



Suite 2, Level 1
33 Herbert Street
ST LEONARDS NSW 2065

PO Box 292
ST LEONARDS NSW 1590

T 02 9438 5098
F 02 9438 5398

www.acor.com.au

ENGINEERS

MANAGERS

INFRASTRUCTURE
PLANNERS

DEVELOPMENT
CONSULTANTS

SSD10371

Trinity Grammar School, Summer Hill Campus - The Renewal Project

ESD Report

ACOR Project No.: SY180898

Revision No.: 04

Disclaimer

This Report has been prepared in accordance with the scope of services described in the contract or agreement between ACOR Consultants Pty Ltd and the Client. The Report relies upon data, surveys, measurements and results taken at or under the particular terms and conditions specified herein. Changes to circumstances or facts after certain information or material has been submitted may impact on the accuracy, completeness or currency of the information or material. This Report has been prepared solely for use by the Client, ACOR Consultants Pty Ltd accepts no responsibility for its use by other parties without the specific authorisation of ACOR Consultants Pty Ltd. ACOR Consultants Pty Ltd reserves the right to alter, amend, discontinue, vary or otherwise change any information, material or service at any time without subsequent notification. All access to, or use of, the information or material is at the user's risk and ACOR Consultants Pty Ltd accepts no responsibility for the results of any actions taken on the basis of information or material provided, nor for its accuracy, completeness or currency. Any reference to "Report" where used in this Disclaimer is also a reference to any plan, table, data or other document that has been created for the purposes of the "Report" and referred to in the "Report" ²

REVISIONS

Revision	Date	Purpose	Prepared By	Approved By
01	15/10/2019	Preliminary for review – DTS parameters	T. Zheng	W.M
02	29/10/2019	Preliminary Issue	B. Johnson	W.M
03	05/12/2019	Final Issue	B. Johnson	W.M
04	04/02/2020	Final Issue	B. Johnson	W.M

Review Panel	
Division/Office	Name

Unless otherwise advised, the parties who have undertaken the Review and Endorsement confirm that the information contained in this document adequately describes the conditions of the site located at corner of Seaview St, Prospect Rd and Victoria St, Summer Hill, NSW.

<p>COPYRIGHT</p> <p>No part of this document (where "document" includes any plan, specification, detail, report or other document created by ACOR Consultants Pty Ltd or any of its related or associated entities) may be reproduced, adapted, transmitted or stored in a retrieval system in any form or by any means without written permission unless otherwise permitted under the Copyright Act, 1968. Enquiries should be addressed to ACOR Consultants Pty Limited.</p> <p>© ACOR Consultants Pty Limited</p> <p>All intellectual property and copyright reserved.</p>

Table of Contents

1	Executive Summary	5
	1.1 Background	5
2	Project Overview	6
	2.1 Aims and Objectives	6
	2.2 Description of the Proposal.....	6
3	Secretary’s Environmental Assessment Requirements (SEARs).....	7
	3.1 Requirement Guidelines	7
4	Sustainable Design Initiatives.....	8
	4.1 General.....	8
	4.2 Green Star Accredited Professional.....	8
	4.3 Commissioning and Building Tuning.....	8
	4.4 Shading and Daylighting.....	8
	4.5 Impact of refrigerant.....	8
	4.6 Metering	8
	4.7 Hot Water	8
	4.8 Lighting Control	9
	4.9 Waste Recycling.....	9
	4.10 Building/Public information display.....	9
	4.11 Quality of Internal Air	9
	4.12 Peak Electricity Demand Reduction.....	9
	4.13 Material Life Cycle	9
	4.14 Materials and Products.....	10
	4.15 Storm Water and Non-Potable Use.....	10
	4.16 Water Sensitive Urban Design.....	10
	4.17 Landscaping	10
	4.18 Operational Consumables	10
	4.19 Climate Change Projected Impacts.....	10
5	Environment Planning Assessment Regulation	11
	5.1 The Precautionary Principle.....	11
	5.2 Inter-generational equity	12
	5.3 Conservation of biological diversity and ecological integrity	12
	5.4 Improved valuation, pricing and incentive mechanisms	12
6	Demonstration of Accredited Rating Scheme	13

Appendices

Appendix A - Greenstar Scorecard	14
--	----

1 Executive Summary

1.1 Background

The following report has been prepared by ACOR Consultants to support the State Significant Development Application (SSDA 10371) prepared by PMDL Architects for the Trinity Grammar School - The Renewal Project.

