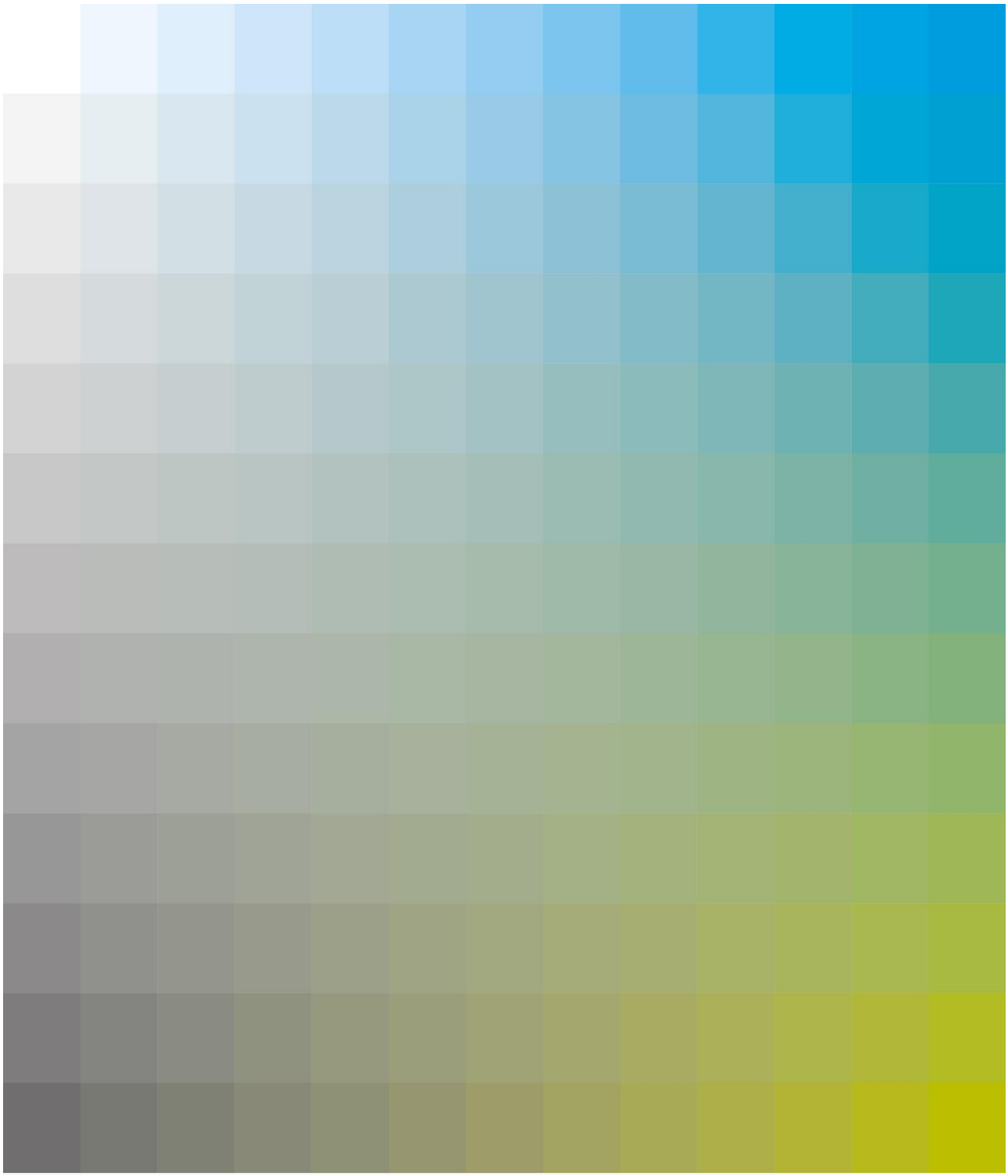
SSDA ESD Report

NORTH SYDNEY PUBLIC SCHOOL

18 August 2021



INTEGRAL

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Project Office
Integral Group
Level 7, 657 Pacific Highway
St Leonards NSW 2065
ABN 27 618 557 672

Project Contact:

Alex Krickx

akrickx@integralgroup.com

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1 SEARS Requirements

Table 1 outlines the SEARS requirements for North Sydney PS specifically relating to the Ecological Sustainable Design (ESD) report. Other references to ESD do exist within SEARS, such as "demonstrate good environmental amenity", and these are addressed within other consultants' reports, such as the Architects.

Table 1 SEARS Requirements

Key Sustainability Issues	Relevant Report Section
Identify how ESD principles (as defined in clause 7(4) of Schedule 2 of the Regulation) will be incorporated in the design and ongoing operation phases of the development.	Section 3
Identify proposed measures to minimise consumption of resources, water (including water sensitive urban design) and energy.	Section 4
Identify how the future development would be designed to consider and reflect national best practice sustainable building principles to improve environmental performance and reduce ecological impact. This should be based on a materiality assessment and include waste reduction design measures, future proofing, use of sustainable and low-carbon materials, energy and water efficient design (including water sensitive urban design) and technology and use of renewable energy.	Section 5
Identify how environmental design will be achieved in accordance with the GANSW Environmental Design in Schools Manual (GANSW, 2018).	Appendix A (Extract from "Architectural Design Report" Section 8)
Provide an assessment against an accredited ESD rating system or an equivalent program of ESD performance. This should include a minimum rating scheme target level.	Section 6
Provide a statement regarding how the design of the development is responsive to the NARCliM projected impacts of climate change.	Section 7
Provide an Integrated Water Management Plan detailing any proposed alternative water supplies, proposed end uses of potable and non-potable water, and water sensitive urban design.	Section 8

2 Introduction

2.1 General

This ESD Report has been prepared by Integral Group on behalf of Department of Education (DoE) in support of the development of North Sydney Public School (NSPS) at 182 Pacific Highway, North Sydney, NSW (the 'Site').

The purpose of this ESD Report is to address the items identified in part "6. Ecologically Sustainable Development" of the Planning Secretary's Environmental Assessment Requirements, application number SSSD-11869481; 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 sustainability framework.

2.2 Project Description

This SSDA seeks consent for alterations and additions to the existing North Sydney Public School. The proposal entails:

- Demolition of the existing hall (building B), haven building (building C) and 6 temporary buildings;
- Construction of a three storey building comprising:
  - staff administration rooms;
  - 16 homebases
  - a new library;
  - hall;
  - out of school hours care facilities;
  - covered outdoor learning area;
  - bicycle parking and end of trip facilities for staff; and
  - services, amenities and access.
- New entry gate and forecourt from Bay Road;
- Internal refurbishment of building G ground floor from the existing library to 3 homebases;
- Capacity for an increase in student numbers from 869 to 1,012; and
- Associated tree removal, landscaping and excavation.

The proposal maintains:

- The gates and fence of former Crows Nest House including the entrance from Pacific Highway and Bay Road;
- Existing gate along McHatton Street;
- The outdoor play area to the east of Building A;
- Existing covered outdoor learning area adjacent to Building A;
- The basketball courts and staff carpark in the western portion of the site;
- The significant tree planting on all school boundaries;
- Buildings A, D and F noting minor internal refurbishments are being undertaken outside of the SSDA scope of work (exempt development) to improve student amenities and canteen; and
- Building G noting ground floor internal refurbishment is proposed in the SSDA.

2.3 Referenced Standards

This report has been undertaken with reference to the following:

- Clause 7(4) Schedule 2 of the Environmental Planning and Assessment Regulation 2000 (EP&A Regulations)
- DoE Sustainability Framework Tool
- Green Building Council of Australia, Green Star Design & As Built v1.3 Rating Tool
- SEARS Application number SSD-11869481, relevant clauses
- CSIRO projected impacts of climate change
- NSW and ACT Government Regional Climate Modelling (NARCliM) climate change projections.

2.4 Source Documentation

The project's architectural documentation has been used in preparation of this report. Inputs have also been coordinated with all relevant Consultants.

2.5 Limitations of This Report

Due care and skill have been exercised in the preparation 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.

No responsibility or liability to any third party is accepted for any loss or damage arising out of the use of this report by any third party. Any third party wishing to act upon any material contained in this report should first contact Integral Group for detailed advice which will consider that party's requirements.

2.6 Departures from the EFSG

There are no departures from the EFSG.

3 Schedule 2 of EP&A Regulation 2000

The followings section details how the proposed North Sydney Public School incorporates the principles of ecologically sustainable development (ESD) in accordance with Schedule 2 Clause 7(4) of the Environmental Planning and Assessment Regulation 2000 (EP&A Regulation).

3.1 The Precautionary Principle

Per Schedule 2 Clause 7(4) of the EP&A Regulation:

> (a) the "precautionary principle", namely, that if there are threats of serious or irreversible environmental damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation. In the application of the precautionary principle, public and private decisions should be guided by:
>
> > (i) careful evaluation to avoid, wherever practicable, serious or irreversible damage to the environment, and
> >
> > (ii) an assessment of the risk-weighted consequences of various options.

3.1.1 Project Response

The precautionary principle has been adopted and all potential impacts have been considered and mitigated where a risk is present, as outlined in this report and any accompanying documentation.

The built form embraces sustainable design principles as it has been planned to maximise the passive (i.e. energy free) performance of the building. The building formed with extensive north shading to improve daylight access without increasing the heat load.

Incorporating natural ventilation across the site will assist minimising energy consumption from mechanical systems. Final designs and technologies have not yet been selected; however an example of implementing this strategy relies on a “Green Light / Blue Light" system, Figure 1, as ways to incorporate natural ventilation into the design.

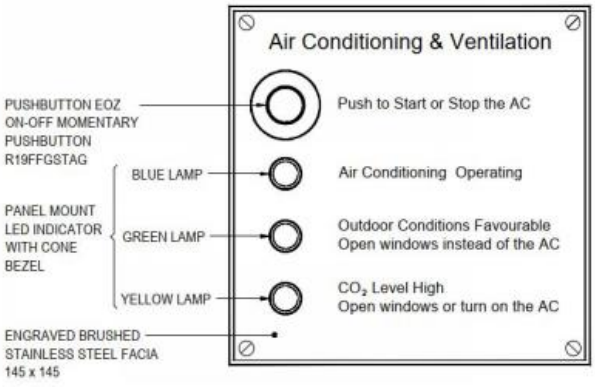

Figure 1 Green Light / Blue Controls Panel

External shading detailing will reduce solar gain during the summer months in turn reducing cooling loads and the risk of overheating. The walkway along the Northern Façade, Figure 2, ensures that the entire façade is shaded during the summer months to mitigate solar gain.

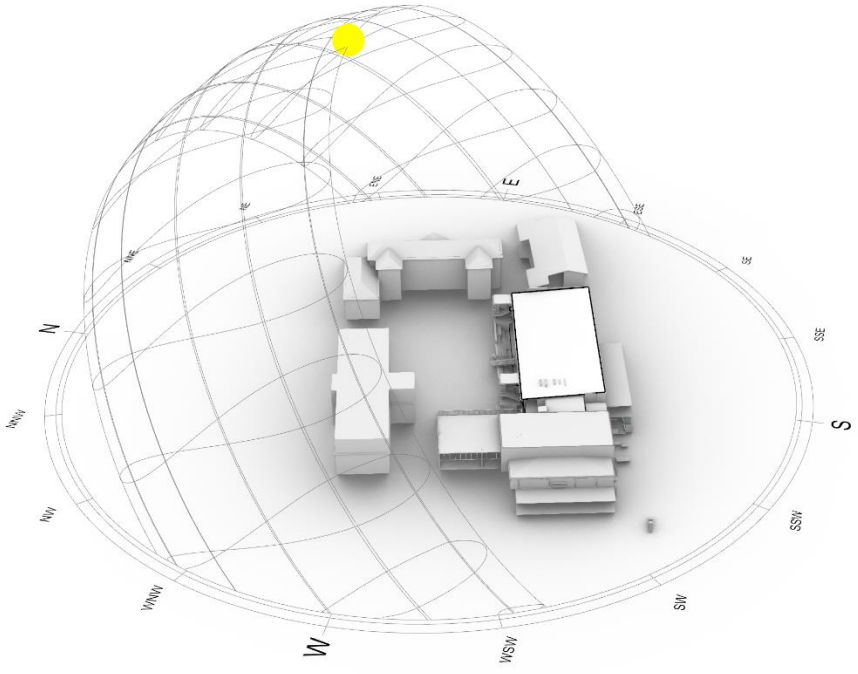

Figure 2 Northern Walkway shades classrooms

Stormwater design will ensure post-development peak event discharge rates do not exceed pre-development rates and design development will explore the feasibility for all rainwater from roofing to be captured and re-used on site for toilet flushing. Roof materials and colours will also be carefully selected in order to contribute to a cooler microclimate and mitigate any potential for the 'Heat Island Effect'.

Building services, lighting and equipment will be specified to be highly energy efficient using current best practice approaches and products. We are also currently investigation routes to allow the building to be classified as "all electric". A building developed now that all electric will have lower emissions than a comparable gas building. This is due to the NSW grid decarbonising as more renewables come online.

Whilst a comprehensive climate risk assessment has not been carried out on this site, any potential future climate-driven risks relating to this site have been considered, with the highest risk being an increase in maximum temperatures and the length and frequency of heat events.

