and natural capital for the benefit of people and wildlife.		<ul style="list-style-type: none"> Land Use & Ecology 	<ul style="list-style-type: none"> Landscaping designed to support indigenous flora, fauna and biodiversity Stormwater retention and filtration
	Community & Culture	Nurturing local identity and heritage, empowering communities and promoting a culture of sustainable living.	 		<ul style="list-style-type: none"> Community interaction – naming, art provision, exhibition space Event spaces for community use
	Equity & Economy	Creating safe, just and equitable places to live, work, learn & trade, and supporting local prosperity and fair trade.	 		<ul style="list-style-type: none"> Award/wage commitments
	Health & Wellbeing	Encouraging active, social, meaningful lives and providing the buildings, infrastructure and spaces to support good health and wellbeing for all ages.		<ul style="list-style-type: none"> Indoor Environment Quality 	<ul style="list-style-type: none"> High-quality indoor environment quality Lighting for learning Outdoor comfort & shelter IEQ monitoring
	Climate Risk & Adaptation	Applying practical actions to manage risks from climate impacts, protecting communities and strengthening the resilience of the local economy.		<ul style="list-style-type: none"> Management 	<ul style="list-style-type: none"> Coping with increasing extremes of heat, wind and rain
	Pollution	Minimising air, noise, land, water and night sky pollution.		<ul style="list-style-type: none"> Emissions 	<ul style="list-style-type: none"> Reduce air pollution Reduce noise pollution Reduce night sky pollution via lighting design and control Water – see Sustainable Water

6.0 Appendix – Preliminary Green Star Pathway

Green Star - Design & As Built Scorecard

Project:	St Matthews Catholic High School, Mudgee	Round:	Equivalency
Targeted Rating:	4 Star - Best Practice		

Core Points Available	Total Score Targeted
100	45

CATEGORY / CREDIT	AIM OF THE CREDIT / SELECTION	CODE	CREDIT CRITERIA	POINTS AVAILABLE	POINTS TARGETED
Management				14	
Green Star Accredited Professional	To recognise the appointment and active involvement of a Green Star Accredited Professional in order to ensure that the rating tool is applied effectively and as intended.	1.1	Accredited Professional	1	1
		2.0	Environmental Performance Targets	-	Complies
Commissioning and Tuning	To encourage and recognise commissioning, handover and tuning initiatives that ensure all building services operate to their full potential.	2.1	Services and Maintainability Review	1	1
		2.2	Building Commissioning	1	
		2.3	Building Systems Tuning	1	1
		2.4	Independent Commissioning Agent	1	
Adaptation and Resilience	To encourage and recognise projects that are resilient to the impacts of a changing climate and natural disasters.	3.1	Implementation of a Climate Adaptation Plan	2	
Building Information	To recognise the development and provision of building information that facilitates understanding of a building's systems, operation and maintenance requirements, and environmental targets to enable the optimised performance.	4.1	Building Information	1	1
Commitment to Performance	To recognise practices that encourage building owners, building occupants and facilities management teams to set targets and monitor environmental performance in a collaborative way.	5.1	Environmental Building Performance	1	1
		5.2	End of Life Waste Performance	A. Contractual Agreements	1
Metering and Monitoring	To recognise the implementation of effective energy and water metering and monitoring systems.	6.0	Metering	-	Complies
		6.1	Monitoring Systems	1	1
Responsible Construction Practices	To reward projects that use best practice formal environmental management procedures during construction.	7.0	Environmental Management Plan	-	Complies
		7.1	Environmental Management System	1	1
		7.2	High Quality Staff Support	1	1
Operational Waste	B. Prescriptive Pathway	8A	Performance Pathway: Specialist Plan	0	
		8B	Prescriptive Pathway: Facilities	1	1
Total				14	10