The development is located at 119 Prospect Road, Summer Hill NSW 2130 and consists of an independent, junior and secondary school facility for assembly, community, examinations and school performance.

This report identifies and summarises the Ecologically Sustainable Design (ESD) initiatives under the Secretary's Environmental Assessment Requirements (SEARs) date 26th September 2019 with matters pertinent in the design of the proposed Trinity Grammar School -The Renewal Project.

The report also examines the principles of Ecologically Sustainable Design (as defined in clause 7(4) of Schedule 2 of the Environmental Planning and Assessment Regulation 2000) and demonstrate ways on how it will be incorporated in the design and on-going operation phases of the development.

The report is to accompany the State Significant Development Application (SSDA 10371) submission to the NSW Department of Planning, Industry and Environment. This report should be read in conjunction with the Architectural design drawings and other consultant design reports submitted as part of the SSDA.

The building is classified as Class 9b (school), in Climate Zone 5.

2 Project Overview

2.1 Aims and Objectives

The following objectives have been identified as forming the basis of the proposed development of the existing educational establishment:

- Create an education precinct to create a high-quality teaching and learning environment for staff and students;
- Establish additional floor space to increase availability and efficiency of teaching functions for Trinity Grammar School Summer Hill Campus;
- Improve site access, car parking and surrounding traffic functions in the precinct;
- Strengthen pedestrian linkages throughout the campus;
- Enhance the overall campus aesthetic, upgrade the public domain to create visually interesting transitions through the campus, and promote the heritage elements of the campus;
- Ensure minimal environmental impact;
- Maintain the significant green fields assets and provide opportunities for new outdoor environments;
- Ensure development is compatible with surrounding development and the local context; and
- Create a safe environment to support and nurture the boy's growth.

The site and proposed design are considered to meet the objectives of the project as it allows for development on land that has been previously used for educational purposes.

2.2 Description of the Proposal

The proposed development seeks detailed built form approval of new teaching and educational facilities, as detailed below:

- New five (5) storey building at the heart of the Campus to accommodate contemporary, flexible teaching and learning spaces;
- Improve movement and flow for students, with better east-west and north-south links across the school grounds and between levels, including more accessible connections between the Junior School, ovals and car park, and providing strong visual and physical connections;
- Renewal and Refurbishment of existing teaching and learning facilities;
- Reconfiguration and connection of underground car park improve traffic flow for the school drop-off and pick-up zone and improve the safety of boys and visitors who enter the school grounds as pedestrians from Victoria Street;
- New multipurpose pavilion between Ovals 1 and 3 containing a championship size basketball court with practice overlay, spectator seating and amenities;
- Demolition of school-owned residences at 46, 48, 50 and 52 Seaview Street, improving the existing service, maintenance and delivery facilities;
- Improvement and extension to Junior School outdoor teaching, assembly and recreational areas.

3 Secretary's Environmental Assessment Requirements (SEARs)

3.1 Requirement Guidelines

This report acknowledges the SEARs with reference to section 9 of the documents for the following list of requirements under "Ecologically Sustainable Development (ESD)".

- Detail how the ESD principles (as defined in clause 7(4) of Schedule 2 of the Environmental Planning and Assessment Regulation 2000) 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.
- Demonstrate how environmental design will be achieved in accordance with the GANSW Environmental Design in Schools manual.
- Preliminary consideration of building performance and mitigation of climate change, including consideration of Greenstar Performance.
- Provide assessment against an accredited ESD rating system; e.g. Green Star.
- Statement regarding how the design of the future development is responsive to CSIRO projected impacts of climate change.

4 Sustainable Design Initiatives

4.1 General

The Trinity Grammar School project team is committed to achieving sustainability outcomes in the design, construction and operation phases of the development. The following objectives will be incorporated into the project to minimise consumption of resources. The following objectives undertaken show compliance with the objectives of the SEARs requirements and best practice requirements.

4.2 Green Star Accredited Professional

All engaged of the design team will undertake a sustainability workshop presented by a Green Star Accredited Professional to provide advice on achieving the sustainability targets of the project. The sustainability professional will provide guidance throughout the project on specifications, material and product selection and commissioning and tuning.