In relation to any predicted increases in temperatures, the current concept design pays attention to addressing high external heat loads by proposing measured glass to façade ratios and other passive measures to support energy efficient mechanical solutions. Design development will further explore options for enhancements to the building thermal envelope through increased insulation, high-performance glazing, detailing of the building fabric to minimise unwanted infiltration and careful consideration of thermal mass.

Therefore, the design directly addresses Greenhouse Gas Emissions (GHG Emissions) and their impact on climate change.

3.2 Inter-Generational Equity

Per Schedule 2 Clause 7(4) of the EP&A Regulation:

(b) "inter-generational equity", namely, that the present generation should ensure that the health, diversity and productivity of the environment are maintained or enhanced for the benefit of future generations.

3.2.1 Project Response

Good architecture often outlasts the architect, great architecture may endure ten times as long. The impact of architecture on its environment is enduring and significant. What architects do today will shape the environment for future generations; North Sydney Public School embodies this approach by proposing a building for the local precinct, acting as a landmark for the local area.

The concept design has embraced Indoor Environmental Quality as a fundamental requirement by focusing on delivering fresh air, quality acoustics, and low toxicity materials and finishes.

The proposed design places an emphasis on daylight access that will result in the project actively engaging its occupants with their surroundings, considered a key factor in the link between building design and occupant wellbeing – commonly referred to as our 'biophilic response'.

The building targets high levels of energy efficiency and low operational energy consumption. A low energy building minimises the GHG gas emissions during use. GHG Emissions are a known key contributor to human-caused climate change, considered one of the most critical inter-generational issues of our time. By addressing this at an early stage the building aims to "meet the needs of the present without compromising the ability of future generations to meet their own needs" a key takeaway from the infamous Brundtland Report.

3.3 Conservation of Biological Diversity and Ecological Integrity

Per Schedule 2 Clause 7(4) of the EP&A Regulation:

(c) "conservation of biological diversity and ecological integrity", namely, that conservation of biological diversity and ecological integrity should be a fundamental consideration.

3.3.1 Project Response

The proposed works have minimal impact on existing vegetation and biological communities on the site, moreover the intended works increase the number of plant species improving biodiversity across the area. The landscape design will consider a range of initiatives to enhance the biodiversity on the site, including native plants, educational aspects and community food gardens. Refer to the landscape architectural package for more information on proposed landscape.

3.4 Improved Valuation, pricing and incentive mechanisms

Per Schedule 2 Clause 7(4) of the EP&A Regulation:

> (d) "improved valuation, pricing and incentive mechanisms", namely, that environmental factors should be included in the valuation of assets and services, such as:
>
> > (i) polluter pays, that is, those who generate pollution and waste should bear the cost of containment, avoidance or abatement,
> >
> > (ii) the users of goods and services should pay prices based on the full life cycle of costs of providing goods and services, including the use of natural resources and assets and the ultimate disposal of any waste,
> >
> > (iii) environmental goals, having been established, should be pursued in the most cost effective way, by establishing incentive structures, including market mechanisms, that enable those best placed to maximise benefits or minimise costs to develop their own solutions and responses to environmental problems.

3.4.1 Project Response

The environmental targets for the project have largely been embedded in the nature of the development rather than as additional 'add-on' items. For example, the proposed areas will have a high degree of thermal efficiency and careful considerations has been given to incorporate excellent distribution of throughout the learning areas - reducing ongoing operating costs for the school.

A reduction in waste directed to landfill will be realised through planned waste management strategies and as such a cost saving may be realised. Further cost savings will be achieved by a reduction in potable water consumption via rainwater harvesting and re-use. Finally, by ensuring the total volume of stormwater discharge is not increased this development will place no greater strain on existing infrastructure, thus negating the need to upgrade said infrastructure. The cost of which ultimately gets passed onto the rate payer in the medium to long term.

4 ESD Measures Development

The project has made early commitments to pursue a Green Star rating certification which has resulted in a wide array of targeted sustainability measures. See **Section 6** for the details of the Green Star credits targeted.

4.1 Energy and Carbon

The following list summarises the project's ambition around energy and carbon initiatives:

- **Passive Design:** The east-west orientation of the building and northern façade shading strategy promotes passive performance by minimising direct solar gains in summer whilst maintaining access to daylight and views.
- **Electrification:** The project is targeting all electric heating system that will minimise fossil fuel use on site and associated carbon emissions.
- **Renewable Energy:** The project is including rooftop PV array to generate renewable energy on site to further reduce energy and carbon emissions.
- **Efficiency:** The project is targeting a high performing envelope, lighting system and HVAC system in line with Green Star D&AB v1.3 credit requirements (15A.1, 15A.3, and 15A.4).

4.2 Water

The following list summarises the project's ambition around water initiatives:

- **Rainwater Reuse:** The project is including rainwater capture and reuse for toilet flushing to minimise the use of potable water on site
- **Efficiency:** The project is targeting efficient fixtures and fittings in line with Green Star D&AB v1.3 credit requirements (7 points targeted under Credit 18A, performance pathway)
- **Water Sensitive Urban Design (WSUD):** WSUD is an important design element and is discussed in this report under **Section 0.**

4.3 Materials and Resources

The following list summarises the project's ambition around material initiatives:

- **Cement Reduction:** The project is targeting reduced Portland cement in concrete in line with Green Star D&AB v1.3 credit requirements (19.B.1.1)
- **Responsible Steel Procurement:** The project is targeting procurement of Steel from a Responsible Steel Maker in line with Green Star D&AB v1.3 credit requirements (20.1)
- **Best Practice for PVC:** The project is targeting best practices around PVC use (minimising use or following best practice guides) in line with Green Star D&AB v1.3 credit requirements (20.3)
- **Reduction of Construction Waste** in line with Green Star D&AB v1.3 credit requirements (22)
- Waste Management: a
- **Cement Reduction:** The project is targeting reduced Portland cement in concrete in line with Green Star D&AB v1.3 credit requirements (19.B.1.1)
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5 Sustainable Building Principles

The project will achieve best practices in sustainable building principles through its commitment to a certified 5 Star Green Star rating. This rating tool has a broad reach across nine categories. The current scorecard targets credits that promote sustainable practices around materials, energy efficiency, renewable energy, waste, water use, and stormwater. The certification process provides a quality assurance that the building will be constructed and operated as intended in design through a thorough review process.

Between the commitments through Green Star for design and operational requirements, and the initial design efforts the project is on track to achieve it's 5 Star Green Star rating which is deemed "Australian Excellence".

5.1 Sustainable Materials

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

The project where possible will implement an independent environmental certification, for example use 'Ecospecifier' or Good Environmental Choice Australia related products, the project will confidently reduce environmental impacts and waste from furnishings over the life of the building.

Use building's structural and reinforcing steel sourced from a responsible steel maker.

Steel will aspire have a post-consumer recycled content or be reused steel. Sustainable timber shall be specified for at least half of the timber products used on the project. Recycled concrete shall be specified using recycled aggregate or manufactured sand and reduced quantities of Portland cement to reduce environmental impacts of concrete production and embodied energy.

5.2 Waste Management

A systematic and methodical Environmental Management plan will be formalised for implementation during the construction phase by the Contractor such as ISO 14001.

During the construction and demolition phase of the project, waste shall be recycled to a minimum 80%.

The design will include infrastructure for operational waste management and the separation of waste streams in order to facilitate recycling throughout the school.

5.3 Whole of Life Costs

Project team consider whole of life (WOL) costs in design decisions in line with ESFG requirements to ensure that capital costs are balanced against operational, maintenance and replacement costs. This approach will help future proof the design by determining which options will result in the lowest total cost of ownership that can be delivered within budget constraints.

This approach also applies to selection of materials where materials that are sustainably sourced or have lower embodied carbon may command a first cost premium but support the design ambition of the project to achieve best practices in sustainable buildings.

5.4 Resource Efficiency

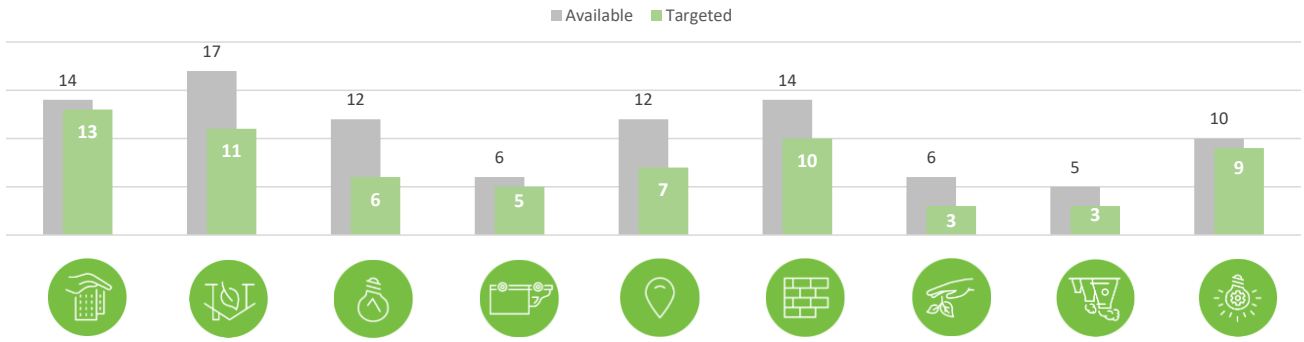
The project is targeting energy efficiency and water efficiency as outlined in report Section 4.1 and Section 4.2. The Green Star pathway is dependent on performance beyond minimum code compliance in these areas.

6 ESD Rating System Assessment

Green Star Design & As Built v 1.3

The project has been assessed against the Green Star Design & As Built (GS D&AB) v1.3 rating tool. The current design and scorecard show a pathway to a 5 Star certified GS D&AB v1.3 rating.

The following graphic shows the distribution of points targeted (and available) across each of the nine Green Star categories.



The project is targeting 67 points. 60 points are required to achieve a certified 5 Star rating. This margin provides an 11% buffer should some of the targeted points become unachievable. An additional 11 points have been flagged as “potential” points that could be substituted in for currently targeted points.

The table on the following page summarises each credit targeted, and the alternatives (“potential”) points that could be feasible.

A detailed scorecard for this rating system is are included in Appendix B.

Green Star Buildings – Not Currently Targeted

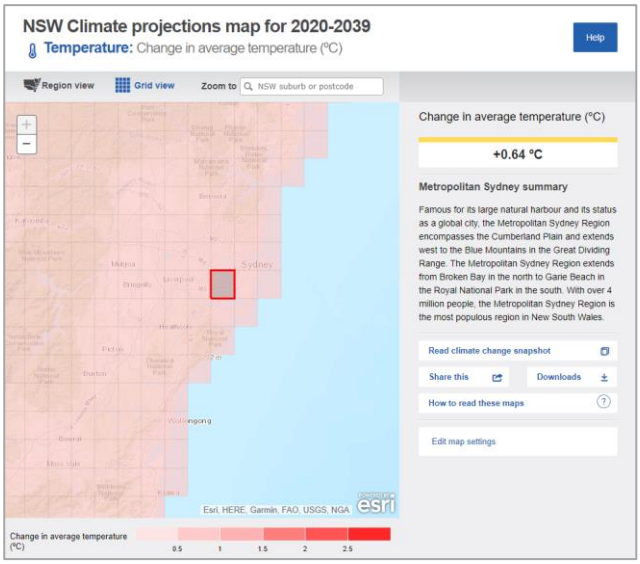
The initial project meetings reviewed the possibility of achieving a 4 Star Green Star Buildings rating (the latest tool available from the Green Building Council of Australia). Analysis showed that a 4 Star Buildings rating would require a similar level of sustainable design initiatives as a 5 Star D&AB v1.3 rating. Although no technical hurdles were identified, certification under this new scheme was deemed a departure from the approved methodology and was not endorsed.

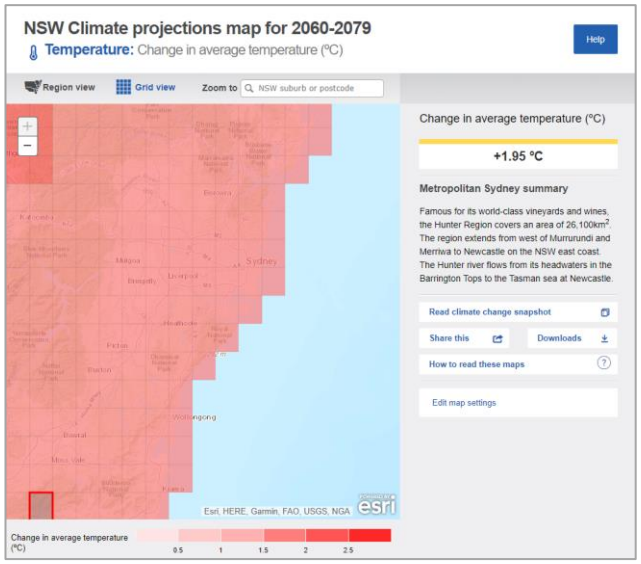
The project team may choose to target a 4 Star Buildings rating in the future, should this approach be endorsed. The detailed scorecards that were generated for a Green Star Buildings rating are included in Appendix C.

