

An aerial photograph of a lush green forested area with a winding river. Residential buildings and roads are visible in the upper right and lower left corners.

CONRAD
GARGETT

NSW
Department of
Education
Green Star & ESD
Report

Smalls Road Public School
16321 October 2017
Revision C

Documentation Control

Revision	Description	Issue date	Prepared by	Reviewed by
A	Draft Issue	19/07/2017	AF	GR
B	Revised Issue	1/08/2017	AF	NG
C	Revised Issue	6/10/2017	AF	SW

Introduction:

General:

This ESD Report accompanies an Environmental Impact Statement (EIS) prepared in support of the State Significant Development Application for the development of 'Smalls Road Public School (Ryde)' at Smalls Road, Ryde, NSW.

The purpose of this ESD Report is to outline the measures that are proposed to be implemented to minimise consumption of resources, energy and water, and to demonstrate that the project has been assessed against a suitable accredited rating framework. The sustainability initiatives proposed for the development including water and energy efficiency initiatives are in addition to the minimum compliance requirements of the BCA (i.e. Section J).

As a result of the sustainability initiatives discussed within this report, the Smalls Road Public School (Ryde) development is expected to achieve a high level of environmental sustainability.

Project Description:

The site is located within the City of Ryde Government Area. The proposed development consist of a new Public Primary School, Landscaping and pedestrian improvements throughout the site are also included, such as new central outdoor learning area.

The School will contain high quality classrooms, collaborative learning spaces, open play spaces and associated facilities including a performance hall, as well as a library and canteen.

Limitation of this report:

The purpose of this ESD Report is to outline the measures that are proposed to be implemented to minimise consumption of resources, energy and water, and to demonstrate that the project has been assessed against a suitable accredited rating scheme, as detailed within the EIS. It should be read in conjunction with the current project documentation and specific applications may vary during the design development of the project.

Ecologically Sustainable Development Requirements

02.01 Definition

The NSW DoE Definitions

Ecologically Sustainable Development (ESD) is defined in Australia as: Using, conserving and enhancing the community's resources so that ecological processes, on which life depends, are maintained, and the total quality of life, now and in the future, can be increased.

ESD principles are to be applied in the design, development and operation of all state assets, and are an important contribution to developing a considered whole of life cost development

02.03 NSW DEPARTMENT OF EDUCATION (DoE) ENVIRONMENTAL DESIGN POLICIES

The following design principles are applicable to all NSW DoE Facilities:

02.03.01 Green Building Design and Green Star

NSW DoE requires that any new school buildings on an existing or new site will be able to achieve a minimum 4 Star Green Star rating.

DoE also aims to ensure Ecologically Sustainable Development principles will be included in any new school, to a level that the building could be benchmarked to achieve a 5 Star Green Star rating.

Note: Green Star - Education v1 Design & As Built rating tool has been superseded by Green Star - Design & As Built in December 2015. This rating tool is the most appropriate for assessing new school/ school buildings sustainable design principles.

4 Star rating is considered Best Practice in the Australian building industry.

ACTION:

Refer to the Green Star section of this report

02.03.02 Environmental Management Plan (EMP)

All projects will require the preparation of an appropriate site-specific Environmental Management Plan (EMP) prior to the commencement of the relevant site works.

Contractors will be required to prepare an EMP as a condition of contract.

All projects of \$10m or more, and all projects under \$10m if they are environmentally sensitive, contractors will need to have a corporate Environmental Management System (EMS) accredited by a NSW government construction agency.

ACTION:

Nominated in CGAMW Specification for *Contractor* to provide

02.03.03 Timber

No Rainforest timbers to be used unless plantation grown

No timbers from high conservation forests

Use only recycled timber, engineered and glued timber composite products, timber from plantations or from sustainably managed regrowth forests.

ACTION:

Captured in CGAMW Specification.

02.03.04 Ecologically Sustainable Development

Ensure the preservation, maintenance and sustainable use of the community's natural and material assets.

Protect and support biological and ecological diversity

Restrict the flow of pollutants into our natural environment.

ACTION:

Captured in CGAMW Specification.

02.03.05 Environmentally Friendly Materials / Products

Encourage the use of materials and products which:

Adequately and economically perform their intended functions, and also have lower adverse environmental impacts throughout their life cycle.

Contain reduced or no hazardous substances (Low VOC)

Reduce the demand for rare or non-renewable resources

Are made from or contain recycled materials or can be recycled at the end of their useful life.

ACTION:

Captured in CGAMW Specification.

02.03.06 Conservation of Biological Diversity

Conserve for future generations, the biological diversity of genetic materials, species and ecosystems.

Assess project and purchasing impacts on the natural environment during all project phases and adopt a precautionary approach where risk is high.

ACTION:

Captured in CGAMW Specification.

02.03.07 Pesticide

New Buildings: no chemical pesticides and termiticide to be used. Preventive treatments to be by physical means and careful design to minimise risk.

Existing Buildings: Chemicals to be used only as a last resort for the eradication of infestations, using chemicals approved by the National Registration Authority and applied by a Pest Control Operator licensed by Workcover.

ACTION:

Captured in CGAMW Specification.

02.03.08 Waste

Eliminate unnecessary waste by better planning and more efficient use of natural and manufactured resources. This approach is often referred to as a Whole of Life approach to building.

ACTION:

Nominated in CGAMW Specification for Contractor to provide

02.04 ENVIRONMENTAL DESIGN FEATURES OF EDUCATIONAL FACILITIES

A major objective in the design of Education Facilities is to achieve good indoor environmental quality and comfort conditions with minimum energy consumption.

Passive Design principles should be employed wherever possible to achieve this.

The following design solutions are to be incorporated into schools:

ACTION:

Captured in CGAMW Drawings, refer to solar and cross ventilation diagrams

02.04.01 Natural Light

Natural daylight improves the indoor environmental quality of spaces and encourages beneficial learning.

Natural daylight is to be provided to all teaching spaces unless identified otherwise.

Natural daylight can be provided via windows, skylights, rooflights and the like. Where a room is required to have a brownout function, rooflights and skylights will need to include a method to sufficiently adjust light levels.

Include daylight sensors to rooms to reduce light output or turn off lights when sufficient daylight is provided within the space.

When the space is large, it is recommended that perimeter lighting is adjacent to windows be on a separate zone to make maximum use of daylight.

Benefit: Saving in energy consumption and ongoing running costs. Lights will seldom need to be turned on during the day.

ACTION:

Captured in CGAMW Drawings, refer to solar and external view diagrams

02.04.02 Sun Shading

On exposed facades subject to direct sunlight, external window shading should be considered as part of the building design to ensure energy efficiency and thermal comfort.

Benefit: Reduces heat gain due to the easterly rising sun and westerly setting sun. Shading will reduce need for cooling energy required for classroom.

ACTION:

Captured in CGAMW Drawings, refer to solar and external view diagrams

02.04.03 Period Bells

Period Bell Light switching systems are to be in all new schools, major conversions and additions.

All luminaires in rooms are to automatically turn off five minutes after the period bell has rung and all students have left the room. Alternatively include systems to turn off lights when the room is not in use.

A conscious decision is required to turn the lights on again.

Benefit: Significant savings on luminaire energy consumption and ongoing running costs in Schools.

ACTION:

Service engineers to attend too

02.04.04 Appliances and Equipment

The NSW Government Resource Efficiency Policy sets out the minimum standards for new appliances and equipment.

All new electrical equipment purchased by DoE where relevant, available and fit for purpose, must have minimum Greenhouse and Energy Minimum Standards (GEMS) star ratings stipulated under target E3 of the Policy.

ACTION:

Captured in CGAMW Specification.

02.04.05 Air Cooling and Heating Systems

Timed or sensor operation functionality for all Air Cooling systems

Centralised control of HVAC plant with programmable schedules for the school year

Consider one single infrastructure for heating and cooling where it demonstrates whole life cycle cost savings.

Benefit:

Ensure electric HVAC systems are turned off when a space is not occupied

Ensure whole of life costs and operation and maintenance costs are optimised through consideration of both heating and cooling infrastructure

ACTION:

Service engineers to attend too

02.04.06 Electricity meters

Suitably sized meter to be installed with capability for monitoring. Contact Advisory Services (sustainability.enquiries@det.nsw.edu.au) to ascertain site specific metering requirements.

Benefit:

Lower electricity meter maintenance costs through selecting a fit for purpose meter.

Better access to energy consumption data at the school

ACTION:

Service engineers to attend too

02.04.07 Renewable Energy Generation

Assess viability of Solar PV systems for new school proposals.

Different financing options such as: purchased outright, financial leasing; or solar leasing should be considered.

Benefit: Onsite generation of electricity to supplement base load demand at the school

ACTION:

Service engineers to attend too

02.05 INSULATION

The Building Code of Australia (BCA) sets out the insulation requirements for buildings based on the local conditions and is to be applied to all school spaces

The Key Purpose of insulation is to:

In summer keep heat out to provide cooler, more comfortable classrooms.

In winter keep warmth in to reduce heating energy consumption.

Roof and wall Insulation to achieve the required BCA insulation R values as a minimum.

ACTION:

Captured in CGAMW Specification.

02.06 VENTILATION

02.06.01 Natural Ventilation

Natural Ventilation is the preferred option to maintain good indoor environmental air quality through all school areas.

02.06.02 Mechanical Ventilation

Generally used only in areas where natural ventilation can not be achieved, such as School Performance Spaces, Duplicating Rooms, Dark Rooms and any internal toilets.

02.06.03 Cross Ventilation

Is the primary means of achieving good air movement and comfort conditions in all habitable rooms.

Maximise cross ventilation wherever possible.

Single loaded covered walkways are frequently used to maximum cross ventilation.

02.06.04 Roof Turbo Ventilators

Roof turbo ventilators are an effective way of enhancing the natural ventilation of a single or upper storey of a multi storey building.

Size ventilators to provide a minimum of 7.5 air changes per hour using the local climatic data.

ACTION:

Service engineers to attend too

02.07 PESTICIDES

Schools should be designed, constructed and maintained, without using chemicals for termite and other pest control.

ACTION:

Captured in CGAMW Specification.

02.08 WATER CONSERVATION

Practical water conservation systems to be incorporated into schools include:

Purchase products where relevant available and fit for purposes with minimum Water Efficiency Labelling and Standards Scheme (WELS) star ratings as stipulated under W3 of the NSW Government Resource Efficiency Policy.

Where WELS rating is not available, use the alternative Smart Approved WaterMark rating scheme.

Internal Flow Controllers can be used to minimise water usage and wastage for staff amenities.

Taps with timed flow can be used to minimise water usage and wastage in student amenities.

Dual Flushing Cisterns with a minimum WELS rating of 4, to be used to reduce water usage and minimise waste. Appropriate cisterns must be used with a suitably rated pan to ensure effective use.

Manual flushing urinals are preferred.

Waterless urinals should only be considered in new facilities with appropriate drainage.

Roof water harvesting and tank storage for landscape irrigation and flushing of toilets. Rainwater tanks to be incorporated where there is a local identified end use such as irrigation or toilet flushing. Rainwater tank designed preferably with gravity flow. However, an electric pump should be installed with the rainwater tank where required and economically feasible.