4.3 Commissioning and Building Tuning

The services design team will provide detailed commissioning procedures including controls descriptive to ensure the development is commissioned correctly. Quarterly tuning of building services is to be undertaken in the first year of operation and regular tuning of controls is to be undertaken throughout operation to maintain a high-performance building.

4.4 Shading and Daylighting

Preliminary PMDL concept indicates elevation facing Victoria street for west wings are provided with shading element of consisting of perforated mesh. The external shading scheme helps increase natural daylight whilst minimising unwanted passive solar heat gain and glare for the building. This facilitates use of glazing without treatment that reduces natural light transmission.

The new development and existing founders building forming the quadrangle with high façade area provide passive design features, allowing for enriched daylighting and greater access to external views for occupants. Additional daylighting reduces the reliance on artificial light and benefits alertness, mood and productivity. External views provide a connection to nature and the campus sports ovals and help to create an environment encouraging constructive learning.

Highs levels of daylights reduce the need for artificial lighting, this reducing energy consumption.

4.5 Impact of refrigerant

All refrigerant comes with ozone depletion potential (ODP) of 0 with minimal GWP. HVAC design using a chilled water system proposal will aim to keep total System Direct Environmental Impact (TSDEI) of the refrigerant systems in the building to less than 15 to ensure the environmental impacts of refrigeration and air conditioning equipment are minimised. Leak detection will be fitted to the chillers.

4.6 Metering

Energy and water meters shall be provided on all major usages of water and electricity. The data from these meters will be monitored and recorded by the BMCS. This data will then be used to assist with benchmarking and tuning the buildings to ensure that energy and water consumption is reduced.

4.7 Hot Water

Energy efficient options for generation and reticulation will be investigated further through the concept design phase. The design currently incorporates a central gas fired plant, but gas boosted is to be investigated. All major hot water usages will be metered.

4.8 Lighting Control

Lighting in all areas/rooms (except small storage rooms) will be controlled by movement sensors. External lighting will be controlled via a daylight sensor (PE cell) and timer.

Lighting is to achieve a minimum 15% improvement over BCA Section J6 lighting power density allowances (W/m²) predominantly using LEDs. This improvement reduces the environmental impact of the building.

4.9 Waste Recycling

During the construction and demolition phases of the project a minimum of 80% of waste by mass shall be recycled.

Centralised waste and recycling bin systems shall be provided for the building during operation as well as a dedicated storage area for the separation and collection of recyclable wastes.

4.10 Building/Public information display

All relevant information about the design and operation of the building's environmental features will be transferred to the occupants via the Building Users' Guide.

Internal building digital signage and interactive screens will be considered for public information display of welcome messages, student information marketing etc.

Digital screens will help achieve a paperless environment by reducing the need for print materials and labour costs for the service and maintenance of traditional solid display boards.

4.11 Quality of Internal Air

Adequate natural ventilation via openable doors and windows, permeable airways and permanent openings in façades are proposed to the common spaces and major transient areas of the buildings.

All classrooms, and large western façade common area, shall be provided with mechanical ventilation through local façade penetrations for each level, to ensure adequate fresh air for all learning and teaching spaces whilst minimizing thermal leakage from air-conditioned zones. Heat exchangers and carbon CO₂ controls shall be implemented where required to reduce energy consumption of HVAC equipment and to ensure sufficient levels of outside air are entering the space to maintain high IAQ levels.

Adequate natural ventilation to spaces reduces the operational requirements for mechanical cooling systems and reducing greenhouse gas emissions.

4.12 Peak Electricity Demand Reduction

The proposal PV (photovoltaic) panels on the roof of the new school will be provided to further reduce ongoing energy costs for the school and reduce Greenhouse gas emissions. The area of roof could potentially accommodate a large amount of PV panels to satisfy a significant proportion of the electrical usage of the school and reduce peak demand from power grid. Roof space to be coordinated with proposed chilled water plant deck.

4.13 Material Life Cycle

Materials for building adhesives, sealants, flooring and paint products will be selected to contain low or no Volatile Organic Compounds (VOCs) and all engineered wood products used in exposed or concealed applications are specified to contain low or no formaldehyde to avoid harmful emissions that can cause illness and discomfort for occupants.

Internal furnishings within the building will be selected considering their recycled content, embodied energy, end-of-life recyclability and reduction of carbon foot print to minimise environmental impact in production.