Categories & Credits		Points Available	Targeted	Potential
MANAGEMENT		14	**13**	**1**
1	Green Star Accredited Professional	1	**1**	0
2	Commissioning and Tuning	4	**4**	0
3	Adaptation and Resilience	2	**2**	0
4	Building Information	1	**1**	0
5	Commitment to Performance	2	**1**	1
6	Metering and Monitoring	1	**1**	0
7	Responsible Construction Practices	2	**2**	0
8	Operational Waste	1	**1**	0
INDOOR ENVIRONMENT QUALITY		17	**11**	**3**
9	Indoor Air Quality	4	**2**	0
10	Acoustic Comfort	3	**3**	0
11	Lighting Comfort	3	**1**	2
12	Visual Comfort	3	**2**	0
13	Indoor Pollutants	2	**2**	0
14	Thermal Comfort	2	**1**	1
ENERGY		12	**6**	**1**
15	Greenhouse Gas Emissions	11	**5**	1
16	Peak Electricity Demand Reduction	1	**1**	0
TRANSPORT		6	**5**	**2**
17	Sustainable Transport	10	**5**	2
WATER		12	**7**	**0**
18	Potable Water	12	**7**	0
MATERIALS		14	**10**	**2**
19	Life Cycle Impacts	7	**3**	2
20	Responsible Building Materials	3	**3**	0
21	Sustainable Products	3	**3**	0
22	Construction and Demolition Waste	1	**1**	0
LAND USE & ECOLOGY		6	**3**	**0**
23	Ecological Value	3	**1**	0
24	Sustainable Sites	2	**1**	0
25	Heat Island Effect	1	**1**	0
EMISSIONS		5	**3**	**1**
26	Stormwater	2	**2**	0
27	Light Pollution	1	**0**	1
28	Microbial Control	1	**1**	0
29	Refrigerant Impacts	1	**0**	0
INNOVATION		10	**9**	**1**
30	Innovation	10	**9**	5
TOTAL Points		96	**67**	11

7 Response to Climate Change

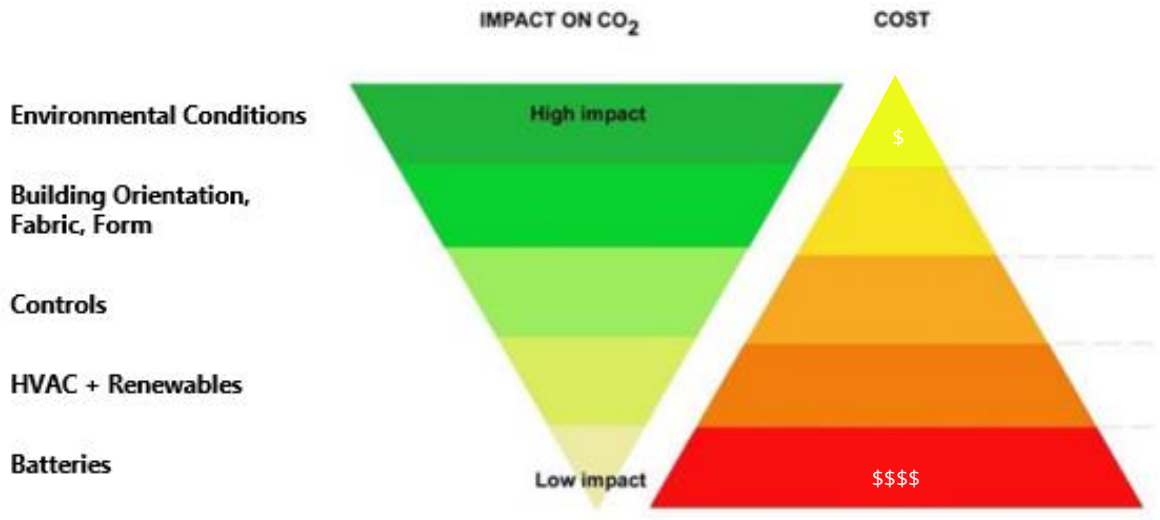
The NARCliM projected impacts of climate change for metropolitan Sydney predict a +0.64 °C change in average temperature from 2020 to 2039, and a +1.95 °C change in temperature looking out to 2060.





The project seeks to deliver an outcome that minimises associated CO2 emissions and includes passive and resilient design features whilst minimising capital costs.

The image below illustrates the opportunities that exist to minimise CO2 emissions and their related capital costs. The initiatives that have the most impact and lowest capital cost **also** have the highest impact on responding to climate changes risks.

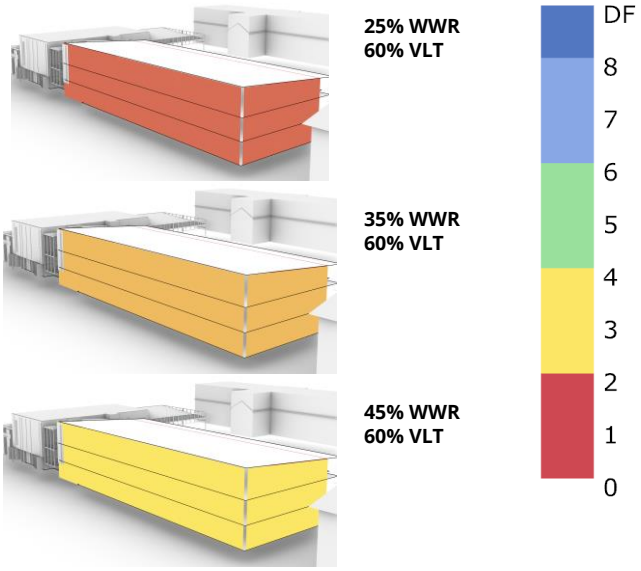


7.1 Passive Measures

The building is situated with the long axis east-west which provides opportunity for northern façade shading with the use of roof overhangs and exterior walkways. This minimises the energy use of the building and promotes a passive approach to providing comfort.

Operable windows are included to facilitate natural ventilation through teaching spaces to allow for air flow, reducing the operational hours for the mechanical cooling system.

Façade analytics has been performed to optimise glazing size and performance to minimise heat gain and maximise daylight access and views out of the building.



7.2 Efficient Services

The implementation of efficient services will both reduce associated CO2 emissions and reduce the internal heat loads thus reducing overheating risks. The following conventional energy saving ideals should be included into the proposed design:

- Low energy/LED Lighting, with automatic switching and dimming.
- Provision of mix-mode ventilation design, potentially with blue light/green light system reducing the mechanical cooling system's operational hours.
- Post Occupancy Evaluation by the DoE delivery team, providing an aftercare service to ensure all HVAC plant, and wider services systems, have been commissioned.
- Sizing mechanical systems to account for future climatic scenarios such as increased peak temperatures.

7.3 Renewable Energy

A solar system will aim to be installed on site. The performance of which has been amplified by orientating the roof design to the North to increase the efficiency of the PV panels.

8 Integrated Water Management Plan Overview

The project has an integrated water management plan comprising of the following elements:

Alternative Water Supplies

The project will capture and re-use rainwater on site for toilet flushing and potentially irrigation, depending on final tank sizing and landscaping demands. Rainwater tank sizing has been completed by the hydraulic engineer, and provision for treatment and filtration is provided for indoor re-use.

Use of Potable And Non-Potable Water

The project will specify efficient fixtures and fittings to minimise the use of water on site. Rainwater capture will supplement toilet flushing to minimise the use of potable water for non-potable demands. The project is targeting the performance pathway for Green Star Credit 18 “Potable Water”; additional work is needed during the design development phase to minimise water use on site and match non-potable water demands with the available rainwater supply.

Water Sensitive Urban Design

Water Sensitive Urban Design (WSUD) has been considered in the design of rainwater capture and re-use on site and site stormwater treatment and flows. Refer to Stormwater Management Plan prepared by the civil engineer.

Appendix A Architectural Design Statement

8 Response to Design Quality Principles

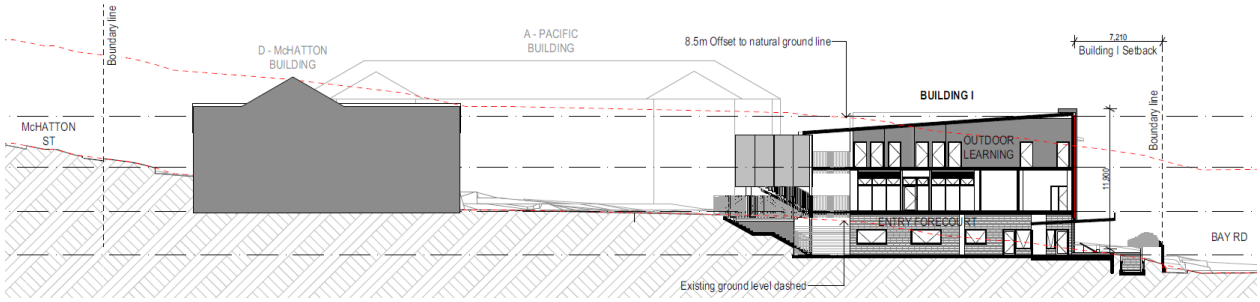
Below is a summary of how the proposed scheme responds to the Design Quality Principles outlined in the State Environmental Planning Policy (Educational Establishments and Child Care Facilities) 2017 -

8.1 Context, Built Form and Landscape

As mentioned above, one of the key goals for the project is to create a new street address to the Bay Road frontage and, as a result, an increased street presence to this street. The building has been located along the frontage in order to sit between the services easement and the mature stand of angophora trees to the Western end of the site and existing Building G to the East of the site. These existing restrictions dictate the location of the building along the Bay Road frontage of the site.

The scale of the building form has been established as 3 storeys in order to accommodate the facilities and home bases required for the increased site population. As discussed above, the levels of the building have been structured to connect into the existing topography and platforms – as follows:

- Level 1 – Bay Road Street Level
- Level 2 – Existing Central Courtyard Level
- Level 3 – Top Storey of the Proposed Buildings



Site Section – Through New Site Entry

These levels allow for the building to connect into both the existing site – at the central courtyard level – as well as the Bay Road Street frontage. This allows for the new site entry to provide an accessible path of travel into Level 1 of the proposed new building and, from there, via a new lift into the remainder of the proposed building and into the existing site.

The scale of the building that is produced is consistent with the scale of the existing 2 and 3 storey buildings on the site as well as the multi-storey residential and commercial developments opposite the site along the Pacific Highway.

Adjoining Properties to the Pacific Highway to the East of the Site - Image source: Google maps

Therefore, while the residences directly opposite the development along Bay Road are largely low density residential housing, the proposed building form is considered to be in keeping with the scale and mass of the surrounding area.

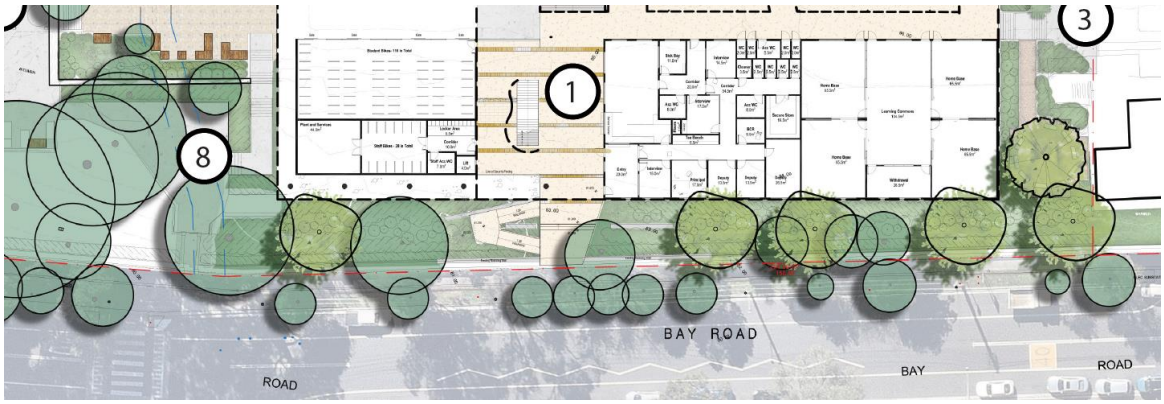
Adjoining Properties to Bay Road to the South of the Site - Image source: Google maps

The impact of the mass and scale of the proposed buildings has been considered in the following ways -

- **Setbacks**
  The building is located with appropriate setbacks from the Bay Road boundary of the site – a minimum setback of 6m to the Eastern end of the building.

- **Heritage Fencing and Landscape Setting**
  The existing heritage fencing is retained along the Bay Road site boundary – except where the new entrance is created (as discussed above).

  In addition to this the majority of the existing street planting and landscape buffer trees along the Bay Road boundary are retained. Additional landscaping is provided along the boundary line to ensure that the proposed buildings sit in behind a landscaped buffer to the street – softening the impact of the building.



Landscape Buffer Planting – prepared by Taylor Brammer Landscape Architects

The overall landscaping strategy is documented separately in the **Landscape Design Report prepared by Taylor Brammer Landscape Architects.**

- **Overshadowing**
  The impact of the shadows produced by the proposed buildings have been reviewed. Because the site fronts directly onto Bay Road the majority of the overshadowing created by the proposed building impacts on the road reserve rather than the neighbouring buildings across Bay Road to the South. The proposed buildings only impact on the neighbouring properties after midday in the Winter months.

Sunshading Studies – June 21st - 9.00am

Sunshading Studies – June 21st - 9.00am

- **Visual Privacy**
  As with the overshadowing, the impact of the proposed development on the visual privacy of the neighbouring properties is reduced by the buffer of Bay Road as well as the presence of generous landscape buffer planting and street planting to both sides of the street.