Where schools are required to install a sprinkler system for fire safety, it is recommended to install a closed loop system to capture and reuse fire systems testing and maintenance water, or by using an alternative non-potable water source.

ACTION:

Captured in CGAMW Specification.

Service engineers to attend too

Green Star - Design & As Built v1.1

Building Information

Building Input	
Name of Building:	Smalls Road Public School
Address of Building:	3B Smalls Road, Ryde
Postcode:	2112
State:	

Area Listing (GFA in m ²)	
Office	
Residential	
Retail	
Healthcare	
Education	6460m ²
Industrial	
Other	
Total	0

Applicant Details	
Applicant:	
Contact Person:	

Project Team Details	Company/Organisation
Acoustic Consultant	TTM Group
Architect	Conrad Gargett Ancher Mortlock Woolley
Building Services Engineer	Wood & Grieve Engineers
Building Surveyor	RPS
ESD Consultant	Conrad Gargett Ancher Mortlock Woolley
Landscaping Consultant	Conrad Gargett Ancher Mortlock Woolley
Local Planning Authority	City of Ryde
Main Contractor	TBC
Project Manager	Coffey
Quantity Surveyor	Turner & Townsend
Structural/Civil Engineer	MYD Consulting Engineers

Project Timeline	Date (Month/Year)
Site purchase date	NA
Start of design	NA
Design completed	TBC
Start of construction	TBC
Practical Completion	TBC

Building Description	
Description of building	Public School

Green Star - Design & As Built v1.1 Eligibility

Building Type: Green Star – Design & As Built is intended to rate new buildings and major refurbishments. The majority of building types are eligible to be rated, included mixed use developments. All BCA space uses definitions are eligible for certification apart from parking garages (BCA Class 7a and 10).

Compliance:

Spatial Differentiation: To meet the Spatial Differentiation criterion, the project must be clearly distinct. Only distinct projects are eligible for assessment; project components are not eligible. Shared building services (such as HVAC plant or water treatment) or amenities (such as waste rooms or bicycle facilities) do not affect the building's eligibility for Green Star assessment. Subtenancies are considered part of the fitout and cannot be excluded from the rating.

Compliance:

Timing of Registration and Certification: All projects registered for Green Star – Design & As Built must achieve an As Built certified rating. Registered projects may seek to achieve a Design Review certified rating as an interim step towards As Built certification.

Compliance:

Design Review Certified Rating: Submissions for a Design Review certified rating can be lodged as soon as the required evidence is available, but prior to practical completion.

Compliance:

As-Built Certified Rating: Submissions for an As Built certified rating can be lodged after practical completion.

Compliance:

Conditional Requirements: A project seeking certification must meet the Conditional Requirement criterion outlined in the 'Greenhouse Gas Emissions' credit (15) and the 'Sustainable Sites' credit (24).

Compliance:

Green Star - Design & As Built v1.1 Rating Scale

The Green Star – Design & As Built Scorecard is used to calculate the Green Star score. The methodology for calculating a Green Star rating is as follows:

The conditional requirements must be met;

The estimated number of points for each credit criterion, within each credit, is entered into the 'Points Claimed' column in the scorecard; and

Once all claimed points have been entered, the Scorecard automatically compares the points claimed against the requirements for each Green Star rating level, for the total score.

The Green Star Rating Scale:

The Green Star rating is determined by comparing the percentage of available points achieved out of the total available points. The rating scale shown below details the percentage thresholds for the Star ratings awarded.

% of available points	Rating	Outcome
Less than 10	Zero Star	Assessed
Oct-19	One Star	Minimum Practice
20 - 29	Two Star	Average Practive
30 - 44	Three Star	Good Practive
45 - 59	Four Star	Australian Best Practice
60 - 74	Five Star	Australian Excellence
75+	Six Star	World Leadership

Points Allocation: Each point throughout the Green Star – Design & As Built rating tool is comparable to any other point in the rating tool. This means that one point in the 'Management' category contributes as much to the total score as one point in any of the other categories. The number of points available in each category indicates the relative importance of the impact addressed within that category towards the overall sustainability outcomes.

Green Star - Design & As Built v1.1 Categories and Credits

The Submission Guidelines is divided into Green Star categories and credits. Each category includes a number of credits, which in turn describe the targets that a project must meet, and requirements. Each credit is structured as follows:

Aim of Credit: Outlines the environmental issue that the credit is targeting, the guiding principles behind the credit, and the desired environmental outcomes of the credit.

Credit Criteria: Explains the issues within the credit that must be addressed in order to meet the 'Aim of Credit'. Where the 'Aim of Credit' is the guiding principle, 'Credit Criteria' outline performance metrics that the project must achieve. This section also outlines the number of available points and how points are either awarded or 'Not Applicable'.

Compliance Requirements: Describes the method for demonstrating compliance with the 'Credit Criteria'. Projects must meet the performance and documentation requirements to be awarded the credit points.

The 'Compliance Requirements' can provide performance methods or prescriptive methods for demonstrating compliance with a criterion. The performance methods rely on demonstrating compliance with the credit criteria via modelling solutions. The prescriptive solutions are pre-assessed conditions that have been found to meet the 'Credit Criteria' (for example, a building applying prescriptive sustainability initiatives for the 'Potable Water' credit, rather than modelling the building's predicted water usage).

Guidance: This section contains additional information and clarification on how project teams may demonstrate compliance. The guidance in this section is not mandatory but may offer suggestions on how a project could demonstrate compliance. The Guidance section may also provide a description of how compliance could be demonstrated for alternative space type uses or project delivery type. Definitions and standards in each credit are also listed in this section.

Documentation Requirements: Details the submission requirements for a credit for both a 'Design Review' and an 'As Built' rating. In all cases, a Submission Template must be presented alongside evidence justifying claims made within. More information is provided in the section titled 'Submitting for Certification'. For information on Green Star – Design & As Built Submission Templates, see the section titled 'Submitting for Certification'.

Credits Deemed 'Not Applicable': Credits or specific criteria may not be considered relevant to the sustainability outcomes for some projects. This usually depends on the nature of the building and the inclusion, or otherwise, of a variety of typical features. In this instance, the credit or specific criteria may be considered 'Not Applicable'.

Innovation: There are 10 additional points available in the 'Innovation' Category. These points fall outside of the number of available points used to calculate the rating tool threshold. The Innovation points can be used by project teams to increase the number of points achieved to contribute to their rating. For example, if a project has a score of 55 %, and is awarded 6 points in the Innovation Category, the total resulting score will be 61% and thus be awarded a 5 star rating.

Green Star - Design & As Built v1.1

List of Credits

INDEX	CREDIT	POINTS AVAILABLE	POINTS TARGETING	POINTS TBC	POINTS NOT TARGETING
MANAGEMENT					
1	Green Star Accredited Professional	1	1	0	0
2.0	Commissioning and Tuning - Environmental Performance Targets (Prerequisite)	-	-	-	-
2.1	Commissioning and Tuning - Services and Maintainability Review	1	1	0	0
2.2	Commissioning and Tuning - Building Commissioning	1	1	0	0
2.3	Commissioning and Tuning - Building Systems Tuning	1	1	0	0
2.4	Commissioning and Tuning - Independent Commissioning Agent	1	0	0	1
3	Adaptation and Resilience	2	0	2	0
4.1	Building Information - Building Operations and Maintenance Manual	1	1	0	0
4.2	Building Information - Building User Information	1	1	0	0
5.1	Commitment to Performance - Environmental Building Performance	1	1	0	0
5.2	Commitment to Performance - End of Life Waste Performance	1	0	0	1
6.0	Metering and Monitoring - Metering (Prerequisite)	-	-	-	-
6.1	Metering and Monitoring - Monitoring Systems	1	1	0	0
7.0	Construction Environmental Management - Environmental Management Plan (Prerequisite)	-	-	-	-
7.1	Construction Environmental Management - Formalised Environmental Management System	1	1	0	0
8	Operational Waste	1	1	0	0
SUB TOTAL		14	10	2	2
INDOOR ENVIRONMENT QUALITY					
9.1	Indoor Air Quality - Ventilation System Attributes	1	1	0	0
9.2	Indoor Air Quality - Provision of Outdoor Air	2	2	0	0
9.3	Indoor Air Quality - Exhaust or Elimination of Pollutants	1	1	0	0
10.1	Acoustic Comfort - Internal Noise Levels	1	0	0	1
10.2	Acoustic Comfort - Reverberation	1	1	0	0
10.3	Acoustic Comfort - Acoustic Separation	1	0	1	0
11.0	Lighting Comfort - Minimum Lighting Comfort (Prerequisite)	-	-	-	-
11.1	Lighting Comfort - General Illuminance and Glare Reduction	1	1	0	0

11.2	Lighting Comfort - Surface Illuminance	1	1	0	0
11.3	Lighting Comfort - Localised Lighting Control	1	1	0	0
12.0	Visual Comfort - Glare Reduction (Prerequisite)	-	-	-	-
12.1	Visual Comfort - Daylight	2	1	1	0
12.2	Visual Comfort - Views	1	1	0	0
13.1	Indoor Pollutants - Paints, Adhesives, Sealants and Carpets	1	1	0	0
13.2	Indoor Pollutants - Engineered Wood Products	1	1	0	0
14.1	Thermal Comfort - Thermal Comfort	1	1	0	0
14.2	Thermal Comfort - Advanced Thermal Comfort	1	0	1	0
	SUB TOTAL	17	13	3	1
ENERGY					
15A	GHG Emissions Reduction – Performance Pathway	20			12
	OR				
	GHG Emissions Reduction – Prescriptive Pathway				
15A.1.1	Greenhouse Gas Emissions - Building Fabric	1	1	0	0
15A.1.2	Greenhouse Gas Emissions - Glazing	1	1	0	0
15A.1.3	Greenhouse Gas Emissions - Lighting	1	1	0	0
15A.1.4	Greenhouse Gas Emissions - Ventilation and Air Conditioning	1	1	0	0
15A.1.5	Greenhouse Gas Emissions - Hot Water System	1	1	0	0
15A.1.6	Greenhouse Gas Emissions - Building Sealing	1	0	0	1
15A.1.7	Greenhouse Gas Emissions - Accredited GreenPower® Projects	1	0	0	2
16	Peak Electricity Demand Reduction	2	2	0	0
	SUB TOTAL	22	7	0	15
TRANSPORT					
17A	Sustainable Transport - Performance Pathway	10			4
	OR				
17B	Sustainable Transport - Prescriptive Pathway				
17B.1	Sustainable Transport - Access by Public Transport.	3	2	0	0
17B.2	Sustainable Transport - Reduced Car Parking Provision	1	1	0	0
17B.3	Sustainable Transport - Low Emission Vehicle Infrastructure	1	1	0	0