Low VOC products ensure healthy working and learning spaces for students and staffs and reduce sick building syndrome.

4.14 Materials and Products

Materials and products specified for the development will be preferred to meet GBCA certification requirements, for example “Ecospecifier”, FSC or Good Environmental Choice Australia related products. Products meeting these certification requirements will confidently reduce environmental impacts and waste from furnishings over the life of the building.

Building’s structural and reinforcing steel will be specified to be sourced from a responsible steel maker and a percentage will be required to be recycled.

Recycled concrete shall be specified using recycled aggregate or manufactured sand and reduced quantities of Portland cement to reduce environmental impacts of concrete production and embodied energy.

The reuse of the facades of existing buildings will reduce the amount of new construction materials, thus reducing the environmental impact of the building.

4.15 Storm Water and Non-Potable Use

The school has an existing extensive rainwater and stormwater capture system. This water is used for landscape irrigation (The school has 3 large ovals) The existing system during detailed design will be reviewed for storage capacity and capture and additional storage and capture added to ensure the school does not increase its potable water demand for irrigation requirements.

This will help alleviate environment impact by reducing dependency on mains water supply reduce negatives effects of storm water runoff and minimise water consumption and costs.

4.16 Water Sensitive Urban Design

External area design will implement best practices of water sensitive landscaping and urban design, including permeable paving and indigenous low water usage plants to increase stormwater retention. The carbon sequestration of the plants on the exposed surfaces will also combat climate change contributions.

Water efficient fixtures and fittings will be implemented to reduce water consumption in accordance with the Australian Government’s Water Efficiency Labelling Scheme (WELS) using 5 Star rated fixtures and fittings.

4.17 Landscaping

Local indigenous planting will be provided to the development. Indigenous plants are drought resistant and allow for reduced water consumption.

4.18 Operational Consumables

Strategies and purchasing requiring for consumables will be developed and actioned by the school to ensure operational and maintenance purchasing is preferably sourced from sustainable suppliers. Consumables will be complying with the requirements initiated during the design and construction phases.

A commitment to reduce waste at end life is being developed by the school and will be implemented.

4.19 Climate Change Projected Impacts

The development is aware of the following projected climate change impacts and mitigation of these predicted changes will be addressed during detailed design:

- Hotter Days and Extreme heat waves
- Extended Drought Periods

- Extreme Rainfall Events
- Gustier Wind Conditions
- Effects on material selection, landscape design and social equity.

The development has addressed these items as detailed in the points 3.1 to 3.18 by the use of:

- Maximising natural cross ventilation.
- Drought tolerant landscaping by indigenous species.
- Stormwater and rainwater capture for irrigation reuse.
- Shading and thermal massing.

5 Environment Planning Assessment Regulation

The following list of Clause 7(4) of Schedule 2 Environmental Planning and Assessment Regulation 2000 have been incorporated into the design and on-going operation phases of the development as follows:

5.1 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.*

Project Response

The proposed development will be designed with the view to ensure suitability is incorporated through a broad range of ESD goals in service design, building construction and operations. The development team will ensure that building minimises the impact on the environment.

A strong emphasis on electrical and mechanical design including minimising energy and water use, building materials, environment friendly refrigerants and maximising controls efficiencies etc will be taken in to account to prevent irreversible damage to the environmental. In addition, Trinity Grammar School will be guided to explore the use of renewable energy sources. Best possible design practices with a requirement to exceed BCA/NCC Section J – Energy Efficiency Targets by a minimum 10%.

Design will be referenced to guidelines under Australian Green Building Council Green Star benchmarks, and GANSW Environmental Design in Schools manual to help drive a balanced approach with risk weighted assessment.

The proposed building embraces sustainable design principles to maximise where possible natural daylight and natural ventilation. The orientation and massing of built form allows daylight into the building. Roof material and columns will be carefully selected, and the retaining of existing landscaping contributes to the cooling of the immediate environment.

Building construction will be expected to be resource efficient, cost-effective and to deliver enhanced sustainability benefits with respect to impacts on the environment and health and well-being of students and staff for the best possible learning facilities.

List of items with possible effects on environment are categorised to the following:

- Management
- Building Envelope

- Services Installations (MEP)
- Lighting
- Water
- Materials
- Waste
- Landscaping

5.2 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

Project Response

The new development is expected to be highly beneficial for the school community of the future generation.