Overall View – South West - Perspective

8.2 Sustainable, Efficient, Durable (Environmental Amenity)

The project has been designed to achieve a 5 Star Green Star Design and As-Built rating. The environmental performance of the development has been considered in the following ways -

- **Siting and Orientation**
  The buildings have been orientated to face North/South rather than East/West – allowing them to avoid thermal heat gains from the Western and Eastern sun.

- **Natural Light and Sun Shading**
  Large windows are provided to the teaching spaces and staff areas. The windows that face south don't require sunshading due to the building orientation and the windows that face north are protected by the verandahs and eaves of the building.

- **Natural Ventilation**
  Large openable windows are provided to all classroom and staff spaces to allow for a good amount of natural ventilation to the spaces. This means that, while air conditioning is to be provided as part of this development, natural ventilation can be maximised in order to reduce the reliance on artificial cooling.

- **Solar Electricity**
  Allowance has been made for the inclusion of a 75kW PV array to the site. This is created through a combination of existing systems located on the existing buildings and supplemented by an additional PV array to roof of the proposed new building (Building I). This system will offset the demands for the site.

- **Energy Efficient Fixtures and Equipment**
  Equipment and fixtures will be selected to minimise their energy use and wastage. This will include efficient water fixtures, energy efficient light fixtures (LED) with motion sensors and zoned switching. The project also features an energy efficient air conditioning system that features a mixed mode ventilation system to limit Co2 levels in indoor spaces.

- **Rainwater Harvesting**
  A rainwater tank is included to capture and recycle rain water from the roof for the use of irrigation of landscaping and the flushing of toilets.

- **Durability and Maintenance**
  For the most part unfinished, highly durable materials have been selected in order to minimise the ongoing maintenance required on the site and to ensure the longevity of the buildings. This includes the use of unfinished face blockwork and pre-cast concrete panels as well pre-finished metal roof sheeting and soffit linings.

- **Landscaping**
  As discussed above, the development has been planned to minimise the disruption to the existing landscaping. In addition to this the landscaping has been designed to include the provision of additional landscaping, trees and deep soil planting areas to offset the impact of the building.

Aurecon has been engaged as the ESD consultant for the project. Further details of all ESD initiatives can be found in the **Environmentally Sustainable Development Report prepared by Integral Group.**

8.3 Accessible and Inclusive

As discussed above, the new buildings have been positioned to create a new site entry and street presence to Bay Road. The siting of the building improves the connection of the school to the surrounding community and increases the accessibility of the site.

The entry forecourt that connects to the new site entry create an open and welcoming entrance to the school that provides direct connections (both via stairs and lifts) into the Library and Hall facilities as well as into the central courtyard area of the site. This allows for the Library and Hall facilities to be established as shared public use facilities.

New Site Entry – Bay Road - Perspective

8.4 Health and Safety

Health and Safety issues are addressed on the site in a number of ways –

- **Quality of Internal Space**
  As discussed above, the buildings have been designed to allow for all habitable spaces to have good levels of natural ventilation and natural light. This will ensure that the internal areas (the teaching spaces in particular) provide a good level of amenity to the students who will use them.

- **Child Safety**
  The site and the buildings have been designed, in keeping with the Department of Education's requirements, in order to allow the students to be safe and protected while in the school. This includes designing the spaces to allow for a good level of supervision of the students at all times – whether in or out of the classroom. This also includes providing a clear and solid line of protection around the site that can be closed and monitored during school hours.

- **Play Space and Covered Play Space**
  As discussed previously, the development maintains the generous amount of play space provided on the site and creates new covered walkway roofs to allow all weather access between the new facilities and the existing buildings surrounding the central courtyard.

- **Natural Ventilation**
  Large openable windows are provided to both sides of the new buildings to allow for a good amount of natural ventilation to the spaces. This means that, while air conditioning is to be provided as part of this development, natural ventilation can be maximised in order to reduce the reliance on artificial cooling.

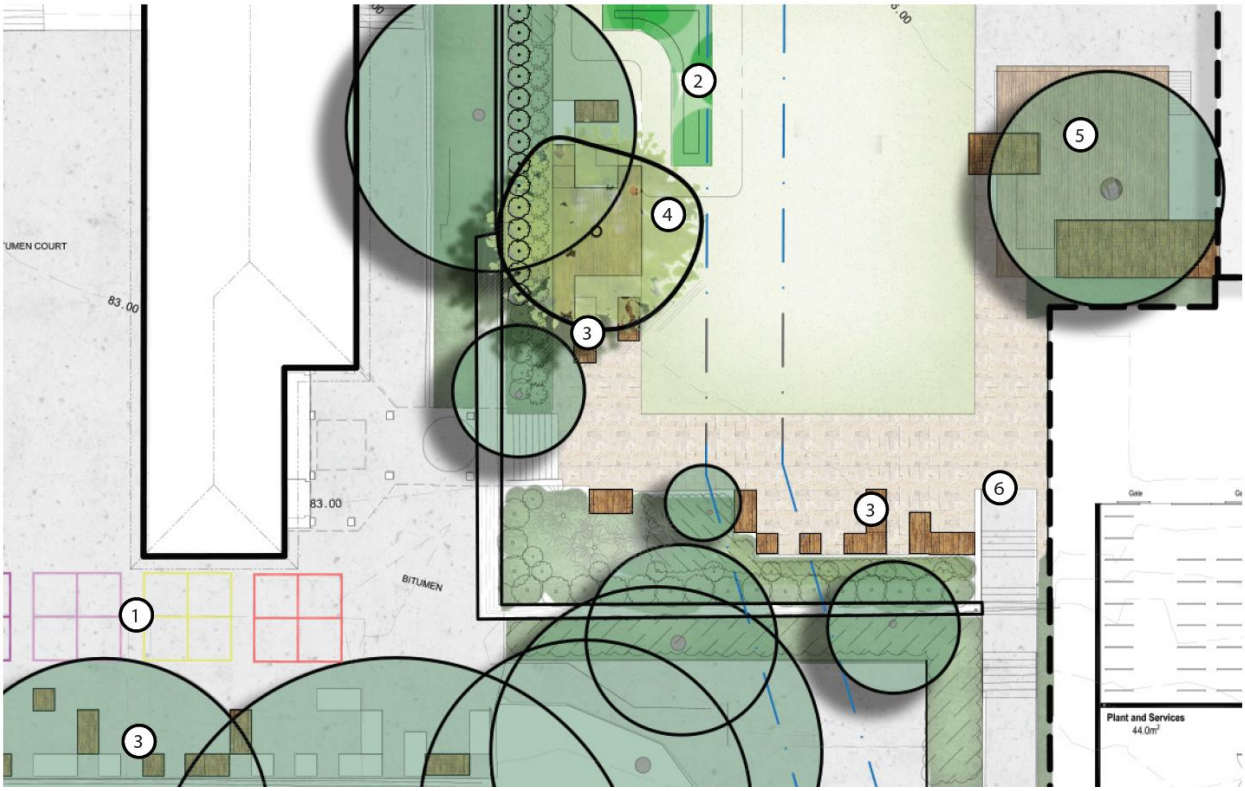
- **Safe Pedestrian / Bike Access**
  The creation of the new entry to the site provides a clear delineation between pedestrian movement and vehicular movement on the site. The site also provides safe areas for bikes to access the site. Bicycle parking is also provided on the site.

- **CPTED**
  The CPTED principals have been considered and implemented into the development. This is discussed further in Section 10 below.

8.5 Amenity

As discussed in the above sections, the project creates a high level of amenity on the site by –

- Creating spaces with a strong connection to external spaces by allowing the proposed new buildings to connect out onto the central courtyard space
- Creating internal spaces with good access to natural ventilation and natural light.
- Increasing the tree canopy coverage on the site
- Creating a series of external spaces that support the needs of the students – including large informal gathering spaces, a formal tiered teaching space as well as more intimate small group spaces.

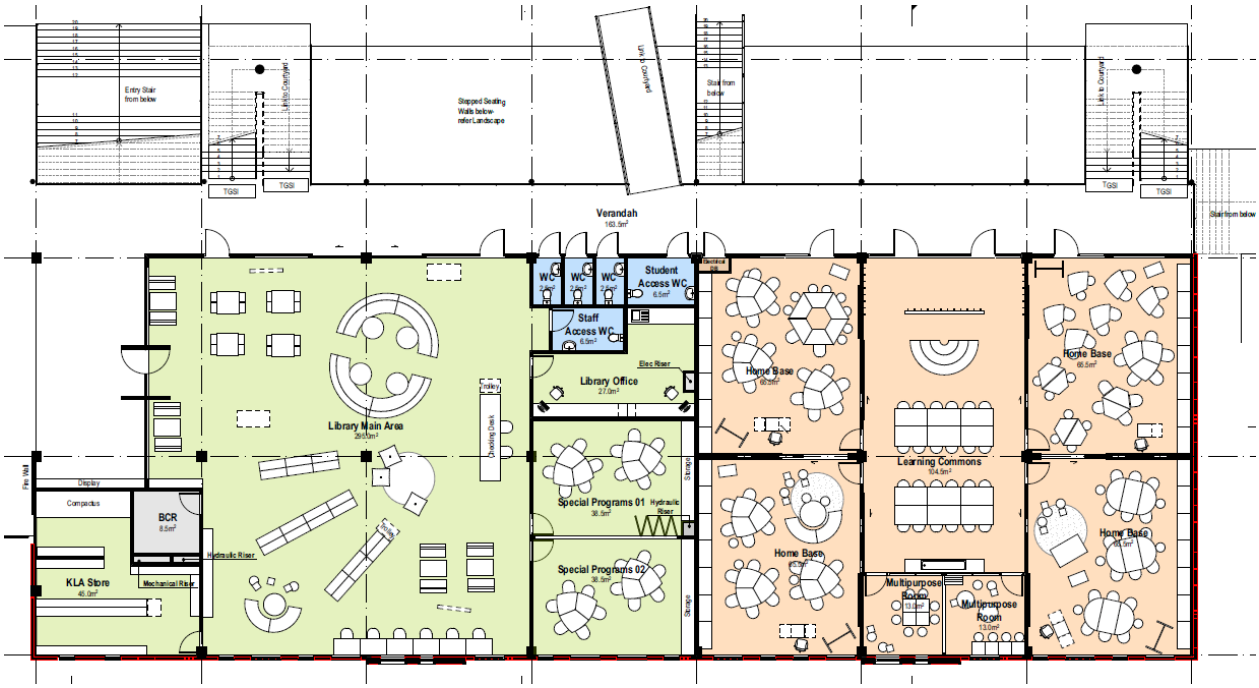


Western Courtyard adjacent to Building J - prepared by Taylor Brammer Landscape Architects

8.6 Whole of Life, Flexible and Adaptive

The Whole of Life approach has been considered in this development in the following ways –

- Ensuring that structural elements and columns are kept to the perimeter of the spaces where possible to allow for future re-configuration and adjustment of the spaces without needing large amounts of structural work.
- Internal spaces have been designed to be flexible and adaptable – particularly in the teaching spaces. The planning allows for the teaching spaces to be easily left open or closed up as required to suit the needs of the students and the teachers using them. They provide a variety of education needs and teaching styles.



Floor Plan – Building I – Level 2

- Materials have been chosen to require a minimum of ongoing maintenance. They are durable and hard wearing to ensure that they age well, without needing replacement or re-finishing on a regular basis.

8.7 Aesthetics

As discussed above, the architectural expression of the proposed new building takes cues from the existing built form on the site to create a new, contemporary building form that sits comfortably within the existing building fabric.

The base of the building is clad with face brickwork (referencing the main material of the existing buildings) and the upper levels are finished with a panelised façade system of glass reinforced concrete in a sandstone colour (referencing the materiality of the heritage fencing around the site).

The articulation of the panelling is structured to reflect the vertical nature of the existing windows as well as the vertical features found in Building A – The Pacific Building.

Bay Road East - Perspective

The volume of the hall is clad in modern CFC cladding to create a contemporary finish in contrast to the materials referencing the heritage of the site. Similar forms are created along the length of the building to disrupt the mass of the form and reference the gable forms generated along the length of the heritage buildings. These elements are given red coloured feature trims referencing the red door features in the existing buildings.