17B.4	Sustainable Transport - Active Transport Facilities	1	1	0	0
17B.5	Sustainable Transport - Walkable Neighbourhoods.	1	1	0	0
	SUB TOTAL	10	6	0	4
WATER					
18A	Potable Water - Performance Pathway OR	12			6
18B	Potable Water - Prescriptive Pathway	6			
18B.1	Potable Water - Sanitary Fixture Efficiency	1	1	0	0
18B.2	Potable Water - Rainwater Reuse	1	0	1	0
18B.3	Potable Water - Heat Rejection	2	2	0	0
18B.4	Potable Water - Landscape Irrigation	1	1	0	0
18B.5	Potable Water - Fire Protection System Test Water	1	1	0	0
	SUB TOTAL	12	5	1	6
MATERIALS					
19A	Life Cycle Assessment (LCA) - Performance Pathway	7			
19A.1	Comparative Life Cycle Assessment	6	0	0	6
19A.2	Additional Life Cycle Impact Reporting OR	1	0	0	1
19B	Life Cycle Impacts – Prescriptive Pathway	5			-2
19B.1.1	Life Cycle Impacts – Concrete - Portland Cement Reduction	2	1	0	1
19B.1.2	Life Cycle Impacts – Concrete - Water Reduction	0.5	0.5	0	0
19B.1.3	Life Cycle Impacts – Concrete - Aggregates Reduction	0.5	0.5	0	0
19B.2A	Life Cycle Impacts – Steel - Reduced Mass of Steel Framing	1	0	0	1
19B.2B	Life Cycle Impacts – Steel - Reduced Use of Steel Reinforcement	1	0	0	1
19B.3.1	Life Cycle Impacts – Facade Reuse or	2	0	0	2
19B.3.2	Life Cycle Impacts – Structure Reuse	2	0	0	2
20.1	Responsible Building Materials - Structural and Reinforcing Steel	1	1	0	0
20.2	Responsible Building Materials - Timber Products	1	1	0	0
20.3	Responsible Building Materials - Permanent Formwork, Pipes, Flooring, Blinds and Cables	1	1	0	0
21	Sustainable Products	3	2	1	0

22	Construction and Demolition Waste	1	1	0	0
	SUB TOTAL	14	8	1	5
LAND USE & ECOLOGY					
23.0	Ecological Value - Endangered, Threatened or Vulnerable Species (Prerequisite)	-	-	-	-
23.1	Ecological Value - Ecological Value	3	0	0	3
24.0	Sustainable Sites - Conditional Requirement (Prerequisite)	-	-	-	-
24.1	Sustainable Sites - Reuse of Land	1	1	0	0
24.2	Sustainable Sites - Contamination and Hazardous Materials	1	1	0	0
25	Heat Island Effect	1	0	1	0
	SUB TOTAL	6	2	1	3
EMISSIONS					
26.1	Stormwater - Reduced Peak Discharge	1	1	0	0
26.2	Stormwater - Reduced Pollution Targets	1	0	1	0
27.0	Light Pollution - Light Pollution to Neighbouring Bodies (Prerequisite)	-	-	-	-
27.1	Light Pollution - Light Pollution to Night Sky	1	1	0	0
28	Microbial Control	1	1	0	0
29	Refrigerant Impacts	1	1	0	0
	SUB TOTAL	5	4	1	0
TOTALS		100	55	9	36
INNOVATION					
30	Innovation	10	0*	10*	0*

NOTE:

Credit points with a * after the number are not linked to the individual credit tabs

REQUIREMENT:

60 - 74 - Five Star Australian - Australian Excellence

OUTCOME:

This project has the ability to seek GBCA certification for a 5 star Green Star rating if additional funds are available

Green Star - Design & As Built v1.1 Management Credits

NO.	CREDIT	POINTS AVAILABLE	POINTS TARGETING	POINTS TBC	POINTS NOT TARGETING
1	GREEN STAR ACCREDITED PROFESSIONAL				
	AIM				
1.0	To recognise projects that engage a Green Star Accredited Professional to support the Green Star certification process.				
	CRITERIA				
	1 point is available where a Green Star Accredited Professional – Design & As Built (GSAP) 1 has been contractually engaged to provide advice, support and information related to Green Star principles, structure, timing and processes, at all stages of the project, leading to certification.		1	0	0
	DESIGN TEAM ACTION				
	Provide name and contact details of GSAP and summarise their involvement in the project. The GSAP must deliver at least one workshop to the project team covering the topics above. It is expected that this workshop will be of most benefit at project inception.				
	ACTION				
	Anissa Farrell is the GSAP for Conrad Gargett AMW with assistance from Mitch Walsh. Anissa Farrell to complete Design Reviews at designated DD and TD milestones.				
2	COMMISSIONING AND TUNING				
	AIM				
	To encourage and recognise commissioning, handover and tuning initiatives that ensure all building services operate to their full potential and as designed.				
	CRITERIA				

2.0	Environmental Performance Targets: It is a minimum requirement for this credit that the project team must set and document environmental performance targets for the project. Confirm project requirements including targets with the client technical stakeholder group outlining the basic functions, operations and maintenance of the building system; the targets for the project energy and water consumption and energy and water budgets for all nominated building systems; and confirm how energy, water, and aspects of indoor environment quality are metered and monitored.	Prerequisite				
2.1	Services and Maintainability Review: 1 point is awarded where a project team can demonstrate that a comprehensive services and maintainability review has been conducted, led by the head contractor or the owner's representative (or the ICA where applicable), during the design stage and prior to construction. The review must occur firstly in the design stage and then prior to construction by the client's technical stakeholder group and the head contractor and address the following; Commissionability; Controllability; Maintainability; Operability (including 'Fit for Purpose'); and Safety. The review and outcomes must be summarised and incorporated with the Environmental Performance Targets in a Services and Maintainability Report.	1	1	0	0	
2.2	Building Commissioning: 1 point is awarded when a project team can demonstrate that the pre-commissioning and commissioning activities have been performed based on the approved standards and guidelines.	1	1	0	0	
2.3	Building Systems Tuning: 1 point is awarded where, following practical completion and prior to occupation, the owner/client has formally committed to a tuning process for all nominated building systems. This process occurs in the first twelve months of occupation (up to the end of the Defects Liability Period) where the systems are tested quarterly and tuned to meet targets set in the Services and Maintainability Report. It may be worth confirming with the Asset Management Unit if they are committed to a process of reviewing targets in this period.	1	1	0	0	
2.4	Independent Commissioning Agent: This point can only be awarded if at least one of the credit requirements for 2.1, 2.2 or 2.3 has been achieved. 1 additional point is available for utilisation of an Independent Commissioning Agent (ICA) to advise, monitor, and verify the commissioning and tuning of the nominated building systems throughout the design, tender, construction, commissioning and tuning phases.	1	0	0	1	
DESIGN TEAM ACTION						
2.1	The specification could include a section within it stating that the Head Contractor is required to provide evidence of comprehensive services and maintainability review.					

- 2.2 The Project Manager is to prepare the Commissioning Management Plan.
- 2.3 The specification could include a section within it stating that the Head Contractor is required to commit to this quarterly review process including tuning services to meet the agreed targets under the monitoring of the Asset Management Unit.
- 2.4 No costs in the budget for an ICA

3 ADAPTATION AND RESILIENCE

AIM

To encourage and recognise projects that are resilient to the impacts of a changing climate and natural disasters.

CRITERIA

2 points are awarded if there is a Climate Adaption Plan in place which identifies potential environmental, social and economic climate change impacts on the project, Risks associated with the climate change scenarios and impacts on the project and a list of actions and responsibilities.

0 2 0

DESIGN TEAM ACTION

No action. The submission of the Climate Adaption Plan needs to be done by a suitably qualified professional. A fee variation for this service would be required.

- * Adaptation and Resilience is becoming a greater environmental risk on building projects, engaging a qualified professional could have some positive impacts on the overall schools ability to withstand increased weather systems. examples of these positive impact include Climate change adaptation and mitigations for energy security, water security etc.

4 BUILDING INFORMATION

AIM

To recognise the development and provision of building information that facilitates operator and user understanding of a building's systems, their operation and maintenance requirements, and their environmental targets, to enable optimised performance.

CRITERIA

4.1	Building Operations and Maintenance Manual. 1 point is available where it is demonstrated that comprehensive Operations and Maintenance information is developed and made available to the facilities management team.	1	1	0	0
4.2	Building User Information. 1 point is available where relevant and current building user information is developed and made available to all relevant stakeholders. DESIGN TEAM ACTION The specification could include a section within it stating that the Head Contractor is required to provide a compiled Building Operations and Maintenance Manual.	1	1	0	0

5 COMMITMENT TO PERFORMANCE

AIM

To recognise practices that encourage building owners, building occupants and facilities management teams to set targets and monitor environmental performance in a collaborative way.

CRITERIA

5.1	Environmental Building Performance. 1 point is awarded if at least 80% of the project's gross floor area (GFA), excluding carparking areas, is covered by a commitment to set, measure and report on its environmental performance. A smaller proportion of compliant space may be rewarded partial points on a sliding-scale to one decimal point, e.g. if 40% of the project's GFA is covered 0.5 points are awarded. Compliance shall be demonstrated by providing a commitment to set, measure and report on building performance. At least two of the following building performance metrics must be set, measured and reported at least quarterly. 1. Energy targets in kWh/m2 or Greenhouse Gas Emissions kg/CO2/m2 2. Potable water usage in kL/m2 or kL/person 3. Operational waste minimisation targets stated in kg/m2 or per person. 4. Indoor environment quality targets including Occupant Comfort survey, Indoor Air Quality; Lighting Comfort; Thermal Comfort	1	1	0	0
5.2	End of Life Waste Performance: 1 point is awarded where at least 80% of the project's GFA, excluding carparking areas, has a formal commitment in place to reduce demolition waste at the end of life of an interior fitout or base building component. A smaller proportion of compliant space may be rewarded partial points on a sliding-scale to one decimal point.	1	0	0	1

DESIGN TEAM ACTION

5.1: Ensure that two of the above environmental performance metrics in 5.1 are set and included in the Services Engineers specification. Target Certified Operational Performance Rating; At least two NABERS ratings: NABERS Energy, NABERS Water, NABERS Waste and NABERS IE. The targets should be reviewed by the Services Engineer and the Asset Management Unit

5.2: this credit is to arduous to obtain under this contract

6 METERING AND MONITORING

AIM

To recognise the implementation of effective energy and water monitoring systems.

CRITERIA

6.0 It is a minimum requirement of this credit that project teams must provide accessible metering to all energy and water common uses and major uses, and to energy and water sources provided by the project. Prerequisite

6.0.1. Distinct uses or different floors must be metered.

6.0.2. Water and Energy Meters must be easily accessible, monitored and maintained.

6.0.3. If the building area is less than 1000m² then a single meter for energy and a single meter for water is acceptable if accessible to the Asset Management Unit.

6.1 **Monitoring Systems. 1 point** is awarded where a monitoring system is provided capable of capturing and processing the data produced by the installed energy and water meters. The monitoring system must accurately and clearly present the metered data and include reports on consumption trends, in accordance with the following requirements. 1 0 0

o Monitoring Strategy such as CIBSE TM39 Building Energy Metering.

o Automatic Monitoring System

In an education building, the metering strategy should address the multiple uses in the facility. The kitchen, computer classrooms, auditoriums, gyms, swimming pool, laboratories, study rooms, classrooms and lecture halls all have different usage patterns. As such, the metering strategy should separately sub-meter those.