Trinity Grammar School – The renewal Project indicates significant development to allow for future growth of core student population, aiming to provide good access to sport & recreational facilities and more appropriate spaces for music and drama performances.

Trinity Grammar Schools vision is to enhance overall campus amenity and provide further opportunities for a diverse and contemporary learning environment. Major upgrades will provide strong circulation access to multilevel access around campus. The proposed redevelopment will be for the secondary school providing multipurpose room use for the student and staff population for assembly, community, examinations and performances.

5.3 Conservation of biological diversity and ecological integrity

Namely, that conservation of biological diversity and ecological integrity should be a fundamental consideration

Trinity Grammar School assessment

It is expected the development will have minimal ecological impact as the proposed works are refurbishment of existing buildings and construction on previously developed areas. The landscape design will be designed to strengthen and diversify the existing landscaping by introducing new specimen planting that reinforces the quantity and legibility of the existing established landscape pattern.

5.4 Improved valuation, pricing and incentive mechanisms

- 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.

Project Response

The project aims to minimise the consumption of resources required for construction, by where practicable the adaptive reuse of existing buildings on site. Existing building external structure is to be retained with internal fitout for new school usage.

The mechanical, electrical and plumbing service design of this development will employ lifecycle costing to determine the optimum strategy with regards to major items of plant and equipment, with decisions being made based on whole of life costs rather than capital expenditure only.

PV panels, use of natural and low GWP refrigerant. Natural cross ventilation, natural lighting will be employed on the project.

Internal building digital signage and possible interactive screens will be implemented for public display of welcome messages, student information and marketing etc.

Selection of durable, attractive and robust building materials although having a higher upfront cost, will have long term benefits in providing an easy to maintain building and lowering maintenance costs. Products will be sourced from sustainably grown sources and suppliers of these products. E.g. timber products.

6 Demonstration of Accredited Rating Scheme

The development has been assessed against the Green Star Design and As Built Rating Tool, for the purposes of overview and to help achieve best industry practice. A table has been included in Appendix A that summaries the credits that would be achieved should a rating be undertaken.

The project would achieve an informal 4 Green Star rating.

I am an appropriately qualified and competent person operating with >20 years industry experience in the field of HVAC design, installation and ESD analysis and as such qualified to assess building compliance in respect to ESD and appropriate performance-based requirements.

Signature:



Date:

29/01/20

Qualifications:

Ass. Diploma Mechanical Engineering
MAIRAH

Name of Author:

Brad Johnson
Senior Mechanical and ESD Engineer
ACOR Consultants Pty Ltd

Signature:



Date:

04/02/2020

Qualifications:

BE (Hons)
FIEAust
CPEng 211107
NER
RBP – EM 1031
RPEQ - 16436

Name of Reviewer:

Warwick Meadows
Principal
ACOR Consultants Pty Ltd

Appendix A - Greenstar Scorecard

Green Star - Design & As Built Scorecard

Project: Trinity Grammar School MasterPlan - 4 Green Star Pathway



CATEGORY / CREDIT	AIM OF THE CREDIT / SELECTION	CODE	CREDIT CRITERIA	Points Available	4 Star	Points TBC	Compliance Requirements
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.	1.0	Accredited Professional	1	1	-	GSAP to be included on the project
		2.0	Environmental Performance Targets	-	Complies	-	Documented targets for environmental performance for the project to be set.
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	-	Review of services and maintainability to be undertaken by owners representative during design stage. The review must address the following aspects of the nominated systems : Commissionability, Controlability, maintainability, fit for purpose and safety
		2.2	Building Commissioning	1	1	-	Pre-commissioning and commissioning to be undertaken to the requirements of ASHRAE, AIRAH and CIBSE standards. Commissioning plans to be produced and requirements also documented in design specifications. Air Permeability performance testig to be undertaken.
		2.3	Building Systems Tuning	1	1		Formal commitment to 12 month tuning process undertaken quarterly with system adjustments to be undertaken.
		2.4	Independent Commissioning Agent	1	-	-	Engagement of ICA to lead and co-ordinate commissioning and tuning requirements for services
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	-	-	Not targeted
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	-	Comprehensive O+M Manuals and Building Users guide to be provided to school operations personnel. Provided information to include descriptives of operation. System types and maintenace requirements of all systems and log book.
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	-	Commitment to set, measure and report on environmental performance targets set in Credit 2.0
		5.2	End of Life Waste Performance	1	1		80% of GFA excluding carparking has a formal commitment to reduce waste at end of life. Commitment to extend interiors to 10 years.
Metering and Monitoring	To recognise the implementation of effective energy and water metering and monitoring systems.	6.0	Metering	-	Complies	-	Metering system to be provided for energy and water consumption for common and major usages.
		6.1	Monitoring Systems	1	1	-	Monitoring system to be provided that is capable of capturing and processing the data produced by the metering, analysis and produce reports.
Responsible Building Practices	To reward projects that use best practice formal environmental management procedures during construction.	7.0	Environmental Management Plan	-	Complies	-	Project specific EMP to be produced by Head contractor for the project.
		7.1	Formalised Environmental Management System	1	1	-	Formalised systematic and methodical approach to planning, implementing and auditing is in place during construction, to ensure compliance with the EMP. Head contractor to have ISO14001 certification
		7.2	High Quality Staff Support	1	-	1	Promote positive mental and physical health outcomes of site activities and culture of site workers, through programs and solutions on site in accordance with 7.2.1; and, Enhance site workers' knowledge on sustainable practices through on-site, off-site, or online education programs in accordance with 7.2.2.
Operational Waste	Performance Pathway	8A	Performance Pathway - Specialist Plan		0		
		8B	Prescriptive Pathway - Facilities	1	1		Facilities provided to collect and separate distinct waste streams and meet best practice access requirements for collection
Total				14	10	1	

Green Star - Design & As Built Scorecard

Project: Trinity Grammar School MasterPlan - 4 Green Star Pathway



CATEGORY / CREDIT	AIM OF THE CREDIT / SELECTION	CODE	CREDIT CRITERIA	Points Available	4 Star	Points TBC	Compliance Requirements
Indoor Environment Quality				17			
Indoor Air Quality	To recognise projects that provide high air quality to occupants.	9.1	Ventilation System Attributes	1	1	-	Ventilation system design must ensure mitigation of outdoor pollutants, ease of access for maintenance and cleaning and be cleaned prior to use.
		9.2	Provision of Outdoor Air	2	-	-	50% increase on AS1668 requirement of 12l/s/person required.
		9.3	Exhaust or Elimination of Pollutants	1	1	-	Pollutants from photocopiers, cooking processes, vehicle and limited.
Acoustic Comfort	To reward projects that provide appropriate and comfortable acoustic conditions for occupants.	10.1	Internal Noise Levels	1	-	1	Internal ambient noise levels in the nominated area are suitable and relevant to the activity type in the room. This includes all sound generated by the building systems and any external noise ingress.
		10.2	Reverberation	1	-	-	Nominated area has been built to reduce the persistence of sound to a level suitable to the activities in the space.
		10.3	Acoustic Separation	1	1	-	Nominated enclosed spaces have been built to minimise crosstalk between rooms, and between rooms and open areas.
Lighting Comfort	To encourage and recognise well-lit spaces that provide a high degree of comfort to users.	11.0	Minimum Lighting Comfort	-	Complies	-	Lights in the nominated area are flicker-free and accurately address the perception of colour in the space.
		11.1	General Illuminance and Glare Reduction	1	1	-	Lighting levels and quality comply with best practice guidelines (AS1680.2.4) and Glare is eliminated.
		11.2	Surface Illuminance	1	-	-	Combination of lighting and surfaces improve uniformity of lighting to give visual interest in the nominated area.
		11.3	Localised Lighting Control	1	-	1	In the nominated area, occupants have the ability to control the lighting in their immediate environment. Not applicable to classrooms
Visual Comfort	To recognise the delivery of well-lit spaces that provide high levels of visual comfort to building occupants.	12.0	Glare Reduction	-	Complies	-	Glare, in the nominated area from sunlight through all viewing façades and skylights is reduced through a combination of blinds, screens, fixed devices, or other means
		12.1	Daylight	2	-	1	40% of nominated area receives high levels of daylight.
		12.2	Views	1	-	-	60% of the nominated area has a clear line of sight to a high quality internal or external view.
Indoor Pollutants	To recognise projects that safeguard occupant health through the reduction in internal air pollutant levels.	13.1	Paints, Adhesives, Sealants and Carpets	1	1	-	All internally applied paints, adhesives, sealants and carpets meet stipulated 'Total VOC Limits', or, where no paints, adhesives, sealants or carpets are used in the building.
		13.2	Engineered Wood Products	1	1	-	All engineered wood products meet stipulated formaldehyde limits or no new engineered wood products are used in the building.
Thermal Comfort	To encourage and recognise projects that achieve high levels of thermal comfort.	14.1	Thermal Comfort	1	-	-	High degree of thermal comfort is provided to occupants in the space, equivalent to 80% of all occupants being satisfied in the space.
		14.2	Advanced Thermal Comfort	1	-	-	
Total				17	6	3	