Appendix B Green Star D&AB v1.3 Pathway

Green Star Pathway - Design & As Built v1.3

Rev1 for SSDA

Date 12/08/2021

Project: NSPS

Targeted Rating: 5 Star - Australian Excellence

Total Points		
Available	Targeted	Potential
110	67	Extra 11 Total 78

Credit Name	Aim of Credit	Credit #	Sub-Criteria	Criteria Requirements	Points		
					Available	Targeted	Potential (Backup)
MANAGEMENT							
Green Star Accredited Professional (GSAP)	To recognise projects that engage a Green Star Accredited Professional to support the Green Star certification process	Man-1.1	**Accredited Professional**	GSAP 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. GSAP is required to undertake at least one Green Star workshop with the project team and meeting minutes must sufficiently demonstrate GSAP involvement.	1	**1**	**0**
Commissioning and Tuning	To encourage and recognise commissioning, handover and tuning initiatives that ensure all building services operate to their full potential and as designed	Man-2.0	**Environmental Performance Targets**	MINIMUM CREDIT REQUIREMENT: Environmental performance targets must be set and documented for the project through the development of a Design Intent Report or an Owner's Project Requirements report. These documents must outline; a) Description of the basic functions/operations/maintenance of the nominated building systems; b) Targets for the project energy & water consumption, and budgets for all nominated systems; c) Description of how energy, water and aspects of indoor environment quality are metered and monitored.	-	**Complies**	**-**
		Man-2.1	**Services and Maintainability Review**	A comprehensive 'Services and Maintainability Review' must be conducted during design stage and prior to construction. This can be conducted by the Head Contractor (where applicable), an Owner's Representative (e.g. FM sub-contractor) or the ICA (where applicable). The design review must address the following for all nominated building systems; commission ability, controllability, maintainability, operability (fitness for purpose) and safety.	1	**1**	**0**
		Man-2.2	**Building Commissioning**	Pre-commissioning & commissioning must be undertaken to CIBSE, ASHRAE and/or AIRAH standards/guidelines. The commissioning process must generate key documents a) Commissioning Specification, b) Commissioning Plan and c) Commissioning Report. The Commissioning Specification must list the commissioning requirements for each system, not simply reference compliance "to the relevant standard". The Commissioning Report is a summary of the commissioning undertaken and that all documents were adhered to and the nominated systems have been commissioned. AIR TIGHTNESS (Permeability Test) IS NOW A REQUIREMENT OF THIS CREDIT	1	**1**	**0**
		Man-2.3	**Building Systems Tuning**	A 12 month building tuning period is required to be implemented with a minimum of quarterly reviews and tuning, inclusive of analysis of data from the monitoring systems and assessment of feedback from occupants. Specific documentation/actions required are; a) O&M Manuals developed and provided to building owner; b) Building Tuning Plan is developed; c) Building Tuning Team is formed.	1	**1**	**0**
		Man-2.4	**Independent Commissioning Agent**	An ICA must be appointed from design stage and one of the above points targeted. The ICA must advise, monitor, and verify the commissioning and tuning of the nominated building systems throughout the design, tender, construction, commissioning and tuning phases. ICA must satisfy Green Star qualifications & experience requirements.	1	**1**	**0**
Adaptation and Resilience	To encourage and recognise projects that are resilient to the impacts of a changing climate and natural disasters.	Man-3.0	**Implementation of a Climate Adaptation Plan**	Undertake the development of a Climate Adaptation Plan in accordance with recognised standards. A minimum of two risk items identified within the CAP are addressed by specific design responses.	2	**2**	**0**
Building Information	To recognise the development and provision of building information that facilitates understanding of a building's systems, operation and maintenance requirements, and environmental targets to enable the optimised performance.	Man-4.0	**Building User Information**	A Building User Information package must be developed for the building and its content must be appropriate for the occupants ("day to day users"). Specific Green Star content requirements must be satisfied. A key requirement is that the BUI is communicated digitally such as digital signage, interactive information kiosks, websites, apps or mobile devices etc written for the building tenants.	1	**1**	**0**
Commitment to Performance	To recognise practices that encourage building owners, building occupants and facilities management teams to set targets	Man-5.1	**Environmental Building Performance**	80% of the GFA must be covered by a performance agreement with at least 2 environmental metrics (emissions, energy, water, waste or IEQ). Alternative pathway through NABERS	1	**1**	**0**
		Man-5.2	**End of Life Waste Performance**	80% of the GFA must be covered by a formal commitment to by the owner to extend the life of finishes to all common areas to at least 10 years (barring minor wear & tear).	1	**0**	**1**
Metering and Monitoring	To recognise the implementation of effective energy and water metering and monitoring systems.	Man-6.0	**Metering**	MINIMUM CREDIT REQUIREMENT: Accessible metering to be provided to monitor building energy & water consumption, including all common & major uses (Base Building). Metering shall be provided to allow for monitoring of relevant areas or functional space types. In most cases, floor-by-floor metering will suffice, however if a floor comprises separate space types, each shall be metered separately. Each tenancy shall be provided with sub-metering (NB - Authority Meters will meet this as they are required per tenancy). All sub-meters shall meet NABERS requirements pertaining to accuracy and be located in areas that allow regular monitoring & maintenance.	-	**Complies**	**-**
		Man-6.1	**Monitoring Systems**	Two key requirements must be met: a) A sub-meter monitoring strategy must be developed in accordance with a recognised standard (CIBSE TM 39), and shall provide a metering schedule which identifies location, type of meter & resource, end-use demand, and estimated energy consumption. b) Sub-meters must be connected to an automated system capable of capturing and processing sub-meter data, and shall have the functionality to produce reports, alter owner/FM to missing data or meter failures, alarms when use increases beyond defined thresholds, and other functionality to provide a useful monitoring system. c) MUST MEET THE METERING INTEGRITY REQUIREMENTS OF GREEN STAR d) PROVIDE A DETAILED PROCESS ON HOW TO DEAL WITH FAULTS	1	**1**	**0**
Responsible Construction Practices	To reward projects that use best practice formal environmental management procedures during construction.	Man-7.0	**Environmental Management Plan**	MINIMUM CREDIT REQUIREMENT: A project specific Environmental Management Plan (EMP) is required to be prepared and must be compliant with best practice guidelines such as the NSW Environmental Management System Guidelines. All sub-contractors are required to adhere to the requirements of the EMP. Scope of EMP shall meet Green Star minimum requirements.	-	**Complies**	**-**
		Man-7.1	**Formalised Environmental Management System**	Formalised Environmental Management System must be implemented on site and must have been certified by a third-party organisation which provides independent verification of system compliance. EMS must be certified to ISO14001, BS 7750 or European Community EMAS. Certification to these standards must be valid before and throughout construction and all sub-contractors are required to adhere to the requirements of the EMP.	1	**1**	**0**
		Man-7.2	**High Quality Staff Support**	1 point is available where high quality staff support practices are in place that: a) Promote positive mental and physical health outcomes of site activities and culture of site workers, through programs and solutions on site. To comply, programs and policies must go beyond OH&S to promote health and Wellbeing on-site for both physical and mental health outcomes; and b)Enhance site workers' knowledge on sustainable practices through on-site, off-site, or online education programs. Training for at least three days on site provided through one or more of: □ On-site training, such as by including the items above as part of site induction practices. □ Off-site training, such as by providing sustainability training to site workers via a TAFE or similar program within the last 3 years . □ Online training, such as by a third party service that can provide training on sustainability topics and track personnel who have taken the relevant materials within the last three years	1	**1**	**0**

Credit Name	Aim of Credit	Credit #	Sub-Criteria	Criteria Requirements	Points		
					Available	Targeted	Potential (Backup)
Operational Waste	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.	Man-8A	**Performance Pathway - Specialist Plan**	An Operational Waste Management Plan (WMP) shall be developed by a qualified professional, in accordance with best practice guidelines (e.g. City of Sydney Policy for Waste Minimisation in New Developments). The WMP scope must meet minimum Green Star requirements. Waste Auditor professional shall meet Green Star minimum qualifications & experience requirements. RECYCLING TO BE COLLECTED BY BUILDING'S WASTE SERVICE. COMINGLED RECYCLING IS PERMISSIBLE TO THE EXTENT THAT IT IS ACCPETED BY THE WASTE COLLECTION SERVICE	0	**0**	**0**
		Man-8B	**Prescriptive Pathway - Facilities**	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.	1	**1**	**0**
					14	**13**	**1**
INDOOR ENVIRONMENT QUALITY							
Quality of Indoor Air	To recognise projects that provide high air quality to occupants.	IEQ-9.1	**Ventilation System Attributes**	Three requirements are to be met: a) Mechanical services to be designed in accordance with ASHRAE Standard 62.1:2013 with regards to separation distances between OA intakes and pollution sources) such that the entry of outdoor pollutants is mitigated; b) Mechanical services shall be designed for ease of maintenance and cleaning with adequate access provided to both sides of moisture or debris generating (i.e. coils & filters) components within the air distribution system; c) Prior to occupation, all new and existing ductwork is cleaned in accordance with recognised stands.	1	**1**	**0**
		IEQ-9.2	**Provision of Outside Air**	1 point awarded for 50% above AS1668.2 For mechanically ventilated spaces, 2 point is awarded where; a) Outdoor air is provided at a rate 100% greater that the minimum required by AS1668.2:2012 or ASHRAE 62.1:2003; OR b) CO_2 concentrations are maintained below 700ppm with CO_2 sensors located within each enclosed space or as regularly as temperature sensors, or monitor an area no greater than 500m^2.	2	**0**	**0**
		IEQ-9.3	**Exhaust or Elimination of Pollutants**	Credit criteria is achieved where one or any combination of the following are achieved; a) Removing the source of the pollutants - Print/photocopy/ cooking equipment/vehicle exhausts are compliant with ECMA-328, RAL-UZ 171 or GGPS.003 emissions standards or are not present within the Nominated Area; b) Exhausting pollutants directly to outside where they exist in accordance with a recognised standards; c) Printing and photocopy equipment is enclosed in a dedicated area and exhausted directly to outside or to a dedicated exhaust riser. d) Cooking process & equipment - All kitchens are ventilated in accordance with AS1668.2-2012 & are separated from other areas. Kitchenettes with only simple reheat equipment are excluded from scope. e) Vehicle exhausts - Spaces with vehicle exhausts are compliant with AS1668.2-2012.	1	**1**	**0**
Acoustic Comfort	To reward projects that provide appropriate and comfortable acoustic conditions for occupants.	IEQ-10.1	**Internal Noise Levels**	Internal ambient noise levels within the nominated area are no more than 5dB(A) above the satisfactory sound levels provided in Table 1 AS/NZS 2107:2016. Noise measurement must account for all internal and external noise sources . Noise measurement and documentation must be provided by a qualified acoustic consultant. Compliance demonstrated through measurement at commissioning/practical completion sampling 10% of spaces representative of the nominated area and space diversity. GFA<500sqm require 95% of spaces to be measured. Mixed mode building to be calculated as if Mechanical.	1	**1**	**0**
		IEQ-10.2	**Reverberation**	Reverberation time within dedicated teaching spaces must be in the lower range of 'Recommended Reverberation Time' provided in Table 1 of AS/NZ 2107:2016. 2016 VERSION OF STANDARD NOW REFERENCED	1	**1**	**0**
		IEQ-10.3	**Acoustic Separation**	Noise transmission within enclosed spaces is addressed through the achievement of a weighted sound reduction index of at least Rw 45 fixed partitions without door or glazed without door and at least Rw 35 for all partitions containing a door, or suitable performance is achieved though measurement. Acoustic consultant can use their discretion on glazed partitions on whether 35 or 45 is used.	1	**1**	**0**
Lighting Comfort	To encourage and recognise well-lit spaces that provide a high degree of comfort to users.	IEQ-11.0	**Minimum Lighting Comfort**	MINIMUM CREDIT REQUIREMENT: All lights within the nominated area are; a) Flicker-free through the application of Class A1 and/or A2 ballasts, high-frequency ballasts for fluorescent lamps or electronic ballasts in HID lamps; AND b) Accurately address the perception of colour in the space with a minimum CRI of 80.	-	**Complies**	**-**
		IEQ-11.1	**General Illuminance and Glare Reduction**	a) Maintained illuminance levels comply with best practice guidelines and glare is eliminated as demonstrated in accordance with three options 11.1.2A, 11.1.2B & 11.1.2C.	1	**0**	**1**
		IEQ-11.2	**Surface Illuminance**	Within the nominated area, a combination of lighting and surfaces improve uniformity of lighting to give visual interest. Demonstration is via 2 compliance methods 11.2A or 11.2B. 11.2A Prescriptive Method: □ An average surface reflectance for ceilings of at least 0.75; AND □ A direct/indirect lighting system is present such that the ceiling area has an average surface illuminance of at least 30% of the lighting levels on the working plane.	1	**1**	**0**
		IEQ-11.3	**Localised control**	Occupants have the ability to control the lighting in their immediate environment. This includes turning the lights on and off **and adjusting their light levels**. For integrated fit out incorporating an ABW environment, the occupant adjustment of light levels criterion may be achieved where it is demonstrated that a wide variety of working environments provide a variety of lighting conditions, including some with the ability to adjust lighting levels, which are suitable for the activity undertaken in the space.	1	**0**	**1**
Visual Comfort	To recognise the delivery of well-lit spaces that provide high levels of visual comfort to building occupants.	IEQ-12.0	**Glare Reduction**	MINIMUM CREDIT REQUIREMENT: Within the nominated area glare from sunlight is reduced through a combination of blinds, screens, fixed devices or other means. Glare reduction is to be demonstrated through methods 12.0A Fixed Shading Devices, 12.0B Blinds or Screens and/or 12.0C Daylight Glare Model. For 12.0A Blinds should have a visual light transmittance (VLT) <= 10%.	-	**Complies**	**-**
		IEQ-12.1	**Daylight**	Up to 2 points are available where a percentage of the nominated area receives compliant levels of daylight during 80% of the nominated hours. Compliant daylight levels are considered a Daylight Factor (DF) of no less than 2.0% at Finished Floor Level under either a CIE overcast or CIE uniform sky; 1 point - 40% of nominated area OR 2 points - 60% of nominated area	2	**1**	**0**
		IEQ-12.2	**Views**	60% of the nominated area has a clear line of sight to a high-quality internal view or an external view. All floor areas within 8m from a compliant window, atrium or view can be considered to meet this criterion.	1	**1**	**0**
Indoor Pollutants	To recognise projects that safeguard occupant health through the reduction in internal air pollutant levels.	IEQ-13.1	**Paints, adhesives, sealants and carpets**	95% of all internally applied paints, adhesives, sealants and carpets meet stipulated VOC limits. http://new.gbca.org.au/product-certificationschemes/	1	**1**	**0**
		IEQ-13.2	**Engineered wood products**	95% of all engineered wood products meet stipulated formaldehyde limits. http://new.gbca.org.au/product-certificationschemes/	1	**1**	**0**
Thermal Comfort	To encourage and recognise projects that achieve high levels of thermal comfort.	IEQ-14.1	**Thermal Comfort**	For 95% of the nominated area and 98% of occ hours a high degree of thermal comfort is achieved: A- Naturally Ventilated Spaces the internal temperatures in each space are within 80% (1 point) OR 90% (2 points) of Acceptability Limit 1 of ASHRAE Standard 55-2013 B- Mechanically Ventilated Spaces: B) Thermal modelling to verify the space meets specified prescriptive criteria for Thermal Comfort of the PMV +/- 1 (1 point) for >98% of occupied hours; OR	1	**1**	**0**
		IEQ-14.2	**Advanced Thermal Comfort**	B) Thermal modelling to verify PMV +/- 0.5 (2 points) for >98% of occupied hours	1	**0**	**1**
					17	**11**	**3**