DESIGN TEAM ACTION

Ensure that the Services Engineer specifies a strategy for monitoring energy consumption including energy and water. A metering schedule must be included and must list:

- o The incoming input (electricity, gas, water, etc.);
- o The end use (lighting, HVAC, fans);
- o The estimated energy consumption for the end use;
- o Which meter(s) provide the required information; and
- o The individual estimated end consumption.

The Services Specification must allow for automatic monitoring systems that record both consumption and demand of energy or water, and are capable of producing reports on quarter hourly, hourly, daily, monthly, and annual energy use for all meters.

Small Buildings - those with Gross Floor Area (1000m² excluding carparking), are outside the area definition and can submit a CIR to obtain additional clarification. However check what the EFSG and NCC/BCA states about metering and monitoring.

7 CONSTRUCTION ENVIRONMENTAL MANAGEMENT

AIM

To reward projects that use best practice formal environmental management procedures during construction.

CRITERIA

7.0	Environmental Management Plan. To qualify for this credit, it is a minimum requirement that a comprehensive project-specific Environmental Management Plan (EMP) must be in place for construction.	Prerequisite			
7.1	Formalised Environmental Management System. 1 point is available where a formalised, systematic and methodical approach to planning, implementing and auditing is in place during construction, to ensure conformance with the EMP. Projects under \$10 million. An auditor report, confirming evidence of effective use of the formalised Environmental Management System (EMS), must be provided to demonstrate compliance with these requirements. This requirement is applicable to small teams, as it provides an avenue to demonstrate that an environmental management system exists to track all relevant impacts on site.		1	0	0

Projects over \$10 million. The formalised Environmental Management System in use on site must have been certified by a third-party organisation that provides independent verification of system compliance to ISO standards (or equivalent Australian Standards) and are members of the International Accreditation Forum. The Environmental Management System must be certified against one of the following standards: AS/NZS ISO 14001, BS 7750 or the European Community's EMAS.

A Principal/Head contractor which holds the accreditation is an acceptable method of demonstrating compliance for this requirement. In this case, the Principal/Head Contractor for each building and/or piece of infrastructure in the project site area must have a valid certificate before and throughout construction. All subcontractors must be required to adhere to the EMP conditions, and monitored for compliance.

DESIGN TEAM ACTION

The specification could include a section within it stating that the Head Contractor is required to provide a certified EMS within the Tender Documentation.

8 OPERATIONAL WASTE

AIM

To recognise projects that implement waste management plans that facilitate the re-use, upcycling, or conversion of waste into energy, and stewardship of items to reduce the quantity of outgoing waste.

CRITERIA

There are two options available in this credit; a 'Performance Pathway' that relies on specialised waste management solutions, or a 'Prescriptive Pathway' that outlines specific best practice requirements. 1 1 0 0

8A **Performance Pathway: Specialist Plan. 1 point** is available where a waste professional specialist, prepares and implements an Operational Waste Management Plan (OWMP) for the project in accordance with best practice approaches and this is reflected in the building's design.

OR

8B **Prescriptive Pathway: Facilities. 1 point** is available where facilities are in place to collect and separate distinct waste streams, and where these facilities meet best practice access requirements for collection by the relevant waste contractor.

DESIGN TEAM ACTION

The performance pathway (Option 8A) appears to be the one best suited for education projects. Ask the Project Manager and the Project Stakeholder Group whether a waste professional specialist will be employed on the project to provide an OWMP.

Alternatively request a waste management plan from NSW DoE and include Option 8b Prescriptive Pathway requirements within the Waste Management Plan.

The specification could include a section within it stating that the Head Contractor is required to provide Waste Management Plan.

Check with Waste Consultant on implication of this credit

Green Star - Design & As Built v1.1 Indoor Environment Quality Credits

NO.	CREDIT	POINTS AVAILABLE	POINTS TARGETING	POINTS TBC	POINTS NOT TARGETING
9	INDOOR AIR QUALITY				
	AIM To recognise projects that provide high indoor air quality to occupants.				
	CRITERIA				
9.1	Ventilation System Attributes. 1 point is available where: o The entry of outdoor pollutants is mitigated; o The system is designed for ease of maintenance and cleaning; and o The system has been cleaned prior to occupation and use.	1	1	0	0
9.2	Provision of Outdoor Air. 2 points are available where the nominated area is provided with sufficient outdoor air to ensure levels of indoor pollutants are maintained at acceptable levels. Options are available for mechanically and naturally ventilated buildings and for outdoor air provision or contaminant monitoring.	2	2	0	0
9.3	Exhaust or Elimination of Pollutants. 1 point is available where nominated pollutants, such as those arising from printing equipment, cooking processes and equipment, and vehicle exhaust, are limited by either removing the source of pollutants from the nominated area, or exhausting the pollutants directly to the outside while limiting their entry into other areas of the project.	1	1	0	0
	DESIGN TEAM ACTION Confirm with the Mechanical Engineer that the design of any ventilation, maintenance of acceptable indoor air quality levels or provision of exhaust systems (for photocopiers, printers, cooking equipment, etc.) that are designed to remove pollutants and meet minimum emissions standards will be in accordance with the required standards to comply with Green Star requirements.				
10	ACOUSTIC COMFORT				
	AIM To projects that provide appropriate and comfortable acoustic conditions for occupants.				
	CRITERIA				

10.1	Internal Noise Levels. 1 point is available where 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.	1	0	0	1
10.2	Reverberation. 1 point is available where the nominated area has been built to reduce the persistence of sound to a level suitable to the activities in the space.	1	1	0	0
10.3	Acoustic Separation. 1 point is available where the nominated enclosed spaces have been built to minimise crosstalk between rooms and between rooms and open areas. The partition between the spaces should be constructed to achieve a weighted sound reduction index (Rw) of at least 45.	1	0	1	0

DESIGN TEAM ACTION

Confirm with the Acoustic Engineer that Internal Ambient Noise Levels are no more than 5dB(A) above the 'satisfactory' sound levels provided in Table 1 of AS/NZS 2107:2000, or 10dB(A) above for a naturally ventilated building with all openings open.

Confirm with the Acoustic Engineer that 'Recommended Reverberation Time' comply with the requirements of Table 1 of AS/NZS 2107:2000.

Acoustic Separation difficult to achieve this point as DoE EFSG has established the Rw values of partitions with some Rw values less than 45.

11 LIGHTING COMFORT

AIM

To encourage and recognise well-lit spaces that provide a high degree of comfort to users.

CRITERIA

11.0	Minimum Lighting Comfort. The minimum requirement is met where lights are flicker-free and accurately address the perception of colour in the space.	Prerequisite			
11.1	General Illuminance and Glare Reduction. 1 point is available where, in the nominated area: o Lighting levels and quality comply with best practice guidelines; and o Glare is eliminated.	1	1	0	0
11.2	Surface Illuminance. 1 point is available where, in the nominated area, a combination of lighting and surfaces improve uniformity of lighting to give visual interest.	1	1	0	0
11.3	Localised Lighting Control. 1 point is available where, in the nominated area, occupants have the ability to control the lighting in their immediate environment.	1	1	0	0

DESIGN TEAM ACTION

The Electrical Engineer shall confirm that all specified luminaires have either:

- o A minimum Class A1 & A2 ballast;
- o High frequency ballasts for all fluorescent lamps; or
- o Electronic ballasts in High Intensity Discharge (HID) lighting. And that all light sources have a minimum Colour Rendering Index (CRI) of 80 as per the guidance in table 7.2 in AS1680.1:2006 to address the perception of colour.

The Electrical Engineer shall confirm that lighting levels comply with best practice guidelines and that glare is illuminated as per Green Star requirements.

The Electrical Engineer shall confirm that surface illuminance levels comply with the Green Star requirements.

The Electrical Engineer shall confirm that localised lighting control can be achieved.

12 VISUAL COMFORT

AIM

To recognise the delivery of well-lit spaces that provide high levels of visual comfort to building occupants.

CRITERIA

- 12.0 **Glare Reduction.** The minimum requirement is met where the glare in the nominated area from sunlight through all viewing façades is reduced through a combination of blinds, screens, fixed devices, or other means. Prerequisite

12.0A Fixed Shading Devices. For this option, fixed devices must be shown to shade the nominated plane, 1.5m in from the viewing façade. The nominated plane must be shown to be shaded from direct sunlight for 80% of the nominated occupied hours for each day of the winter and spring equinoxes and the summer and winter solstices.

12.0B Blinds or Screens. All blinds or screens in the nominated area must meet the following criteria:

- o The blinds must provide glare reduction to at least 95% of the floor area;
- o Blinds must be controlled by all affected occupants within each individual space; and
- o Blinds must have a visual light transmittance (VLT) of $\leq 10\%$.

Manual or automated internal, in-glazing, or external blinds can be used.

Where automated blinds are used, they must be controlled either by a management system or by a manually-activated switch. All automated blinds and screens must be equipped with a manual override function accessible by occupants in each of the adjacent spaces served.

12.1	<p>Daylight. Up to 2 points are available where a percentage of the nominated area receives high levels of daylight:</p> <ul style="list-style-type: none"> o For 40% of the nominated area – 1 point; o For 60% of the nominated area – 2 points. 	2	1	1	0
12.2	<p>Views. 1 point is available where 60% of the nominated area has a clear line-of-sight to a high quality internal or external view. All floor areas within 8m from a compliant view can be considered to meet this credit criterion.</p> <p>The line-of-sight shall be measured by extending a perpendicular line from the view, be it a window, opening or internal view. A line at 45° can be used at the corners of the view. The thickness of the external walls must be taken into account in the calculations. Internal or external columns can be ignored.</p> <p>DESIGN TEAM ACTION</p>	1	1	0	0
12.0	<p>Provide designs that do not rely on blinds. Provide large roof overhangs, awnings and screens to reduce glare. EFSG has requirements for no direct sunlight to work surfaces with the office and homebase rooms.</p>				

- 12.1 Controlling direct sunlight into spaces is necessary to reduce unwanted heat gain and reduce the adverse effects of glare into a work environment, therefore it is recommended to:
- o Exclude direct sunlight from all learning spaces, libraries, administrative offices and staff studies for the period of 9.00am to 3.30pm including Eastern Daylight Saving Time between 21st September to 21st March (equinoxes). Elimination of direct sunlight into the spaces will also reduce unwanted heat gain in summer.
 - o Exclude direct sunlight from desk level in all learning spaces between 9am and 3:30pm. Sun exclusion and glare control can be achieved by the use of elements such as; Sun shades, eave extensions, vertical blades and the like.
- Glare should only be controlled by blinds as a last resort.*
 Architect to prepare sun diagrams in the design phase as a minimum requirement.

12.2 Architect to prepare line-of-site diagrams to confirm access to external views for 60% of

12 INNOVATION (VISUAL COMFORT)

CRITERIA

Exceeding Green Star Benchmarks - Daylight

Up to 1 point is available where a project team can demonstrate that high levels of daylight are available to a higher percentage of the nominated area than is required for compliance with criterion 12.1. Additional points are awarded as follows:

	1	0	1	0
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- o Where 80% of the nominated area complies – 1 additional point is awarded.