Indoor Environment Quality				17		
Indoor Air Quality	To recognise projects that provide high air quality to occupants.	9.1	Ventilation System Attributes	1	1	
		9.2	Provision of Outdoor Air	<input type="checkbox"/> A. Comparison to Industry Standards <input type="checkbox"/> B. Performance Based Approach <input type="checkbox"/> C. Natural Ventilation	2	
		9.3	Exhaust or Elimination of Pollutants	<input checked="" type="checkbox"/> A. Removing the Source of Pollutants <input type="checkbox"/> B. Exhausting the Pollutants Directly to the Outside	1	1
Acoustic Comfort	To reward projects that provide appropriate and comfortable acoustic conditions for occupants.	10.1	Internal Noise Levels	1		
		10.2	Reverberation	1		
		10.3	Acoustic Separation	A. Sound Reduction	1	
Lighting Comfort	To encourage and recognise well-lit spaces that provide a high degree of comfort to users.	11.0	Minimum Lighting Comfort	-	Complies	
		11.1 General Illuminance and Glare Reduction	11.1.1 General Illuminance	<input checked="" type="checkbox"/> A. Non Residential Spaces <input type="checkbox"/> B. Residential Spaces	1	1
			11.1.2 Glare Reduction	<input type="checkbox"/> A. Prescriptive Method 1 <input type="checkbox"/> B. Prescriptive Method 2 <input type="checkbox"/> C. Performance Method		
		11.2	Surface Illuminance	<input type="checkbox"/> A. Prescriptive Method <input type="checkbox"/> B. Performance Method <input type="checkbox"/> C. Residential Spaces (Prescriptive Method)	1	
11.3	Localised Lighting Control		1	1		
Visual Comfort	To recognise the delivery of well-lit spaces that provide high levels of visual comfort to building occupants.	12.0	Glare Reduction	<input type="checkbox"/> A. Fixed Shading Devices <input type="checkbox"/> B. Blinds or Screens <input type="checkbox"/> C. Daylight Glare Model	-	Complies
		12.1	Daylight	<input type="checkbox"/> A. Prescriptive Methodology <input type="checkbox"/> B. Compliance Using Daylight Factor <input type="checkbox"/> C. Compliance Using Daylight Autonomy	2	
		12.2	Views		1	
Indoor Pollutants	To recognise projects that safeguard occupant health through the reduction in internal air pollutant levels.	13.1 Paints, Adhesives, Sealants and Carpets	13.1.1 Paints, Adhesives and Sealants	<input checked="" type="checkbox"/> A. Product Certification <input checked="" type="checkbox"/> B. Laboratory Testing <input type="checkbox"/> C. No Paints, Adhesives or Sealants	1	1
			13.1.2 Carpets	<input checked="" type="checkbox"/> A. Product Certification <input checked="" type="checkbox"/> B. Laboratory Testing <input type="checkbox"/> C. No Carpets		
		13.2	Engineered Wood Products	<input checked="" type="checkbox"/> A. Product Certification	1	1

		15.2 Engineered Wood Products	<input checked="" type="checkbox"/> B. Laboratory Testing	1	
Thermal Comfort	To encourage and recognise projects that achieve high levels of thermal comfort.	14.1 Thermal Comfort	<input type="checkbox"/> A. Naturally Ventilated Spaces	1	
			<input type="checkbox"/> B. Mechanically Ventilated Spaces		
			<input type="checkbox"/> C. Residential Spaces		
		14.2 Advanced Thermal Comfort	<input type="checkbox"/> A. Naturally Ventilated Spaces	1	
			<input type="checkbox"/> B. Mechanically Ventilated Spaces		
			<input type="checkbox"/> C. Residential Spaces		
Total				17	6