Green Star - Design & As Built Scorecard

Project: Trinity Grammar School MasterPlan - 4 Green Star Pathway



CATEGORY / CREDIT	AIM OF THE CREDIT / SELECTION	CODE	CREDIT CRITERIA	Points Available	4 Star	Points TBC	Compliance Requirements
Energy				22			
Greenhouse Gas Emissions	E. Modelled Performance Pathway	15A.0	Conditional Requirement: Prescriptive Pathway	-			
		15A.1	Building Envelope	-			
		15A.2	Glazing	-			
		15A.3	Lighting	-			
		15A.4	Ventilation and Air-conditioning	-			
		15A.5	Domestic Hot Water Systems	-			
		15A.6	Accredited GreenPower	-			
		15B.0	Conditional Requirement: NatHERS Pathway	-			
		15B.1	NatHERS Pathway	-			
		15C.0	Conditional Requirement: BASIX Pathway	-			
		15C.1	BASIX Pathway	-			
		15D.0	Conditional Requirement: NABERS Pathway	-			
		15D.1	NABERS Energy Commitment Agreement Pathway	-			
		15E.0	Conditional Requirement: Reference Building Pathway	-	Complies		
15E.1	Comparison to a Reference Building Pathway	20		5	-	Energy modelling required to demonstrate reduction in energy consumption of proposed building when compared to a Benchmark building. Purchase of 50% Greenpower assists with achieving points.	
Peak Electricity Demand Reduction	Prescriptive Pathway	16A	Prescriptive Pathway - On-site Energy Generation	2	1	-	Demonstrate that the use of on-site electricity generation systems reduces the total peak electricity demand by at least 15%
		16B	Performance Pathway - Reference Building	-			
Total				22	6	0	
Transport				10			
Sustainable Transport	Prescriptive Pathway	17A.1	Performance Pathway	-			
		17B.1	Access by Public Transport	3	1	-	Based on accessibility of the site by public transport.
		17B.2	Reduced Car Parking Provision	1	1	-	Reduction in the number of car parking spaces in the proposed building when compared to a standard-practice building.
		17B.3	Low Emission Vehicle Infrastructure	1	-	-	Not targeted
		17B.4	Active Transport Facilities	1	1	-	Bicycle parking and associated facilities are provided to regular building occupants and visitors.
		17B.5	Walkable Neighbourhoods	1	1	-	The project is located conveniently to amenities or the project achieves a specified Walk Score.
Total				7	4	0	
Water				12			
Potable Water	Prescriptive Pathway	18A.1	Potable Water - Performance Pathway	0			
		18B.1	Sanitary Fixture Efficiency	1	1	-	All fixtures are within one star of the WELS rating stated below: Taps & Urinals - 6 Stars Toilet - 5 Star, Showers 3 Star, Dishwasher 6 Star
		18B.2	Rainwater Reuse	1	1	-	Rainwater tank is installed to collect and reuse rainwater, within the project's site boundary
		18B.3	Heat Rejection	2	2	-	HVAC system does not use water for heat rejection.
		18B.4	Landscape Irrigation	1	1	-	Drip irrigation with moisture sensor override is installed, or where no potable water is used for irrigation.
		18B.5	Fire System Test Water	1	-	-	The fire system does not expel water for testing or isolation valves fitted per floor
Total				6	5	0	