DESIGN TEAM ACTION

Architect to check line-of-site diagrams to confirm access to external views for 80% of GFA

13 INDOOR POLLUTANTS

AIM

To recognise projects that safeguard occupant health through the reduction in internal air pollutant levels.

CRITERIA

- 13.1 **Paints, Adhesives, Sealants and Carpets.** 1 point is available where at least 95% of 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.
- | | | | | |
|--|---|---|---|---|
| | 1 | 1 | 0 | 0 |
|--|---|---|---|---|

13.2 **Engineered Wood Products. 1 point** is available where at least 95% of all engineered wood products meet stipulated formaldehyde limits or no new engineered wood products are used in the building. 1 0 0

DESIGN TEAM ACTION

The specification to include a section within it specify low VOC level products which are certified under a recognised Product Certification Scheme (listed on the GBCA web site) or other recognised standards.
 The specification to include a section within it specify engineered wood products which are certified under a recognised testing protocol for formaldehyde emission limit.

13 INNOVATION (INDOOR POLLUTANTS)

AIM

Exceeding Green Star Benchmarks – Ultra Low VOC Paints

One (1) additional point may be awarded where over 50% of paints (by cost) specified in the building have a maximum TVOC content of 5g/L. This must be verified by one of the approved paint test methods. 1 0 1 0

ACTION

Test area calculations

AIM

Innovation Challenge – Indoor Plants

One (1) additional point may be awarded where indoor plants are evenly distributed across the nominated area and are regularly maintained. One or more plants with a soil area of at least 500cm² (0.05 m²) are required per 10m² of nominated area (primary spaces and secondary spaces, excluding fully enclosed spaces smaller than 10m²). 1 0 0 1

ACTION

No budget available in the cost plan for indoor plants. In addition school maintenance are reluctant to commit to servicing indoor plans, however this could become part of the school Go Green Sustainable activities.

14 THERMAL COMFORT

AIM

To recognise projects that achieve high levels of thermal comfort.

CRITERIA

14.1 **Thermal Comfort. 1 point** is available where a high degree of thermal comfort is provided to 1 occupant in the space, equivalent to 80% of all occupants being satisfied in the space. 1 0 0

14.2 **Advanced Thermal Comfort. 1 additional point** is available where a high degree of thermal comfort is provided to occupants in the space, equivalent to 90% of all occupants being satisfied in the space. 0 1 0

DESIGN TEAM ACTION

14.1 Mechanical Consultant to provide naturally ventilated spaces with internal temperatures that are within 80% of 14.1.1 requirements

14.2 Mechanical Consultant to provide naturally ventilated spaces with internal temperatures that are within 90% of 14.1.1 requirements

14 INNOVATION (THERMAL COMFORT)

AIM

Innovative technology or process – Individual Comfort Control 1 0 0 1

One (1) additional point is available where the project has achieved either the first or second Thermal Comfort point, is mechanically ventilated, and meets the requirements of the following requirements for individual thermal comfort control. The individual comfort control system must allow control over at least one of the following:

- o Air velocity;
- o Temperature (whether radiant or from direct air temperature); or
- o Air direction.

ACTION

Test area calculations

Green Star - Design & As Built v1.1 Energy Credits

NO.	CREDIT	POINTS AVAILABLE	POINTS TARGETING	POINTS TBC	POINTS NOT TARGETING
15	GREENHOUSE GAS EMISSIONS				
	AIM				
	To encourage the reduction of greenhouse gas (GHG) emissions associated with the use of energy in building operations.				
	CRITERIA				
15A	GHG Emissions Reduction – Prescriptive Pathway				
	Up to 5 out of 20 points are available where it is demonstrated that the predicted building GHG emissions have been reduced by employing ‘best practice’ attributes. This pathway may be applied to NCC Class 3 to Class 9 buildings. The Conditional Requirement must be met as outlined within this pathway. Up to five points can be awarded where the Class 3 to 9 parts of a building exceed the minimum Section J requirements in accordance with the following requirements. Eight (8) points are presented, however a maximum of five (5) points may be awarded:				
	Building Envelope. 1 point is awarded where the roof and ceiling, walls, and flooring construction achieves a 15% increase on the minimum required R-values specified in J1.3, J1.5 and J1.6.	1	1	0	0
	Glazing. 1 point is awarded where the glazing complies with the following conditions: o For vertical glazing, the total energy used for each orientation and each storey is not greater than 85% of the total allowance according to the Australian Building Codes Board glazing calculator or the calculated aggregated air-conditioning energy value as defined in part J2.4 of the NCC; and o Where there are roof lights, the SHGC and total U-Value of these roof lights exceed the requirements of section J1.4 by 15% .	1	1	0	0

<p>Lighting. 1 point is awarded where the lighting complies with the following conditions:</p> <ul style="list-style-type: none"> o The actual installed aggregate illumination power density is 30% less than the maximum illumination power densities defined in Table J6.2a; o Automated lighting control systems, such as occupant detection and daylight adjustment, are provided to 95% of the nominated area; and o For Class 5 and 9a buildings only, the size of individually switched lighting zones does not exceed 100m2 for 95% of the nominated area. 	1	1	0	0
<p>Ventilation and Air-conditioning. 1 point is awarded where all spaces comply with the following conditions:</p> <p>Mechanically Ventilated Spaces</p> <p>The HVAC systems comply with the following conditions:</p> <ul style="list-style-type: none"> o The installed fan motor power and pump power, is at least 15% less that the maximum fan motor powers and pump powers defined in Tables J5.2 and J5.4a; o The thermal efficiency of the installed water heater is 15% more than the required minimum as defined in Table J5.4b; and o The required minimum energy efficiency ratio for packaged air conditioning equipment and refrigerant chillers – as defined in Tables J5.4d and J5.4e, OR, MEPS, where Section J does not apply to the equipment capacity – is increased by at least 15%. 	1	1	0	0
<p>Naturally Ventilated Spaces</p> <p>The building is naturally ventilated in accordance with the Indoor Air Quality credit.</p>	1	1	0	0
<p>Domestic Hot Water Systems. 1 point is awarded where domestic hot water systems are powered by one of the following heat sources:</p> <ul style="list-style-type: none"> o Renewable Energy; o Natural Gas; o Electric heat pump (minimum COP 3.5 under design conditions); or o Waste heat or heat recovered from another process. 	1	1	0	0
<p>Building Sealing. Mechanically and Mixed Mode Ventilated Spaces. 1 point is awarded where a pressurised building air leakage test (refer to guidance section) is carried out on the completed building in accordance with one of the following standards:</p> <ul style="list-style-type: none"> o ASTM E779-10; or o ATTMA TSL2. 	1	0	0	1

	<p>Accredited GreenPower® Projects which have committed to procure GreenPower® can be rewarded for supporting grid-connected renewable energy supply infrastructure.</p> <ul style="list-style-type: none"> o 1 point is awarded where a supply contract is in place to procure at least 50% of the building's electricity consumption through accredited GreenPower®. o 2 points are awarded where a supply contract is in place to procure at least 100% of the building's electricity consumption through accredited GreenPower®. <p>The length of time of the commitment is for a minimum period of ten years after Practical Completion.</p>	2	0	0	2
15B	<p>GHG Emissions Reduction – NatHERS. Up to 12 out of 20 points</p> <p>This method applies to Class 2 multi-unit residential dwellings, the immediate adjacent areas used to access the dwellings, and areas which provide common amenities for use by residents only. This method can be used for projects located in all states and territories, except in New South Wales. Not Applicable to projects located in NSW.</p>	12	0	0	12
15C	<p>GHG Emissions Reduction – BASIX. Up to 16 out of 20 points</p> <p>This method applies to Class 2 multi-unit residential dwellings, the immediate adjacent areas used to access the dwellings and areas which provide common amenities for use by residents only. This method can only be used for projects located in New South Wales. Not Applicable to projects located in NSW and project is not a Class 2 residential project.</p>	16	0	0	16
15D	<p>GHG Emissions Reduction – NABERS. Up to 16 out of 20 points</p> <p>This method applies to Class 5, office buildings only. NABERS Energy Commitment Agreement is used to demonstrate that the predicted building GHG emissions have been reduced compared to an average building. The project teams must demonstrate that the project is subject to a NABERS Energy Commitment Agreement for a minimum of 4.5 Stars. Not Applicable to projects located in NSW and project is not a Class 5</p>	16	0	0	16
15E	<p>GHG Emissions Reduction – Modelled Performance</p> <p>Up to 20 out of 20 points are available where it is demonstrated that there is a specified reduction in the predicted energy consumption and GHG emissions of the proposed building. Points are awarded based both on improvements to the building's façade, and on the project's predicted ability to reduce its energy consumption and emissions towards 'net zero operating emissions'. The Conditional Requirement must be met as outlined within this pathway.</p>	20	0	0	20

ACTION

15A Prescriptive Pathway

- o Documentation showing compliance with all of the applicable Deemed-to-Satisfy requirements of Section J of the NCC*.
- o Documentation showing the performance of applicable components (building envelope, glazing, lighting and HVAC) exceeding the minimum NCC requirements by the specified amount. This includes evidence of fabric elements being installed with the specified requirements, including but not limited to:
 - o Window Energy Rating Scheme (WERS) certificates; and
 - o Calculations of wall, roof and floor R-values.
 - o Drawing(s) identifying the control zone sizes and the luminaire switch and control sensor locations.
- o Extract(s) from the Commissioning Report demonstrating (through supporting evidence) that the lighting system has been commissioned and operates as intended by the design.
- o Building sealing test report including details of test methodology and air flow rates, and statement of the building air permeability achieved. **(Note: this may be difficult to achieve as new in Australia and limited knowledge of the performance of the Australian stock exists. Suggest we concentrate efforts elsewhere.)**
- o Power Purchase Agreement (PPA) identifying the duration of the power supply contract, supply availability (including proportion of GreenPower®) and guaranteed GHG emission factor. **(Note: Unsure what the power purchase agreements are between NSW Govt and power supply companies so this credit may be difficult to achieve due to established/ in place contractual agreements.)**

Confirm with Services Engineers the lighting, mechanical systems and hot water plant requirements to achieve the Green Star credit points.

15 INNOVATION (GREENHOUSE GAS EMISSIONS – Innovative Technology or Process – Onsite Renewable Energy)

AIM

Up to two points may be rewarded in the Innovation Category for installing renewable energy sources on site. 2 0 0 2

Renewable Energy Contribution (including shared renewable services)

Amount - 5% = 1 point

Amount - 10% = 2 points

16 PEAK ELECTRICITY DEMAND REDUCTION **2**

AIM

This credit includes two alternative pathways for project teams to demonstrate reductions in peak electricity demand.

CRITERIA

This credit includes two alternative pathways for project teams to demonstrate reductions in peak electricity demand. 2 2 0 0

16A **Prescriptive Pathway:**

On-site Energy Generation. 1 out of 2 Green Star points are available where it is demonstrated that the use of on-site electricity generation systems **reduces the total peak electricity demand by at least 15%.**

16B **Modelled Performance Pathway: Reference Building. Up to 2 points** are available where it is demonstrated that the project's predicted peak electricity demand has been reduced below that of a Reference Building:

- o 0-10%: 0 point
- o 20% : 1 point
- o 30%: 2 points

ACTION

Confirm with the Electrical Engineer the on-site energy generation requirements to achieve the Green Star credit points.