Credit Name	Aim of Credit	Credit #	Sub-Criteria	Criteria Requirements	Points		
					Available	Targeted	Potential (Backup)
ENERGY							
	>>NOMINATE PATHWAY>>						
Greenhouse Gas Emissions	15-A.1	ENE-15.0	**Conditional Requirement: Performance Pathway**	**GREEN STAR CONDITIONAL REQUIREMENT 15E.0:** Operational greenhouse gas (GHG) emissions from the **Proposed Building** are less than those of the equivalent Benchmark Building (10% over DTS), and that the GHGe from the **Intermediate Building** are less than those of the Reference Building (DTS Compliant). A minimum energy points score of 3 or 6 points, for 5 Star or 6 Star projects (respectively) is required.	-	**Complies**	-
		15-A.1	**Prescriptive: Building Envelope**	• Roof and ceiling and flooring construction achieves a 10% increase on the minimum required R-values specified in J1.3 and J1.6. • For Roofs upper surface solar absorptance of at least 0.05 less than the max allowable in Part J1.3. • For roof lights, total Usyst of less than 3.3 W/m2K and SHGC of less than 85% of the max allowable in Part J1.4	1	**1**	
		15-A.2	**Prescriptive: Glazing**	• Wall-glazing constructions achieve an area-weighted total system U-value, across all facades (Specification J1.5a U-Value – Method 2), at least 10% less than the maximum allowable total system U-value for wall-glazing constructions as per the requirements of Part J1.5, including compliance with Part J0.5 where applicable; and •Wall-glazing constructions have a combination of solar heat gain coefficients, across all facades (Specification J1.5a Solar admittance – Method 2), that achieve a calculated proposed representative air-conditioning energy value of not more than 90% of the calculated reference representative air-conditioning energy value as per the requirements of Part J1.5; and •Where the wall component is 80% or more of the area of the wall-glazing construction, it achieves a 10% increase on the minimum total R-value specified in Table J1.5a; and •For display glazing, have a total system U-value of not more than 5.0 W/m².K and a total system SHGC of not more than 85% of the maximum allowable value in Part J1.5.	1	**0**	**1**
		15-A.3	**Prescriptive: Lighting**	• The actual installed aggregate illumination power is not more than 90% of the maximum illumination power based on the maximum allowable lighting power densities defined in Table J6.2a; and • Automated lighting control systems, such as occupant detection and daylight adjustment, are provided to 95% of the nominated area •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**	
		15-A.4	**Prescriptive: HVAC**	Mechanically ventilated spaces: •Each installed fan must achieve a fan motor input power per unit of flow rate 15% lower than the reference fan motor input power per unit flow rate calculated from the dts requirements of Part J5.4 (b), (c), (d) and (e); and •Each installed pump must achieve a pump motor input power per unit of flow rate 10% lower than the reference pump motor input power per unit flow rate calculated from the dts requirements of Part J5.7 (b), (c) and (d); and •The thermal efficiency of all installed gas water heaters is at least 4 percentage points more than the minimum value required by Part J5.9(d); and •The minimum energy efficiency ratio (EER) (cooling) for all unitary air conditioning equipment is at least 5% higher than the required minimum EER (cooling) as per Part J5.11; and •The minimum energy efficiency ratio (EER) and integrated part-load value (IPLV) for all refrigerant chillers are at least 15% higher than the minimum values specified in Table J5.10a/b for the relevant chiller type and capacity. Naturally ventilated spaces (including naturally-ventilated mode of mixed-mode systems), must also comply with the requirements of 'Provision of Outdoor Air' criterion (9.2C). || R3.15.9 Naturally Ventilated Spaces : The building is naturally ventilated in accordance with 'Indoor Air Quality' credit	1	**1**	
		15-A.5	**DHW**	Compliant where domestic hot water systems are powered by one of the following heat sources: • Renewable Energy (which may include electric/gas boost); • Electric heat pump (minimum COP 3.5 under design conditions); or • Waste heat or heat recovered from another process.	1	**0**	
		15A.6 ~~(15E.5.1)~~	**Transition Plan**	Reduce the fossil fuel use and develop a transition plan to phase them out. These conditions apply; □ A transition plan has been developed showing how the building will transition away from the use of fossil fuels by 2030; □ The commitment to this transition by 2030 is public; and □ It is demonstrated the transition plan has been integrated into the design and operation of the building, including considerations within to accommodate any replacements or changes required for delivery of new services during the operational phase.	1	**1**	**0**
		15A.7 ~~(15E.5.2)~~	**Fuel Switching**	No fossil fuels are burned on site to generate electricity, heating, or cooling; Where a minor amount of fossil fuel (less than 1%) is used on site for purposes where it can be demonstrated that there are no commercial alternatives (e.g. cooking or emergency generators). Renewable Energy Certificates equal to these emissions for the period of ten years following practical completion must be purchased and retired upfront, or through a contractual agreement with the utility. The RECs purchased must be recognised directly support renewable energy generation in Australia	1	**1**	**-**
		15A.8 ~~(15E.5.3)~~	**On-site Storage**	The project's on-site energy storage complies with the following conditions: □ A renewable energy storage procurement and use strategy has been developed and demonstrates that the storage is sized to match the requ of the building and that value will be provided to the project; □ The stored renewable energy is used to reduce the peak electricity demand; and □ A project installs and uses electricity storage such that on-site or off-site renewable energy not instantaneously used by the building is able to be stored and used by the building at a later time	1	**0**	
		15-A.9	**Vertical Transportation**	1 point is awarded where the energy associated with lift machinery or other vertical transportation complies with the following conditions: -The minimum lift energy efficiency is class A or B in accordance with ISO 25745-2; and -The lift idle and standby energy performance level is 1 in accordance with ISO 25745-2. -The minimum escalator energy performance is class A+ to A+++ in accordance with ISO 25745-3 Where projects have both lifts and escalators installed, all three criteria must be met. Where only one type of vertical transportation system is present, the associated criteria with the non-present system can be considered 'not applicable' and not required to be met.	1	**0**	
		15-A.10	**Off-site Renewables**	Projects which have committed to procure Greenpower® products are rewarded additional points for supporting grid-connected renewable energy supply infrastructure. □ 2 points are awarded where at least three points in this pathway have been achieved, and a supply contract is in place to procure at least 50% of the building's electricity consumption through accredited Greenpower® products. □ 5 points are awarded where at least five points in this pathway have been achieved, and a supply contract is in place to procure 100% of the building's electricity consumption through accredited Greenpower® products. The length of time of the commitment is for a minimum period of ten years after Practical Completion. Points awarded under this credit element cannot count towards meeting the Minimum Requirement for 5 and 6 star ratings. LLP2.15.01	5	**0**	
Peak Electricity Demand Reduction	Prescriptive Pathway: Onsite Energy Generation To encourage the reduction of peak demand load on the electricity network infrastructure.	Ene 16.1-A	**Prescriptive Pathway: Onsite Energy Generation**	1 out of 2 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 20%	1	**1**	
		~~ENE-16.1B~~	~~**Modelled Performance Pathway: Reference Building Pathway**~~	~~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: □ 20% : 1 point — □ 30%: 2 points~~	~~0~~	**0**	
					22	**6**	**1**

Credit Name	Aim of Credit	Credit #	Sub-Criteria	Criteria Requirements	Points		
					Available	Targeted	Potential (Backup)
TRANSPORT							
	>>>NOMINATE PATHWAY>>>>						
Sustainable Transport	Performance Pathway	Tra-17-A.1	**Performance Pathway**	Up to 10 points are available where the proposed transport solutions on the site decrease emissions from transport, decreases mental and social impacts of commuting and encourages healthier uptake of active transport options. Points are based on a holistic approach to reducing the impacts from transport where the Proposed Building performance is compared to Reference Building performance across the following indicators: - Emissions reduction; - Active mode encouragement; - Vehicle kilometres travelled reduction; - Walkable location Points are awarded by completing the Sustainability Impacts from Transport Calculator and required the development of a detailed Travel Plan. Any change between the Proposed and Reference scenarios must be supported with significant evidence base on building occupant surveys, evidence of staff living locations, evidence of staff commuter times, incentive programs related to use of public transport and working from home.	**10**	**5**	**0**
					10	**5**	**2**
WATER							
	>>NOMINATE PATHWAY>>						
Potable Water	Modelled Performance Pathway	Wat-18-A	**Potable Water - Modelled Pathway**	Up to 12 points are available based the reduction in potable water consumption of the Proposed Building when compared to a Reference Building. This credit addresses potable water consumption from the use of sanitary fixtures, appliances, HVAC, irrigation systems and swimming pools. Compliance requirements and guidance for the modelled performance pathway is detailed in the Green Star Potable Water Calculator. WELS HAS BEEN ADJUSTED 4 STAR SHOWERS AND 6 STAR WC'S (VACUUM) ARE NOW AVAILABLE	12	**7**	**0**
					12	**7**	**0**
MATERIALS							
	>>>NOMINATE PATHWAY>>>>						
Life Cycle Impacts: Material Use - Prescriptive Pathway Maximum 5 Points Available	Life Cycle Impacts: Material Use - Prescriptive Pathway Maximum 5 Points Available To reward the reduction of the environmental impacts of building materials for the whole building over the entire life cycle.	MAT-19.B.1.1	**Portland Cement Reduction**	Reduced use of Portland cement (1 point for 30%, 2 points for 40%) by mass.	2	**1**	**0**
		MAT-19.B.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).	0.5	**0.5**	**0**
		MAT-19B.1.3	**Aggregate Reduction**	0.5 point is available where either: 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; OR 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.	0.5	**0.5**	**0**
		MAT-19B.2A or MAT-19B.2B	**Steel**	For steel framed buildings, 1 point is available for reducing the mass of steel framing compared to standard practice; or For concrete framed buildings, 1 point is available when there is a reduction in the mass of steel reinforcement used when compared to standard practice. The mass of reinforcing steel can be reduced by optimal fabrication or by innovative structural design. Optimal fabrication techniques may include initiatives such as reinforcing carpets, special mesh, prefabricated reinforcement cages and special couplers can be implemented to reduce the mass of reinforcement.	1	**1**	**0**
		MAT-19B.3.1	**Building Reuse - Façade Reuse**	Reuse of the building façade (1 point for 50% by area, 2 points for 80%)	2	**0**	**0**
		MAT-19B.3.2	**Building Reuse - Structure Reuse**	Retaining of the Structure (1 point for 30% by mass, 2 points for 60%).	2	**0**	**0**
		MAT-19.B.4	**Structural Timber**	The minimum requirement is met where all structural timber used in the building is responsibly sourced, FSC or PEFC certified. If the structural timber used represents less than 30% of the building's GFA, then this pathway cannot be targeted. Up to 3 points are available if building is constructed from the following proportion of structural timber: □ 1 point for 30% of building's GFA; □ 2 points for 70% of building's GFA; and □ 3 points for 90% of GFA.	3	**0**	**0**
Responsible Building Materials	To reward projects that include materials that are responsibly sourced or have a sustainable supply chain.	MAT-20.1	**Responsible Steel Maker and Fabricator**	1 point is awarded where 95% of the building's steel (by mass) is sourced from a Responsible Steel Maker (ISO14001 certified EMS for manufacturing facility AND the steelmaker is a member of the World Steel Association's Climate Action Programme); AND **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); OR	1	**1**	**0**
		MAT-20.2	**Timber**	1 point where at least 95% (by cost) of all timber used in the building and construction works is either: **A.** Certified by a forest certification scheme that meets the GBCA's 'Essential' criteria for forest certification, such as FSC and PEFC; OR **B.** Is from a reused source where the cost of timber is less than 0.1% of the Project Contract Value, this criterion is made 'Not Applicable'.	1	**1**	**0**
		MAT-20.3	**Permanent Formwork, Pipes, Flooring, Blinds & Cables**	1 point is awarded where 90% by cost of all permanent formwork, pipes, flooring, blinds and cables in the project either: **A.** Do not contain PVC and have a recognised product declaration (Enviro Product Declaration);OR **B.** Meet Best Practice Guidelines for PVC as per GBCA requirements. If cost of PVC products in the project is less than 1% of the Project Contract Value this criterion is made 'Not Applicable'	1	**1**	**0**