Energy				22	
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Greenhouse Gas Emissions	E. Reference Building Pathway	15A.0	Conditional Requirement: Prescriptive Pathway	-			
		15A.1	Building Envelope	0			
		15A.2	Wall-Glazing Construction and Retail Display Glazing	0			
		15A.3	Lighting	0			
		15A.4	Ventilation and Air Conditioning	0			
		15A.5	Domestic Hot Water	0			
		15A.6	Transition Plan	0			
		15A.7	Fuel Switching	0			
		15A.8	On-Site Storage	0			
		15A.9	Vertical Transportation	0			
		15A.10	Off-Site Renewables	0			
		15B.0	Conditional Requirement: NatHERS Pathway	-			
		15B.1	Thermal and Energy Performance	0			
		15B.2 Building Services and Appliances	15B.2.1	Lighting	0		
			15B.2.2	Ventilation and Air Conditioning	<input type="checkbox"/> A. Mechanically Conditioned Spaces <input type="checkbox"/> B. Spaces With Mechanical Heating Only <input type="checkbox"/> C. Naturally Ventilated Spaces	0	
			15B.2.3	Domestic Hot Water	0		
			15B.2.4	Appliances & Equipment	0		
			15B.2.5	Fuel Switching	0		
			15B.2.6	On-Site Storage	0		
			15B.2.7	Vertical Transportation	0		
			15B.2.8	Passive Laundry Facilities	0		
			15B.2.9	Unoccupied Areas	0		
			15B.2.10	Off-Site Renewables	0		
		15C.0	Conditional Requirement: BASIX Pathway	-			
		15C.1	BASIX Greenhouse Gas Reductions	0			
		15C.2	Off-Site Renewables	0			
		15D.0	Conditional Requirement: NABERS Pathway	-			
		15D.1	NABERS Energy Greenhouse Gas Emissions Reduction	0			
		15D.2	Off-Site Renewables	0			
		15D.3 Additional Prescriptive Measures	15D.3.1	Transition Plan	0		
			15D.3.2	Fuel Switching	0		
			15D.3.3	On-Site Storage	0		
		15E.0	Conditional Requirement: Reference Building Pathway	-	Complies		
15E.1	GHG Emissions Reduction: Building Fabric	4					
15E.2	GHG Emissions Reduction	16	6				
15E.3	Off-Site Renewables	8					
15E.4	District Services	7					

		15E.5 Additional Prescriptive Measures	15E.5.1 Transition Plan	1	
			15E.5.2 Fuel Switching	2	
			15E.5.3 On-Site Storage	1	
Peak Electricity Demand Reduction	B. Performance Pathway	16A	Prescriptive Pathway: On-Site Energy Generation	0	
		16B	Modelled Performance Pathway: Reference Building	2	1
Total				22	7

Transport				10		
Sustainable Transport	B. Prescriptive Pathway	17A	Performance Pathway	0		
		17B.1	Access by Public Transport	3		
		17B.2	Reduced Car Parking Provision	1		
		17B.3	Low Emission Vehicle Infrastructure	A. Parking for Fuel-Efficient Vehicles	1	
		17B.4	Active Transport Facilities		1	1
		17B.5	Walkable Neighbourhoods	A. Proximity to Amenities	1	
Total				7	1	

Water				12	
Potable Water	B. Prescriptive Pathway	18A	Potable Water - Performance Pathway	0	
		18B.1	Sanitary Fixture Efficiency	1	1
		18B.2	Rainwater Reuse	1	1
		18B.3	Heat Rejection	2	2
		18B.4	Landscape Irrigation	1	1
		18B.5	Fire Protection System Test Water	1	
Total				6	5