Green Star - Design & As Built v1.1

Transport Credits

NO.	CREDIT	POINTS AVAILABLE	POINTS TARGETING	POINTS TBC	POINTS NOT TARGETING
17	SUSTAINABLE TRANSPORT				
	AIM				
	To reward projects that implement design and operational measures that reduce the carbon emissions arising from occupant travel to and from the project, when compared to a benchmark building. This also promotes the health and fitness of commuters, and the increased liveability of the location.				
	CRITERIA				
	This credit includes two alternative pathways for project teams to demonstrate improvements in the building's access to transport.				
17A	<p>Performance Pathway. Up to 10 Green Star points are available where projects provide access to sustainable transport infrastructure which decreases greenhouse gas emissions from transport, decreases mental and social impacts of commuting, and encourages the uptake of healthier transport options by building occupants.</p> <p>The performance pathway only applies to regular occupants of the building.</p> <p>Up to 10 Green Star points are available for this pathway. Points are awarded based on a holistic approach to reducing the impacts from transport, where the proposed building performance is improved when compared to a Reference Building across four indicators:</p> <ul style="list-style-type: none"> o Emissions reduction; o Active mode encouragement; o Vehicle kilometres travelled reduction; and o Walkable location. <p>Points are awarded by completing the Sustainability Impacts from Transport Calculator with the predicted transport mode split as defined in a Travel Plan. More information is available in the Sustainable Transport Calculator Guide.</p>	10	0	0	0
	OR				
17B	<p>Prescriptive Pathway. Up to 7 out of 10 Green Star points are available where projects provide access to sustainable transport infrastructure which demonstrated using specified prescriptive criteria.</p>				

The prescriptive pathway applies to regular building occupants and visitors.

Up to seven (7) points are awarded based on the following credit elements:

17B.1 Access by Public Transport. Up to 3 points are awarded based on the accessibility of the site by public transport. 3	2	0	0
17B.2 Reduced Car Parking Provision. 1 point is available where there is a reduction in the number of car parking spaces in the proposed building when compared to a standard-practice building. 1	1	0	0
17B.3 Low Emission Vehicle Infrastructure. 1 point is available where parking spaces and/or dedicated infrastructure is provided to support the uptake of low-emission vehicles. 1	1	0	0
17B.4 Active Transport Facilities. 1 point is available where bicycle parking and associated facilities are provided to regular building occupants and visitors. 1	1	0	0
17B.5 Walkable Neighbourhoods. 1 point is available where the project is located conveniently to amenities or the project achieves a specified walk score. 1	1	0	0

ACTION

Review site accessibility by Public Transport as per Green Star Public Transport Calculator.

Review car parking numbers to determine maximum car parking rates for the site.

Review on-site transport facilities, including bicycle parking numbers and end of trip facilities.

Review all amenities within 400m from the new building.

17 INNOVATION (SUSTAINABLE TRANSPORT) 1

Improving Green Star Benchmarks – No new car parks on site 1 0 0 0

One (1) Green Star point will be awarded where no new car parking is provided on-site. This applies regardless of who operates the car parking, even if it's operated by an external party. If new car parking is present on site, even if it is commercially operated, this innovation point cannot be claimed. In addition, for campus-style projects, if there is an increase in the number of car parks within 800m of the site that are included within the campus boundary, this innovation point cannot be claimed.

Note: NSW DoE provides education facilities, not car parks. On that basis, and if a school building only was being added to an existing campus then this innovation point should be achievable. Need to discuss with Building Surveyor/ Certifier/ Town Planner/ DoE to understand requirements and strategies a way forward.

Green Star - Design & As Built v1.1 Water Credits

NO.	CREDIT	POINTS AVAILABLE	POINTS TARGETING	POINTS TBC	POINTS NOT TARGETING
18	POTABLE WATER				
	AIM To encourage building design that minimises potable water consumption in operations.				
	CRITERIA This credit includes two alternative pathways to demonstrate reductions in potable water				
18A	Performance Pathway Up to 12 Green Star points are available based on the magnitude of the predicted reduction in potable water consumption, when the project is compared against a Reference Building.				
	18A PERFORMANCE PATHWAY Up to twelve (12) points are awarded where it is demonstrated that the building’s predicted potable water consumption has been reduced below that of a Reference Building. This credit addresses the potable water consumption from the use of sanitary fixtures, appliances, HVAC, irrigation systems, and swimming pools (where present). The Compliance Requirements and guidance for the Performance Pathway are detailed in the Green Star Potable Water Calculator Guide. Points achieved by the Performance Pathway are determined in accordance with the Green Star Potable Water Calculator.	12	0	0	12
	Shared Services This credit rewards projects for reduction in potable water usage due to the use of reclaimed water from on-site rainwater, greywater, blackwater, stormwater or supplied reclaimed water. The calculator allows for the inclusion of the amount of non-potable water that is available from a central or shared service for use within the building.				
	OR				
18B	Prescriptive Pathway Up to 6 Green Star points out of 12 are available where it is demonstrated that the building’s potable water consumption has been reduced through best practice water saving design features.				

18B PRESCRIPTIVE PATHWAY

Up to six (6) points are available where it is demonstrated that specific credit criteria are met as outlined in Table 18B.1.

18B.1 Sanitary Fixture Efficiency

1 1 0 0

One (1) point is awarded where all fixtures are within one star of the WELS rating stated below: Fixture / Equipment Type WELS Rating

Taps/ 6 Star

Urinals/ 6 Star

Toilet/ 5 Star

Showers/ 3 Star (> 4.5 but <= 6.0)

Clothes Washing Machines/ 5 Star

Dishwashers/ 6 Star

18B.2 Rainwater Reuse

1 0 1 0

One (1) point is awarded when a rainwater tank is installed to collect and reuse rainwater, within the project's site boundary, and the rainwater tank size meets the following criteria:

Gross Floor Area (GFA in m2)/ Rainwater Tank Volume (kL)

2,500m2/ 25kL

5,000m2/ 50kL

10,000m2/ 100kL

20,000m2/ 200kL

18B.3 Heat Rejection

2 2 0 0

Two (2) points are awarded where no water is used for heat rejection. To comply, the project must be either naturally ventilated (allowing for the use of ceiling fans or similar) or the **HVAC system must not use water for heat rejection.**

To claim that the project is naturally ventilated, it must be demonstrated that the building is naturally ventilated in accordance with **AS1668.4-2012 The use of ventilation and air-conditioning in buildings – Part 4: Natural Ventilation of buildings**. To claim that no water based heat rejection system is used it must be demonstrated that the air conditioning needs of the project are met by means other than water based heat rejection.

18B.4 Landscape Irrigation

1

1

0

0

One (1) point is awarded where either drip irrigation with moisture sensor override is installed, or where no potable water is used for irrigation.

The landscaping and associated systems must be designed to reduce the consumption of potable water required for irrigation through the installation of subsoil drip irrigation and moisture sensor controls.

In the case of a xeriscape garden, the provision of irrigation systems must be able to be removed within three months of landscaping installation and the landscaping must not require

18B.5 Fire Protection System Test Water

1

1

0

0

One (1) point is awarded when one of the following conditions is met:

- o The fire protection system does not expel water for testing; or
- o The fire protection system includes temporary storage for 80% of the routine fire protection system test water and maintenance drain-downs for reuse on-site. If sprinkler systems are installed, each floor must be fitted with isolation valves or shut-off points for floor-by-floor testing.

ACTION

18B.1 Consult with the Interior Team, Hydraulic Engineer, Mechanical Engineer, Landscape Architect to confirm that all items above can be achieved.

18B.2 no water tanks currently documented and budget is constrained. Civil and hydraulic to see what we can do about getting in a water tank. Landscape to confirm what needs to be irrigated

18B.3 no heat rejections on project

18B.4 landscaped as per above

18B.5 no sprinklers

18 INNOVATION (POTABLE WATER)

AIM

<p>Innovative Technology or Process - Heat rejection systems in equipment requiring process cooling (Prescriptive Pathway 18.B) One Innovation point is available where water use from process cooling in medical, laboratory, or industrial equipment, is at least 10% of the building's total water consumption. In such a case, an innovation point can be achieved if:</p> <ul style="list-style-type: none">o 95% of the water requirement for once-through cooling of equipment requiring process cooling is sourced from non-potable water; <p>OR</p> <ul style="list-style-type: none">o All equipment requiring process cooling uses cooling systems other than once-through cooling systems.	1	0	0	0
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Green Star - Design & As Built v1.1 Material Credits

NO.	CREDIT	POINTS AVAILABLE	POINTS TARGETING	POINTS TBC	POINTS NOT TARGETING
19	LIFE CYCLE IMPACTS				
	AIM To reward the reduction of the environmental impacts of building materials for the whole building over its entire life cycle.				
	CRITERIA This credit includes two alternative methods to demonstrate reductions in the environmental impact of the building's materials.				
19A	Performance Pathway – Life Cycle Assessment (LCA) Up to 7 Green Star points are available where a whole-of-building, whole-of-life (cradle-to-grave) life cycle assessment (LCA) is conducted for the project and a reference building. Points are awarded based on the extent of environmental impact reduction achieved against six environmental impacts categories, when compared to a reference building, with an option to expand reporting to additional criteria.				
	19A.1 Comparative Life Cycle Assessment Up to 6 points are available where a whole-of-building, whole-of-life (cradle-to-grave) life cycle assessment (LCA) is conducted for the project and a reference building. Points are awarded based on the extent of environmental impact reduction achieved against environmental impacts categories, when compared to a reference building.	6	0	0	6
	19A.2 Additional Life Cycle Impact Reporting 1 additional point is available where the LCA conducted by the project includes reporting of five impact categories in addition to those required under the 'Comparative Life Cycle Assessment' credit element.	1	0	0	1
	OR				

19B	<p>Prescriptive Pathway – Life Cycle Impacts</p> <p>Up to 5 Green Star points are available where the project reduces the amount of building materials used. The following options are included in this pathway:</p> <ul style="list-style-type: none"> o Concrete; o Steel; and o Building Reuse. <p>There are 8 points available between the options in this pathway. However, only a maximum of 5 points can be awarded depending on the project's specific conditions.</p>				-2
19B.1	<p>Credit 19B.1 LIFE CYCLE IMPACTS - CONCRETE</p> <p>Green Star Points available: 3</p>				
	<p>19B.1.1 Portland Cement Reduction</p> <p>Up to 2 points are available where the Portland cement content in all concrete used in the project has been reduced by replacing it with supplementary cementitious materials.</p> <p>1 point is available where the Portland cement content is reduced by 30%, measured by mass across all concrete used in the project compared to the reference case;</p> <p>OR</p> <p>2 points are available where the Portland cement content is reduced by 40%, measured by mass across all concrete used in the project compared to the reference case.</p>	2	1	0	1
	<p>19B.1.2 Water Reduction 0.5 point is available where the mix water for all concrete used in the project contains at least 50% captured or reclaimed water (measured across all concrete mixes in the project).</p>	0.5	0.5	0	0
	<p>19B.1.3 Aggregates Reduction 0.5 point is available where either:</p> <p>At least 40% of coarse aggregate in the concrete is crushed slag aggregate or another alternative materials (measured by mass across all concrete mixes in the project), provided that use of such materials does not increase the use of Portland cement by over five kilograms per cubic meter of concrete;</p> <p>OR</p> <p>At least 25% of fine aggregate (sand) inputs in the concrete are manufactured sand or other alternative materials (measured by mass across all concrete mixes in the project), provided that use of such materials does not increase the use of Portland cement by over five kilograms per cubic meter of concrete.</p>	0.05	0.5	0	0

COMPLIANCE REQUIREMENTS

Prerequisite

If the cost of all poured concrete (all costs) represents less than 1% of the project's contract value, the 'Life Cycle Impacts – Concrete' pathway (19B.1) cannot be targeted.
 This credit addresses all new concrete used in the project including structural and non-structural uses. Concrete masonry, including core-filled, is excluded.
 Recycled concrete elements may also be targeted under the 'Sustainable Products' credit (21).