Credit Name	Aim of Credit	Credit #	Sub-Criteria	Criteria Requirements	Points		
					Available	Targeted	Potential (Backup)
Sustainable Products	To encourage sustainability and transparency in product specification.	MAT-21.1	**Sustainable Products**	Up to 3 points are awarded when products meet transparency and sustainability requirements under one of the following categories; **A.** Reused Products, **B.** Recycled Content, **C.** Environmental Product Declarations, **D.** 3rd Party Certifications, or **E.**Stewardship Programs. Points are calculated based on specified benchmarks for the percentage of compliant products used in the project. - 1 point: 3% Compliant products - 2 points: 6% Compliant products - 3 points: 9% Compliant products 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), As per Sustainable Products Calculator. Includes no only products installed into the finished building, such as furniture, partitions, ceilings, etc, but all products and materials used in the construction and fit out of a building, including concrete, steel and glazing etc.	3	**3**	**0**
Construction and Demolition Waste	To reward projects that reduce construction waste going to landfill by reusing or recycling building materials	MAT-22	**Reduction of Construction and Demolition Waste**	The minimum requirement is met where the waste contractors and waste processing facilities servicing the project demonstrate compliance with the Green Star Construction and Demolition Waste Reporting Criteria. 1 point is available where the construction waste going to landfill is reduced by: **A.** Fixed Benchmark: Minimizing the total amount of waste sent to landfill when compared against a typical building (>15kg/m^2 0 points, 12.5-15kg/m^2 0.5 points, <10kg/m^2 1 point); OR **B.** Percentage Benchmark: Diverting a significant proportion of waste (>90% of total) from going to landfill.	1	**1**	**0**
					14	**10**	**2**
LAND USE AND ECOLOGY							
Ecological Value	To reward projects that improve the ecological value of their site.	ECO-23	**Endangered, Threatened or Vulnerable Species**	MINIMUM CREDIT REQUIREMENT: It must be demonstrated that no critically endangered, endangered or vulnerable species, or ecological communities were present on the site at the time of purchase.	-	**Complies**	-
		ECO-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 Green Star Ecological Value Calculator based on a comparison of the condition of the site before and after the project. According to the Improvement in Ecological Value Score, points are awarded as the following: For 0.01: 1 Point - 0.10: 2 Points - 0.20: 3 Points	3	**1**	**0**
Sustainable Sites	To reward projects that choose to develop sites that have limited ecological value, re-use previously developed land and remediate contaminate land.	ECO-24	**Conditional Requirement**	**GREEN STAR CONDITIONAL REQUIREMENT:** It must be demonstrated that at the date of site purchase or date of 'option contract', the project site did not include old growth forest, prime agricultural land, wetlands of 'High National Importance', or did not impact on 'Matters of National Significance'.	-	**Complies**	-
		ECO-24.1	**Reuse of Land**	1 point is awarded where at the date of site purchase, 75% of the site was previously developed such that it was occupied by permanent structure, associated curtilage, road, car park or other hardstand including working areas of mines, landfills, brick pits, quarries or other industrial, commercial, institutional and residential activity and associated curtilage.	1	**1**	**0**
		ECO-24.2	**Best Practice Site Remediation**	1 point is awarded where the site, or an existing building, was previously contaminated and the site has been remediated in accordance with best practice remediation strategies.	1	**0**	**0**
Heat Island Effect	To encourage and recognise projects that reduce the contribution of the project site to the heat island effect.	ECO-25.1	**Heat Island Effect Reduction**	1 point is available if at least 75% of the whole site area comprises building or landscaping elements that reduce the impact of heat island effect. Provisions for Solar Reflectance Index (SRI) apply, □ For roof pitched <15°: a three year SRI of min 64; or -Roof pitched >15°: a three year SRI of min 34. Solar Hot Water and PV Panels features are to be excluded from the calculation of site area percentages for both compliant and noncompliant areas	1	**1**	**0**
					6	**3**	**0**
EMISSIONS							
Stormwater	To reward projects that minimise peak stormwater flows and reduce pollutants entering the public sewer infrastructure or other water bodies.	EMI-26.1	**Stormwater Peak Discharge**	1 point is available where project teams demonstrate that the post-development peak event stormwater discharge from the site does not exceed the pre-development peak event stormwater discharge, using the Average Recurrence Interval (ARI) as defined by Green Star. NOTE - If Man-3.1 Climate Adaptation & Resilience credit is targeted, the risk assessment will impact the ARI used for this credit (1 ARI for low risk and 5 ARI for medium-high risk). If this credit is not targeted, the ARI to be used should be consistent with local requirements/guidelines.	1	**1**	**0**
		EMI-26.2	**Stormwater Pollution Targets**	PRE-REQUISITE CREDIT (PEAK DISCHARGE REQUIREMENT MUST BE MET): 1 additional point is awarded where it is demonstrated that all stormwater discharged from the site meets the Green Star stormwater "Pollution Reduction Targets A" or meet statutory requirements whichever is the higher level of filtration. INNOVATION points available for Table B/C adherence.	1	**1**	**0**
Light Pollution	To reward projects that minimise light pollution.	EMI-27	**Light Pollution to Neighbouring Properties**	MINIMUM CREDIT REQUIREMENT: It must be demonstrated that the project complies with AS 4282 'Control of the Obtrusive Effects of Outdoor Lighting'.	-	**Complies**	-
		EMI-27.1	**Light Pollution to Night Sky**	1 point is awarded where it is demonstrated that a specified reduction in light pollution has been achieved by the project, where either; **A.** Control of Upward Light Output Ratio (ULOR) ; OR **B.** Control of Direct illuminance.	1	**0**	**1**
Microbial Control	To recognise projects that implement systems to minimise the impacts associated with harmful microbes in building systems.	EMI-28.1	**Microbial Control**	1 point is awarded where the building; ~~A. Is naturally ventilated;~~ ~~B. Has waterless heat rejection systems; OR~~ **C.** The project is provided with water-based heat rejection that is design and built in accordance with AS/NZS 3666.1:2011 and includes measures for Legionella control and Risk Management in accordance with Victorian Public Health & Wellbeing Act 2008.	1	**1**	**0**
Refrigerant Impacts	To encourage operational practices that minimise the environmental impacts of refrigeration equipment.	EMI-29.1	**Refrigerant Impacts**	1 point is awarded where one of the following requirements is satisfied: a) The combined Total System Direct Environmental Impact of systems containing refrigerants is less than 15; b) The Total System Direct Environmental Impact of systems containing refrigerants is between 15 and 35 ***AND a leak detection system is in place including an automated refrigerant recovery system capable of recovering over 95% (by weight) of refrigerant;*** c) All refrigerants in the project have an ODP of 0 AND GWP of 10 or less; d) No refrigerants are used within the project	1	**0**	**0**
					5	**3**	**1**

INTEGRAL

Credit Name	Aim of Credit	Credit #	Sub-Criteria	Criteria Requirements	Points		
					Available	Targeted	Potential (Backup)
INNOVATION							
Innovative Technology or Process **Market Transformation** **Improving on Green Star Benchmarks** (2 Point Maximum per item - see new	The project meets the aims of an existing credit using a technology or process that is considered innovative in Australia or the world. The project has undertaken a sustainability initiative that substantially contributes to the The project has achieved full points in a Green Star credit and demonstrates a substantial improvement on the benchmark required to achieve full points.	INN-30A	**GHG Emissions - On-site Renewable Energy**	Up to two (2) points may be awarded for installing on-site renewable energy sources. Additional points are available on a continuous sliding scale for the installation of significant renewable energy generation systems which contribute 15% (1 point) to 30% (2 points max) of the Base Building energy demand.	2	**1**	**1**
		INN-30B	**Life Cycle Impacts - Concrete: Sustainable Sourcing of Aggregates**	One point can be claimed when project team demonstrate the use of concrete aggregates that have chain of custody, or come from a responsible source.	1	**0**	**1**
		INN-30C	**Indoor Pollutants- Ultra Low VOC Paints**	Over 50% of paints (by cost) specified in the building have a maximum TVOC content of 5g/L, verified by one of the approved test methods.	1	**1**	**0**
		INN-30C	**Stormwater Pollution Targets**	Up to 2 points are awarded where it is demonstrated that Pollution Reduction Targets 'B' or 'C' are achieved for the site.	2	**1**	**1**
Innovation Challenge		INN-30D	**Community Benefits**	Assess needs of community, develop strategy, implement plan and deliver specific outcomes.	1	**1**	**0**
		INN-30D	**Culture, Heritage and Identity**	Site/area of heritage value is preserved and/or refurbished and made visible/celebrated.	1	**0**	**0**
		INN-30D	**Financial Transparency**	To increase the amount of information available to industry on the costs and benefits of sustainable building. To claim, project teams must: -Agree to complete the 'Financial Transparency Disclosure Template' that comprehensively itemises design, construction, documentation and project costs. In the case of building operations, the information provided will relate to the cost of collecting documentation, building operations and any building upgrades. • Provide Disclosure Template in Excel format at the time of the project's Green Star submission. • Agree to participate in the yearly GBCA report, using anonymized data provided by project teams.	1	**1**	**0**
		INN-30D	**High performance site office**	To improve the sustainability performance of site offices, thus increasing health and productivity outcomes of site works. Site shed design complies with 75% of the requirements of the credit checklist.	1	**1**	**0**
		INN-30D	**Integrating Healthy Environments**	To support high-performance, cost-effective and health-promoting project outcomes through an early analysis of the interrelationships among systems.	1	**0**	**1**
		INN-30D	**Local Procurement 1**	A percentage of the products/materials were from/made in Australia	1	**0**	**0**
		INN-30D	**Local Procurement 2**	A percentage of the labour and services by the building or fit out come from the local area.	1	**0**	**1**
		INN-30D	**Marketing Excellence**	Specific marketing drivers have been researched and a project specific strategy developed.	1	**1**	**0**
		INN-30D	**Reconciliation Action Plan**	Develop a Reconciliation Action Plan (RAP), as defined and endorsed by Reconciliation Australia. The RAP must be endorsed by Reconciliation Australia. The Green Star project being rated must play a central role in the delivery of the Reconciliation Action Plan. • Demonstrate evidence that relevant Indigenous organisations have been consulted in the development of the RAP.	1	**1**	**0**
		INN-30D	**Social Return on Investment**	Analyse direct costs and benefits of project impact including productivity, health, crime etc.	1	**0**	**0**
		INN-30D	**Universal Design**	Assess activities of >80% of building users and develop solutions to increase activity. This innovation aims to integrate into the design and operation phases of built environment projects, a more inclusive view of how people with disabilities access and engage with place, and most importantly, how they can do so seamlessly with equity and dignity (Australian network on disability 2015)	1	**1**	**0**
					10	**9**	**1**

Available	Targeted	Potential
110	**67**	**Extra 11 Total 78**

Appendix C Green Star Buildings Pathway

Note: The Green Star Buildings pathway is not currently endorsed. The following tables are provided as a reference of a possible pathway to a 4 Star Green Star Buildings certification should this methodology be approved. These credits were discussed with the project team during two Green Star workshops as potentially achievable on the project.