Materials				14			
Life Cycle Impacts	B. Prescriptive Pathway - Life Cycle Impacts	19A.1	Comparative Life Cycle Assessment	0			
		19A.2	Additional Reporting	<input type="checkbox"/> A. Additional Life Cycle Impact Reporting <input type="checkbox"/> B. Material Selection Improvement <input type="checkbox"/> C. Construction Process Improvement <input type="checkbox"/> D. LCA Design Review	0		
		19B.1 Concrete	19B.1.1	Portland Cement Reduction		2	2
			19B.1.2	Water Reduction		0.5	0.5
			19B.1.3	Aggregates Reduction	A. Course Aggregate Reduction	0.5	0.5
		19B.2 Steel	A. Reduced Mass of Steel Framing	A. High Strength Steel	1	1	
		19B.3	Building Reuse	19B.3.1	Façade Reuse	2	
				19B.3.2	Structure Reuse	2	
		19B.4	Structural Timber	19B.4.0	Responsible Sourcing	-	
				19B.4.1	Reduced Embodied Impacts	3	
Responsible Building Materials	To reward projects that include materials that are responsibly sourced or have a sustainable supply chain.	20.1	Structural and Reinforcing Steel	20.1.0 Responsible Steel Maker	-	Complies	
				A. Responsible Steel Fabricator	1	1	
		20.2	Timber	<input type="checkbox"/> A. Certified Timber <input type="checkbox"/> B. Reused Timber	1		
20.3	Permanent Formwork, Pipes, Flooring, Blinds and Cables	B. Best Practice Guidelines for PVC	1	1			
Sustainable Products	To encourage sustainability and transparency in product specification.	21.1	Product Transparency and Sustainability	<input type="checkbox"/> A. Reused Products <input type="checkbox"/> B. Recycled Content Products <input type="checkbox"/> C. Environmental Product Declarations (EPDs) <input type="checkbox"/> D. Third Party Certification <input type="checkbox"/> E. Stewardship Programs	3		

Construction and Demolition Waste	B. Percentage Benchmark	22.0	Reporting Accuracy	A. Compliance Verification Summary	-	
		22A	Fixed Benchmark		0	
		22B	Percentage Benchmark		1	
Total					12	6

Land Use & Ecology					6	
Ecological Value	To reward projects that improve the ecological value of their site.	23.0	Endangered, Threatened or Vulnerable Species	A. EPBC	-	Complies
		23.1	Ecological Value		3	1
Sustainable Sites	To reward projects that choose to develop sites that have limited ecological value, re-use previously developed land and remediate contaminate land.	24.0	Conditional Requirement		-	
		24.1	Reuse of Land	A. Previously Developed Land	1	
		24.2	Contamination and Hazardous Materials	<input type="checkbox"/> A. Site Contamination <input type="checkbox"/> B. Hazardous Materials	1	
Heat Island Effect	To encourage and recognise projects that reduce the contribution of the project site to the heat island effect.	25.1	Heat Island Effect Reduction		1	1
Total					6	2

Emissions					5	
Stormwater	To reward projects that minimise peak stormwater flows and reduce pollutants entering public sewer infrastructure.	26.1	Stormwater Peak Discharge		1	1
		26.2	Stormwater Pollution Targets		1	1
Light Pollution	To reward projects that minimise light pollution.	27.0	Light Pollution to Neighbouring Bodies		-	Complies
		27.1	Light Pollution to Night Sky	A. Control of Upward Light Output Ratio (ULOR)	1	1
Microbial Control	To recognise projects that implement systems to minimise the impacts associated with harmful microbes in building systems.	28	Legionella Impacts from Cooling Systems	B. Waterless Heat Rejection Systems	1	1
Refrigerant Impacts	To encourage operational practices that minimise the environmental impacts of refrigeration equipment.	29.1	Refrigerants Impacts	A. Calculating TSDEI	1	
Total					5	4

Innovation					10	
Innovative Technology or Process	The project meets the aims of an existing credit using a technology or process that is considered innovative in Australia or the world.	30A	Innovative Technology or Process			
Market Transformation	The project has undertaken a sustainability initiative that substantially contributes to the broader market transformation towards sustainable development in Australia or in the world.	30B	Market Transformation			
Improving on Green Star Benchmarks	The project has achieved full points in a Green Star credit and demonstrates a substantial improvement on the benchmark required to achieve full points.	30C	Improving on Green Star Benchmarks		10	
Innovation Challenge	Where the project addresses a sustainability issue not included within any of the Credits in the existing Green Star rating tools.	30D	Innovation Challenge			3
Global Sustainability	Project teams may adopt an approved credit from a Global Green Building Rating tool that addresses a sustainability issue that is currently outside the scope of this Green Star	30E	Global Sustainability			1
Total					10	4

TOTALS	AVAILABLE	TARGETED
CORE POINTS	100	41.0
CATEGORY PERCENTAGE SCORE		41.0
INNOVATION POINTS	10	4.0
TOTAL SCORE TARGETED		45.0

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