19 INNOVATION (SUSTAINABLE SOURCING OF CONCRETE AGGREGATES) Innovation Challenge

AIM

The GBCA invites project teams submit an Innovation Challenge for the sustainable sourcing of concrete aggregates.

REFERENCED DOCUMENTS

The following documents are referred to in this credit:

- AS 1379 – The Specification and Supply of Concrete and standard cement contents for each strength grade.
- AS 3582 - Supplementary cementitious materials for use with Portland and blended cements.
- AS 3972-2010 General purpose and blended cements.
- Cement Concrete and Aggregate Australia publications: Use of Recycled Aggregates in Construction and Guide to the Specification and Use of Manufactured Sand in Concrete.

19B.2 Credit 19B.2 LIFE CYCLE IMPACTS - STEEL

Green Star Points available: 1

19B.2A Reduced Mass of Steel Framing (Steel framed building)

1 0 0 1

Up to 1 point is available when there is a reduction in the mass of steel framing used when compared to standard practice.

19B.2B Reduced Use of Steel Reinforcement (Concrete framed building)

1 0 0 1

Up to 1 point is available when there is a reduction in the mass of steel reinforcement used when compared to standard practice.

Note: If the material cost of structural and reinforcing steels represents less than 1% of the project's total contract value, or there are no new structural or reinforcing steels used in the project, the 'Life Cycle Impacts – Steel' pathway (19B.2) cannot be claimed.
 All benchmark calculations in this credit are based on the mass of steel in the building.

19B.3 Credit 19B.3 LIFE CYCLE IMPACTS - BUILDING REUSE

Green Star Points available: 4

19B.3.1 Facade Reuse 1 point is available where at least 50% (by area) of the building facade is retained; 2 0 0 2
 OR

2 points are available where the proportion retained is 80%.

19B.3.2 Structure Reuse 1 point is available where at least 30% (by mass) of the existing major structure is retained; 2 0 0 2
 OR

2 points are available where the proportion retained is 60%.

Note: Major structure is defined as floors, columns, beams, load bearing walls and foundations. The measure of retained building structure shall be based on gross building volume. Gross building volume is measured as the building footprint (m²) x building height (m).

For a proportion of the existing major structure to be considered reused, all the major structural elements must be retained in that part of the building. The reused percentage should be calculated as a proportion of the existing structure volume.

Refurbishment of Existing Elements: Refurbishment of a structural element is inconsequential to determining whether the element is reused. However, where more than 20% of a structural element is replaced as part of the refurbishment, the element may not be counted as reused.

The proportion of the structural element refurbishment should be measured by length, volume or mass, whichever is more appropriate and the metric chosen must be justified by the project team.

ACTION

Discuss **19B.1** Concrete Green Star Rating options with the Structural Engineer to achieve Green Star points.

Review structural steel solutions as noted in **19B.2** with Structural Engineer.

Review possible facade and structure retention noted in **19B.3**. Discuss with Project Manager and Structural Engineer if any retention strategy is possible/ feasible.

20 RESPONSIBLE BUILDING MATERIALS

AIM

To reward projects that include building materials that are responsibly sourced or have a sustainable supply chain.

CRITERIA

20.1	<p>Structural and Reinforcing Steel: 1 Green Star point is available where 95% of the building's steel (by mass) is sourced from a Responsible Steel Maker; and</p> <p>A. For steel framed buildings, at least 60% of the fabricated structural steelwork is supplied by a steel fabricator/steel contractor accredited to the Environmental Sustainability Charter of the Australian Steel Institute (ASI);</p> <p>OR</p> <p>B. For concrete framed buildings, at least 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).</p>	1	1	0	0
20.2	<p>Timber Products: 1 Green Star point is available where at least 95% (by cost) of all timber used in the building and construction works is either:</p> <p>A. Certified by a forest certification scheme that meets the GBCA's 'Essential' criteria for forest certification (Refer GBCA guidance section);</p> <p>OR</p> <p>B. Is from a reused source.</p>	1	1	0	0
20.3	<p>Permanent Formwork, Pipes, Flooring, Blinds and Cables : 1 Green Star point is available where 90% (by cost) of all permanent formwork, pipes, flooring, blinds and cables in a project either:</p> <p>A. Do not contain PVC and have an Environmental Product Declaration (EPD);</p> <p>OR</p> <p>B. Meet Best Practice Guidelines for PVC.</p>	1	1	0	0

ACTION

Consult with the Structural Engineer and ensure supply and fabrication of Structural and Reinforcing steel is approved by accredited authority such as ASI's Environmental Sustainability Charter Group. Ensure references are made in the specification.

Ensure the specification contains references to the provision of certified new timber or from a reused source including third party verification.

Ensure all PVC used on site meets the best practice guidelines for the use of PVC. Ensure these requirements are included in the specification.

21 SUSTAINABLE PRODUCTS

AIM

To encourage sustainability and transparency in product specification.

CRITERIA

21.0 PRODUCT TRANSPARENCY AND SUSTAINABILITY

Up to three (3) Green Star points are available when project teams can demonstrate that a specified percentage of eligible products meet one of the following initiatives:

- A. Reused Products;
- B. Recycled Content Products
- C. Environmental Product Declarations;
- D. Third-Party Certification; or
- E. Stewardship Programs.

Points are awarded based on the percentage value of the products that meet one of the specified initiatives. This is demonstrated by calculating the Project Sustainability Value (PSV) and comparing it with the Project Contract Value (PCV).

Points are calculated by completion of the Green Star – Design & As Built: Sustainable Products Calculator. Points are awarded as follows: 3% = 1 point, 6% = 2 points, 9% = 3 points

3	2	1	0
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ACTION

Select products that have:

21C Environmental Product Declarations (EPDs) Provide as many products as possible which have achieved third-party verified EPD.

Products with a product-specific, third-party verified EPD

For this format the following minimum requirements apply:

- o The EPD is issued in conformance with ISO 14025 or EN15804;
- o The EPD must be independently-audited; and
- o The EPD must be based on a cradle-to-gate scope as a minimum.

Products with an industry-wide, third-party verified EPD

For this format the following minimum requirements apply:

- o The EPD is issued in conformance with ISO 14025 or EN15804;
- o The EPD must be independently-audited;
- o The EPD must be based on a cradle-to-gate scope as a minimum; and
- o The product manufacturer must be recognised as a participant in the EPD.

or

21D Third Party Certification. Third Party Certification levels are defined in the GBCA's Framework for Product Certification Scheme. Some schemes include the following;

- o Carpet Institute of Australia Limited - Environmental Certification Scheme
- o Ecospecifier - GreenTag GreenRate
- o Australasian Furnishing Research and Development Institute - Green Tick
- o Good Environmental Choice Australia
- o The Institute for Market Transformation to Sustainability - Sustainable Materials Rating Technology

22 CONSTRUCTION AND DEMOLITION WASTE

AIM

To reward projects that reduce construction waste going to landfill by reusing or recycling building materials.

CRITERIA

One (1) point is awarded based on the reduction of waste going to landfill. There are two options for demonstrating compliance with this credit: 1 1 0 0

o 22A Fixed Benchmark

Minimising the total amount of waste sent to landfill when compared against a typical building.

o 22B Percentage Benchmark

Minimising the total amount of waste sent to landfill as a proportion of waste generated.

ACTION

The use of the fixed benchmark procedure looks to be the easiest option. The specification (In GENERAL REQUIREMENTS or ESD CHAPTER) should include the requirement for the Contractor to achieve a maximum 10kg of waste per m2 of GFA.

22 INNOVATION (CONSTRUCTION AND DEMOLITION WASTE) Innovation Challenge

AIM

Improving Green Star Benchmarks 1 0 0 0

One (1) point is available where the construction and demolition waste going to landfill meets a fixed benchmark of 5kg of waste per square meter of gross floor area (GFA).

ACTION

Green Star - Design & As Built v1.1 Land Use & Ecology Credits

NO.	CREDIT	POINTS AVAILABLE	POINTS TARGETING	POINTS TBC	POINTS NOT TARGETING
23	ECOLOGICAL VALUE				
	AIM To reward projects that improve the ecological value of their site.				
	CRITERIA To qualify for points in this credit a minimum requirement must be met.				
23.0	Endangered, Threatened or Vulnerable Species: To meet the minimum requirement for this credit, the project must demonstrate that no critically endangered, endangered, or vulnerable species, or ecological communities were present on the site at time of purchase. Minimum Requirements – Endangered and vulnerable species and communities: It is a minimum requirement of this credit that a check is carried out to ensure that the site does not contain ‘critically endangered, endangered, or vulnerable species or ecological communities as defined in the Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act). If projects are unsure as to whether their project site contained ‘critically endangered, endangered, or vulnerable species or ecological communities’, a report from a qualified Ecologist or suitably qualified professional shall be prepared, confirming that no protected species were present on the site at the time of purchase	Prerequisite			
23.1	Ecological Value: Up to 3 points are awarded where the ecological value of the site is improved by the project. The number of points awarded is determined by the Ecological Value Calculator based on a comparison of the condition of the site before and after design/construction. ACTION no endangered threatened or vulnerables, no flora or fauna report however arbosrisr report Ecological Value maybe a difficult credit to comply with as it requires the project to engage a qualified Ecologist.	3	0	0	3
24	SUSTAINABLE SITES				

AIM

To reward projects that choose to develop sites that have limited ecological value, that reuse previously developed land, and that remediate contaminated land.

CRITERIA

24.0	Conditional Requirement: The Conditional Requirement is met where, at the date of site purchase or date of option contract, the project site did not include old growth forest or wetland of 'High National Importance', or did not impact on 'Matters of National Significance'.	Prerequisite			
24.1	Reuse of Land: 1 point is available where 75% of the site was Previously Developed Land at the date of site purchase or (for previously owned land) at the project's Green Star registration date.		1	0	0
24.2	Contamination and Hazardous Materials: 1 point is available where the site, or an existing building, was previously contaminated and the site has been remediated in accordance with a best practice remediation strategy. 1 point is awarded for this criterion where one (or both) of the following conditions are met:		1	0	0

24.2A Site contamination

- The site has been previously contaminated to the extent that the intended uses, as permitted under the relevant planning scheme, were initially precluded.
- The developer has adopted and implemented a best practice site remediation strategy.
- The best practice site remediation strategy and implementation has been signed off by an auditor prior to issue of the occupation certificate.