Category (Outcome)	#	Credit	Criteria Requirements ME: Minimun expectations (must be achieved, don't worth points) CA: Credit Achievement EP: Exceptional Performance	Points Available	Points Targeted	Potential Points	COMMENTS Changes and new requirements
Responsible				17	4	0	
To recognise activities that ensure the building is designed, procured, built and handed over in a responsible manner. The aim is to help builders, owners, and the supply chain on the sustainability journey. The Responsible Products Framework provides additional flexibility for product suppliers to have their initiatives be recognised in Green Star, provided they fall under the principles of responsibility, transparency, stewardship, foresight or verification.	1	Industry Development	CA- Appoint a Green Star Accredited Professional; and CA- Disclose the cost of sustainable building practices to the GBCA; and CA- Market the building's sustainability achievements.	1	**1**	-	Financial transparency disclossure and Marketing Sustainability achievements are required to achieve this point
	2	Responsible Construction	**ME- Environmental management system (EMS certified)** **ME- Environmental management plan (EMP)** **ME- Construction and demolition waste diversion of 80%** **ME- Sustainability training provided to 95% of all sub/contr at least 3 days** CA- Construction and demolition waste diversion of 90%	1	**1**	-	No substantial changes but 90% diversion of demolition waste required to achieve point.
	3	Verification and Handover	**ME- Meetering and monitoring for energy and water** **ME- Commissioning and tuning from prior to construction to after PC.** **ME- Building Information to be provided to building owner and relevant staff** CA- Soft landing approach; and CA- Independent Commisioning Agent	1	**1**		TC to GBCA if Schools CX Agent can ask as ICA (currently allowed in GS 1.3)
	4	Operational Waste	**ME- Separation of waste streems at least 3** **ME- Dedicated waste storage area to account estimated waste and collection** **ME- Signoff by waste specialist and/or contractor**	0	**-**	-	No substantial changes. No available points in this credit
	5	Responsible Procurement	CA- Risk and opportunity assessment of the supply chain for required issues CA- Responsible Procurement plan to mitigate and manage identified risks	1	**0**	-	New inclusion. Assessment & Plan are required
	6	Responsible Structure	CA- 80% of all structural components (by cost) meet Resp. Products Value score ≥10 EP- In addition to CA, either: 10% of all products in the structure (by cost) RPVS ≥15 OR, 30% of all products in the structure (by cost) have an average RPVS ≥12	5	**0**		Increased weighting and benchmarks. Scores for Responsible Products Framework are currently beign finilised by GBCA https://new.gbca.org.au/rate/rating-system/responsible-products-framework/ March update - only keeping Finishes (Credit 9) as a potential point for 5 star.
	7	Responsible Envelope	CA- 60% of all building envelope components (by cost) meet a RPVS ≥10 EP- In addition to CA, either: 10% of all products in envelope (by cost) RPVS ≥15, OR, 25% of all products in the envelope (by cost) have an average RPVS ≥14	4	**0**		
	8	Responsible Systems	CA- 20% of all active building systems (by cost) meet RPVS ≥6 EP- In addition to CA, either: 5% of all active systems (by cost) meet RPVS ≥11, OR, 15% of all active systems (by cost) have an average RPVS of ≥8	2	**0**		
	9	Responsible Finishes	CA- 60% of all internal building finishes (by area) meet a RPVS ≥7 EP- In addition to CA, either: 10% of all internal building finishes (by area) RPVS ≥12 OR, 20% of all internal building finishes (by area) have an average RPVS of ≥9	2	**1**	0	

Category (Outcome)	#	Credit	Criteria Requirements ME: Minimun expectations (must be achieved, don't worth points) CA: Credit Achievement EP: Exceptional Performance	Points Available	Points Targeted	Potential Points	COMMENTS Changes and new requirements
Healthy				14	6	2	
Emphasises the important role the built environment has in enhancing the health and wellbeing of occupants	10	Clean Air	**ME- Ventilation systems attributes: Separation from pollutants-cleaning ductwk** **ME- Provision of outdoor air: 50% > min AS1668 OR mantain CO_2 levels <800ppm** **ME- Exhaust or elimination of pollutants** CA- Ventilation system attributes: access for maintenance; and CA- Provision of outdoor air: 100% > min AS1668 OR mantain CO_2 levels ≤700ppm	2	**0**	-	No substantial changes, less weighting and no points awarded unless increasing provision of outdoor air by 100% or maintain CO_2 ≤700ppm
	11	Light Quality	**ME- Lighting comfort: Flicker-free, required CRI, illuminance, uniformity & MacA E** **ME- Glare addressed in nominated areas** **ME- Daylight access to building occupants** CA- Artificial Lighting solution that addresses quality, contrast etc; OR CA- Daylight EP- Both CAs are achieved	4	**2**	2	Changes to grouping and slightly decrease in weighting
	12	Acoustic Comfort	**ME- Acoustic Comfort Strategy addressing how design delivers comfort to occ** CA- Internal noise levels limits as per standards; and CA- Acoustic separation between enclosed spaces; and CA- Impact noise transfer through floors; and CA- Reverberation control as per limint in standards	2	**2**	0	No substantial changes. Slightly decrease in weighting
	13	Exposure to Toxins	**ME- Paints, adhesives, sealants, and carpets; 95% (volume) meet TVOC limits** **ME- Engineered wood products; 95% (area) meet formaldehyde limits** **ME- Lead, asbestos and PCBs; hazardous materials survey, best practice removal** CA- Testing of TVOC and formaldehyde levels	2	**0**	-	Testing is now required in order to achieve points.
	14	Amenity and Comfort	CA- Dedicated amenity rooms to promote inclusivity, mindfulness or exercise	2	**0**		Excluded; unclear if space program can accommo
	15	Connection to Nature	CA- Views, indoor plants and incorporation of nature-inspired design. EP- 5% of the building's floor area/ or site area (whichever is greater) is allocated to nature in which occupants can directly engage with.	2	**2**		Incorporation of nature-inspired design

Category (Outcome)	#	Credit	Criteria Requirements ME: Minimun expectations (must be achieved, don't worth points) CA: Credit Achievement EP: Exceptional Performance	Points Available	Points Targeted	Potential Points	COMMENTS Changes and new requirements
Resilient				8	2	1	
Allows building owners to demonstrate to investors and the community that risks that threaten the short- and long-term performance of the building have been considered	16	Climate Change Resilience	**ME- Climate change pre-screening checklist and communication to stakeholders** CA- Project-specific climate change risk and adaptation assessment.	1	**1**		Additional requirement to communicate risks and develop assessment at early design
	17	Operations Resilience	CA- Comprehensive Risk Assessment; and CA- Managing risks; and CA- Addressing power loss	2	**0**	-	New inclusion
	18	Community Resilience	CA- Develop community resilience plan	1	**0**	1	New inclusion
	19	Heat Resilience	CA- Heat island effect reduction strategies in at least 75% of the whole site area	1	**1**		No changes to UHI credit
	20	Grid Resilience	Manage peak electricity demand for the building through 1 or a combination of: CA- Active generation and storage systems: 10% reduction for at leas 1hr; and/or CA- Demand response: 10% reduction withough affecting comfort; and/or CA- Passive design solutions: 10% improvement in NCC Ref facade, apply to nat-vent	3	**0**	-	Update to pathways of compliance

Category (Outcome)	#	Credit	Criteria Requirements **ME:** Minimum expectations (must be achieved, don't worth points) **CA:** Credit Achievement **EP:** Exceptional Performance	Points Available	Points Targeted	Potential Points	COMMENTS Changes and new requirements
Positive				30	6	3	
Allows buildings to meet 1.5°C trajectory goals and sets the pathway for the built environment to address its emissions fully through all scopes of emissions. The category acknowledges the value in understanding the full life cycle impacts of the building, which in turn, can lead to better designs and material selection	21	Upfront Carbon Emissions	**ME- Upfront carbon emissions are at least 10% less than reference building** CA- Net Zero Path: Upfront carbon emissions are at least 20% less than reference b. EP- Achieve CA and all remaining emissions from Modules A1-A5 are offset	6	**0**	-	New inclusion. Higher weighting for embodied emissions. Offsets required to achieve total points
	22	Energy Use	**ME- Energy use is at least 10% less than reference. No PV & NCC-compliant façade** CA- Net Zero Path: Energy use is at least 20% less than a reference building; OR NABERS 5.5 Stars with 25% modelling margin* EP- Energy use is at least 30% less than a reference building; OR NABERS 6 Stars	6	**3**	-	Not required for rating / project should still prioritise energy efficiency
	23	Energy Source	**ME- The building provides a Zero Carbon Action Plan** CA- 100% of the building's electricity comes from renewable electricity EP- Net Zero Path: 100% of the building's energy comes from renewables	6	**0**	3	Separated from GHGe Credit. Requires energy 100% powered by renewables
	24	Other Carbon Emissions	CA- Net Zero Path: The building owner eliminates/offsets emissions from refrigerants EP- All other emissions not captured in the Positive category are eliminated/offset	4	**0**		Increased weighting for Refrigerant Impacts
	25	Water Use	**ME- Efficient water fixtures or 15% less potable water compared to a ref. building** CA- 45% less potable water compared to a reference building EP- 75% less potable water compared to a reference building	6	**3**		Less weighting for water. New target of 40% improvement against reference case to be reviewed under new online calculator
	26	Life Cycle Impacts	CA- 30% reduction in life cycle impacts when compared to standard practice	2	**0**		Increase Benchmark

Category (Outcome)	#	Credit	Criteria Requirements **ME:** Minimum expectations (must be achieved, don't worth points) **CA:** Credit Achievement **EP:** Exceptional Performance	Points Available	Points Targeted	Potential Points	COMMENTS Changes and new requirements
Places				8	8	0	
Focuses on the integration of the building into the urban fabric and delivers places that increase social cohesion. This category celebrates where we come from and our Aboriginal and Torres Strait Islander communities and uses placemaking to give a sense of belonging to the spaces we spend time at	27	Movement and Place	**ME- Showers and changing facilities for building occupants** CA- Design and location prioritises walking, cycling, and transport options: by Introducing cyclist facilities, developing a sustainable transport plan, reducing private vehicle use and encouraging walkability.	3	**3**	0	Significant less weighting. Project team needs to confirm score using new online calculator
	28	Enjoyable Places	CA- Provide memorable, beautiful, vibrant communal or public places where people want to gather and participate. 0.25 m2/occupant or 2.5% of GFA, whichever greater. In addition an Activation Strategy to facilitate initiation placemaking activities	2	**2**		New inclusion
	29	Contribution to Place	CA- Design contributes to the liveability of the wider urban context and enhances the public realm. Demonstrated through Urban Context Report and public realm interface design, OR an Independent design review	2	**2**	-	New inclusion
	30	Culture, Heritage and Identity	CA- Design reflects and celebrates local demographics and identities, the history of the place, and any hidden or minority entities. Demonstrated through local analysis that justifies design responses, OR through Independent Design Review	1	**1**	-	New inclusion. Requires analysis at early design. Engagement should preferebly start from DA

People				9	3	1	
Encourages solutions that address the social health of the community. Promotes recognition of the multitude of people that are involved in the delivery and occupation of a building. Procurement is increasingly being used to improve environmental and social outcomes beyond the project boundary. It highlights issues such as diversity and gender equity, inclusion, and mental health.	31	Inclusive Construction Practices	**ME- Gender inclusive facilities and protective equipment during construction. Also policies on-site to raise awareness, reduce discrimination, racism & bullying.** CA- High quality staff support on-site to reduce physical and mental health impacts.	1	**1**	-	New requirement to evaluate the program's effectiveness
	32	Indigenous Inclusion	CA- Building's design and construction celebrates Aboriginal and Torres Strait Islander people, culture and heritage by either playing an active role in the organisational RAP; OR, Incorporating design elements using the Indigenous Design & Planning principles.	2	**0**	-	New inclusion. No longer innovation
	33	Procurement and Workforce Inclusion	CA- Implement social procurement strategy, at least 2% of the building's total contract value has been directed to generate employment opportunities for disadvantaged and under-represented groups EP- At least 4% instead	3	**0**	0	
	34	Design for Inclusion	CA- The building is designed and constructed to be inclusive to a diverse range of people with different needs. EP- Engagement with target groups has informed the inclusive design	3	**2**	1	

Category (Outcome)	#	Credit	Criteria Requirements **ME:** Minimum expectations (must be achieved, don't worth points) **CA:** Credit Achievement **EP:** Exceptional Performance	Points Available	Points Targeted	Potential Points	COMMENTS Changes and new requirements
Nature				14	8	2	
Built on principles that address the pressure on ecosystems and biodiversity caused by rapid urbanisation. It rewards the positive impacts of green space and biodiversity on people and urban space.	35	Impacts to Nature	**ME- Building was not built on, or significantly impacted, a site w/ high ecological value; and manages light pollution impacts and has a wetland management plan** CA- The building's design and construction conserves existing natural soil, hydrological flows and vegetation elements; and If deemed necessary by an Ecologist, at least 50% of existing site with high biodiversity value is retained.	2	**2**	-	Points are awarded only reporting how ecological values will be protected
	36	Biodiversity Enhancement	CA- Site includes an appropriate landscape area either 15% of site area or at a ratio of 1:500 of the GFA, whichever is larger; and it includes a diversity of species and prioritises the use of climate-resilient and indigenous plants; and develop a site-specific Biodiversity Management Plan and provide it to the building owner. EP- A greater area of landscaping is provided, either 30% of the site area or at a ratio of 1:300 of GFA, whichever is larger; and landscaping includes critically endangered and/or endangered plant species native to the bioregion.	4	**2**	-	Increased benchmarks for ecological value of site. Change in calculation method
	37	Nature Connectivity	CA- Landscaping or Infrastructure is built to encourage species connectivity through the site, and to adjacent sites. In addition, if the project sits within a blue or green grid strategy it must contribute to the goals of the strategy	2	**2**	-	New inclusion. Project team to review if attainable through landscape design
	38	Nature Stewardship	CA- The building owner undertakes activities that protects or restores biodiversity at scale beyond the development's boundary.	2	**-**	-	New inclusion. Project team to confirm if there's interest for purchasing biodiversity offsets.
	39	Waterway Protection	CA- Annual average flow reduction (ML/yr) of 40% compared to pre-development levels and meets specified pollutants targets. EP- Annual average flow reduction (ML/yr) of 80% instead	4	**2**	2	Increased weighting.

Leadership				10	2	2	
recognise the implementation of innovative practices, processes and strategies that promote achievements in the built environment that are beyond the scope of the rating tool as released.	40	Market	TBC	1	**1**	-	The majority of innovation points are now included in the main categories. Project team needs to evaluate applicable innovations
		Transformation	TBC	1	**1**	-	
		(Leading technology	TBC	1	**0**	-	
		or process)	TBC	1	**-**	1	
			TBC	1	**-**		
	41	Leadership Challenges	Net Zero Carbon in Operations Pathway bonus	1	**0**	0	
			Global sustainability, Occupant engagement, etc. Aplicability TBC with GBCA	4	**-**	1	


INTEGRAL