Green Star - Design & As Built Scorecard

Project: Trinity Grammar School MasterPlan - 4 Green Star Pathway



CATEGORY / CREDIT	AIM OF THE CREDIT / SELECTION	CODE	CREDIT CRITERIA	Points Available	4 Star	Points TBC	Compliance Requirements
Materials				14			
Life Cycle Impacts	Prescriptive Pathway - Life Cycle Impacts	19A.1	Comparative Life Cycle Assessment	0			Credit not targeted.
		19A.2	Additional Life Cycle Impact Reporting	0			Credit not targeted.
		19B.1	Concrete	3	2	-	Portland cement content in all concrete used in the project has been reduced by replacing it with supplementary cementitious materials, recycled water used.
		19B.2	Steel	1	1	-	Reduction in the mass of steel reinforcement used when compared to standard practice.
		19B.3	Building Reuse	4	2	-	50% of existing building façade is retained or 60% by mass of existing structure is retained.
		19B.4	Structural Timber	3	0	-	Not targeted
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	1	1	-	95% by mass of steel is sourced from a responsible steel manufacturer and 60% (by mass) of all reinforcing bar and mesh is produced using energy-reducing processed in its manufacture (measured by average mass by steel maker annually).
		20.2	Timber Products	1	1	-	95% by cost of all timber used in construction works is reused or has Forest certification scheme accreditation.
		20.3	Permanent Formwork, Pipes, Flooring, Blinds and Cables	1	-	-	Not targeted
Sustainable Products	To encourage sustainability and transparency in product specification.	21.1	Product Transparency and Sustainability	3	-	1	Percentage of materials must be either reused, have recycled content, third party certification, stewardship programs or environmental product declarations.
Construction and Demolition Waste	Percentage Benchmark	22A	Fixed Benchmark	-	0		
		22B	Percentage Benchmark	1	1		90% of Construction waste going to landfill is reduced by diverting a significant proportion of waste from going to landfill.
Total				18	8	1	
Land Use & Ecology				6			
Ecological Value	To reward projects that improve the ecological value of their site.	23.0	Endangered, Threatened or Vulnerable Species	-	Complies	-	Project can demonstrate that at the date of site purchase or option contract, no critically endangered, endangered or vulnerable species, or ecological communities were present on the site.
		23.1	Ecological Value	3	1	-	Ecological value of site is improved compared to original condition
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	-	Complies	-	Site was not Old Growth Forest, Agricultural land
		24.1	Reuse of Land	1	1	-	Project is a building extension, and 75% of the extension (including landscaping) falls within an area of the site that was 'previously developed land' at the project's Green Star registration date.
		24.2	Contamination and Hazardous Materials	1	-	-	Not claimed
Heat Island Effect	To encourage and recognise projects that reduce the contribution of the project site to the heat island effect.	25.0	Heat Island Effect Reduction	1	-	-	Not claimed
Total				6	2		

Green Star - Design & As Built Scorecard

Project: Trinity Grammar School MasterPlan - 4 Green Star Pathway



CATEGORY / CREDIT	AIM OF THE CREDIT / SELECTION	CODE	CREDIT CRITERIA	Points Available	4 Star	Points TBC	Compliance Requirements
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	-	Post-development peak Average Recurrence Interval (ARI) event discharge from the site does not exceed the pre-development peak ARI event discharge
		26.2	Stormwater Pollution Targets	1	1	-	All stormwater discharged from site meets specified pollution reduction targets when compared to untreated runoff.
Light Pollution	To reward projects that minimise light pollution.	27.0	Light Pollution to Neighbouring Bodies	-	Complies	-	The minimum requirement is met where the project complies with AS 4282:1997 <i>Control of the obtrusive effects of outdoor lighting</i> .
		27.1	Light Pollution to Night Sky	1	1	-	Demonstration that a specified reduction in light pollution has been achieved by the project.
Microbial Control	To recognise projects that implement systems to minimise the impacts associated with harmful microbes in building systems.	28.0	Legionella Impacts from Cooling Systems	1	1	-	Project has no weater based heat rejection systems.
Refrigerant Impacts	To encourage operational practices that minimise the environmental impacts of refrigeration equipment.	29.0	Refrigerants Impacts	1		-	Not targeted
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	10			
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				
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		1		
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 rating tools.	30E	Global Sustainability				
Total				10	1		

TOTALS	AVAILABLE	TARGETED	Points TBC
CORE POINTS	100	45.0	5.0
CATEGORY PERCENTAGE SCORE		45.0	
INNOVATION POINTS	10	1.0	
TOTAL SCORE TARGETED		46.0	