OR

24.2B Hazardous materials

- A comprehensive hazardous materials survey has been carried out on any existing buildings or structures on the project site, in accordance with the relevant Environmental and Occupational Health and Safety (OH&S) legislation.
- Where the survey identified asbestos, lead or PCBs in any existing buildings or structures the materials have been stabilized, or removed and disposed of in accordance with best practice guidelines; or the survey concluded that no hazardous materials were found in any existing buildings or structures on the project site.

ACTION

no Asbestos remediation required in soils, Heritage buildingj removing asbestos under the head contract.

Soils report awaiting results

25 HEAT ISLAND EFFECT

AIM

To encourage and recognise projects that reduce the contribution of the project site to the 'heat island effect'.

CRITERIA

25.0 **Heat Island Effect Reduction: 1 point** is available where at least 75% of the total project site area comprises building or landscaping elements that reduce the impact of the heat island effect. 1 0 1 0

ACTION

Roof are light in colour

Landscape to complete quick study on areas of hardscape versus landscape and implications of astro turf

Green Star - Design & As Built v1.1 Emissions Credits

NO.	CREDIT	POINTS AVAILABLE	POINTS TARGETING	POINTS TBC	POINTS NOT TARGETING
26	STORMWATER				
	AIM To reward projects that minimise peak storm water outflows from the site and reduce pollutants entering the public sewer infrastructure.				
	CRITERIA Up to two points are available, the second point is additional to the first:				
26.1	Reduced Peak Discharge: 1 point is available where the post-development peak event discharge from the site does not exceed the pre-development peak event discharge.	1	1	0	0
26.2	Reduced Pollution Targets: 1 additional point is available, where the first point has been achieved and all stormwater discharged from site meets specified Pollution Reduction Targets.	1	0	1	0
	ACTION				
26.1	Done ue to WC requirements for onsite onsite retention (OSD)				
26.2	This credit will require a treatment system that will have additional costs - cartridge system and matinenance requirements - Team to push for this as we need the points				
	INNOVATION - Exceeding Green Star Benchmark - Stormwater Pollution Targets				
	CRITERIA Up to 2 additional points may be awarded where projects can demonstrate achieving Pollution Reduction Targets from column B (1 point) or C (2 points) as stated in Table 26.1.	2	0	0	2
	ACTION Not achievable				
	Innovation Challenge - Water Sensitive Urban Design				
	CRITERIA Project teams may develop an Innovation Challenge that demonstrate that the criteria of the credit have been exceeded by employing Water Sensitive Urban Design principles.	1	0	0	1

ACTION

Not achievable

27 LIGHT POLLUTION

AIM

To reward projects that minimise light pollution arising from external lighting.

CRITERIA

27.0 **Light Pollution to Neighbouring Bodies:** For the project to be awarded a point for this credit, the project must comply with AS 4282:1997 Control of the Obtrusive Effects of Outdoor Lighting. Prerequisite

Minimum Requirements - To qualify for points under this credit, project teams must demonstrate that all outdoor lighting on the project complies with AS 4282:1997. The conditions shall be applied to all inhabited boundaries, apart from boundaries with roads.

27.1 **Light Pollution to Night Sky: 1 point** is available where it can be demonstrated that a specified reduction in light pollution has been achieved by the project. Two options are available for demonstrating a reduction in light pollution. 1 1 0 0

ACTION

Electrical consultants to assess 27.1A and 27.1B against the project

28 MICROBIAL CONTROL

AIM

To recognise projects that implement systems to minimise the impacts associated with harmful microbes in building cooling systems.

CRITERIA

28.0 **Legionella Impacts from Cooling Systems: 1 point** is available where: 1 1 0 0

- The building is naturally ventilated; or
- The building has waterless heat-rejection systems; or
- The building has water-based heat rejection systems that includes measures for Legionella control and Risk Management.

1 point is awarded where it can be demonstrated that impacts associated with harmful microbes in building cooling systems are minimised through one of the following:

- A. Naturally ventilated buildings; or
- B. Waterless heat-rejection systems; or
- C. Water-based heat rejection systems that include measure for Legionella control and Risk Management.

ACTION

Mechanical consultant confirmed most rooms are natural ventilation, except a minor number of rooms (Comms). No AC 60% of building is natural ventilation. Mechanical system is to extract heat not AC. Building is waterless.

Innovation Challenge - Microbial Control in Hot Water Systems

CRITERIA

A project team may claim an Innovation point where it is demonstrated that hot water systems have also been designed to manage the risk of microbial contamination. This may be done in association with operational practices that are to be implemented, as long as there are also design features that facilitate the achievement of the aim of the credit. 1 0 0 1

29 REFRIGERANT IMPACTS

AIM

To encourage practices that minimise the environmental impacts of refrigeration equipment.

CRITERIA

29.0 Refrigerant Impacts - 1 point is awarded where one of the following criteria is achieved: 1 1 0 0

- The combined Total System Direct Environmental Impact (TSDEI) of the refrigerant systems in the building is less than 15; or
- The combined TSDEI of the refrigerant systems is between 15 and 35, AND a leak detection system with automated refrigerant recovery is in place R1.29.01; or
- All refrigerants in the project have an ozone depletion potential of zero, and a global warming potential of 10 or less; or
- Where there are no refrigerants employed by nominated building systems, this point is awarded.

ACTION

Mech consultant confirmed no refrigerants

Green Star - Design & As Built v1.1 Innovation Credits

NO.	CREDIT	POINTS AVAILABLE	POINTS TARGETING	POINTS TBC	POINTS NOT TARGETING
30	INNOVATION				
	AIM To recognise pioneering initiatives in sustainable design, process or advocacy.				
	CRITERIA Up to 10 points may be awarded where it has been demonstrated that an innovative sustainability design, process or advocacy initiative has been implemented under any of the following categories. Unless indicated elsewhere, each initiative will be awarded one point.	10	0	10	0
30A	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.				
30B	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.				
30C	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. For credits where this innovation credit criterion is applicable, improved benchmarks are included in the 'Guidance' section of the credit.				
30D	Innovation Challenge: Where the project addresses a sustainability issue not included within any of the Credits in the existing Green Star rating tools, projects may propose a new Innovation Challenge. Alternatively, the project can use an existing Innovation Challenge that is published on the GBCA website				
30E	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. A list of approved credits is published on the GBCA website.				
	ACTION Liaise with design team to workshop and Research Innovation				

<p>* Innovation Idea 1: WELL Building Standard rating system applied with the Greenstar rating system (GBCA have a manual that looks at these two rating systems together). The WELL Building Standard (WELL) consists of features across the seven concepts that comprehensively address not only the design and operations of buildings, but also how they impact and influence human behaviours related to health and well-being.</p> <p>Education and Learning Principles: WELL rating initiatives like Nourishment, Light, Fitness and Mind look at how the building impacts and influence the occupants in relation to health and well-being. The NSW DoE general education principles; Principle 1 Focus on the needs of the learners and learning aligns with the WELL rating ideals to provide a second home for students to feel safe and welcome and promote active participate and a 'hands-on' approach.</p>	1	0	1	0
<p>* Innovation Idea 2: Reconciliation Action Plan - encourages the design team to make formalised steps to provide opportunities for Aboriginal and Torres Strait Islander peoples. The Reconciliation Action Plan provide a roadmap and targets for organisations to provide opportunities for Australia's First People and ensure Aboriginal and Torres Strait Islander culture is treasured as part of Australia's everyday life.</p> <p>Education and Learning Principles: Addressing social inequalities is a key contribution to the sustainable development of an organisation. One of the major existing social inequalities within Australia is between Indigenous an non-Indigenous Australians. Principle 2 of the General Education Principles (on building Community and Identity) by making spaces to engender prie and high aspirations that focus on reconsilitation can assist in reducing the gap between Indigenous an non-Indigenous Australians.</p>	1	0	1	0
<p>* Innovation Idea 3: Green Roof and Green Walls - Green roofs/walls provide enhanced thermal mass and insulative performance and help keep the local air temperature around the building cooler - reducing air conditioning energy requirements. They also provide passive cooling to the building if it doesn't have air conditioning. Green roofs/walls also provide acoustic and stormwater quality benefits. Cost premium <0.5% with a payback period of 20 plus years (unquantifiable financial benefits)</p>	1	0	1	0

Education and Learning Principles: Green Roofs and walls can be applied to the General Education Principle No 2: Build community and identity. The Smalls Rd circular school form already has a distinctive building identity which can be enhanced with green roofs and green walls. Creating a space that is truly inspiration and can become a very distinctive character to attract students, families an the community to embrace the school as part of the wide Ryde community.

*	Innovation Idea 4: Double Skin Facade - reduces heating, cooling, lighting and ventilation energy use. The double facade involves a secondary line of glass outside the main glass façade. They allow the introduction of movable external shading on medium - high rise buildings, which enables very clear glass to be used (improving natural daylight) and enhance solar control (reducing air conditioning energy). Double skin facades generally have a better overall insulative performance and can be design to deliver effective natural ventilation in high rise buildings. They can be ventilated or sealed and he distance between the glass can be wide or narrow (Narrow and sealed systems are called Closed Cavity Facades). Cost premium 0.5%+ with a payback period of 20 plus years (unquantifiable financial benefits)	1	0	1	0
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Education and Learning Principles: Having a high performance facade to reduce energy costs results in more of the schools budget going to student focused activities and less on facility running costs.

*	Innovation Idea 5: Building Integrated Photovoltaics (BIPV) - Reduces peak energy demand and enables on-site generation. BIPV materials generate electricity from sunlight, these materials include glazing tiles or wall panelling. BIPV can use higher efficiencies 'crystalline' silicon technology or 'amorphous thin film'. Relatively new technology but particularly efficient on med to high rise buildings on green field sites. Education and Learning Principles: Same opporunties as innovation idea 4 - Having a high performance facade to reduce energy costs results in more of the schools budget going to student focused activities and less on facility running costs. This techology would place this school in one of the top technology advanced school buildings in the world.	1	0	1	0
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*	Innovation Idea 6: Biophilic Design. Biophilic design is the practice of connecting people and nature within out built environments and communities. The opportunity of biophilic design is to connect to the particular ecology of the place, to its culture, history and beauty and to create a building that will regenerate life. The nature of the space ranges from Prospect, Refuge, Mystery and Risk/Peril. Smalls Road Landscape design intent is basically a Biophilic response, as is the school circular building form.	1	0	1	0
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Education and Learning Principles: Principle 3 to provide an aesthetically pleasing environment required a Biophilic response. It is well documented that Biophilic spaces can impact the occupants stress levels, cognitive performance and emotion/mood.

- * ESD initiatives that require additional funding and design team documentation above what is currently provided in the cost plan to date.