SJOG Richmond Hospital

Alternative Ecologically Sustainable Development Process Report

Prepared for: St John of God c/- STH

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Date: 15/08/2022

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Revision

Revision	Date	Comment	Prepared By	Approved By
1	26/11/2020	SSDA Preliminary Issue	JOC	JOC
2	08/08/2022	Alternative Ecologically Sustainable Development Process Report	ZDU	PSU

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1. Executive Summary

This Alternative Ecologically Sustainable Development Process Report has been prepared on behalf of St John of God Health Care c/- Silver Thomas Hanley for the proposed upgrade of St John of God Hospital, located at 177 Grose Vale Road, North Richmond, NSW 2754. This report is to justify the alternative method of ecologically sustainable development compliance from the project specific SEAR's to NSW Department of Planning and Environment particularly the approach to equivalency to an accredited ESD rating system to a level of national best practice.

This report provides an overview of the proposed Ecologically Sustainable Development (ESD) principles and sustainability initiatives to be included within the project and is intended to form the basis of the ESD response as part of the Environmental Impact Statement (EIS) for the upcoming State Significant Development Application. This report is an adapted Sustainable Development Plan with a focus on the proposed alternative assessment process and justifying it's equivalency to an accredited ESD rating system to a level of national best practice.

Information contained within this report has been prepared with consideration for:

- Secretary's Environmental Assessment Requirements (SEARs) for the proposed development;
    - Including a breakdown of the Alternative Approach to National Best Practice ESD Rating Pathway Process
- NCC 2019 Section J

2. Introduction

This report supports a State Significant Development (SSD) Development Application (DA) for the expansion and redevelopment of St John of God (SJG) Richmond Hospital, which is submitted to the Department of Planning, Industry and Environment (DPIE) pursuant to Part 4 of the *Environmental Planning and Assessment Act 1979* (the Act). St John of God Health Care (SJGHC) is the proponent of the SSDA.

NSW Department of Planning have requested details on the proposed alternative process of equivalency to national best practice ESD rating system. This report includes:

- An overview of the Green Star Design & As-Built Certification Process;
    - This can be seen in Section 4.2.1.
- Detailed discussion of the Alternative ESD Certification Methodology. The discussion should comprises
    - The Alternative ESD Framework; The minimum score of points to be achieved; and the differences to a Certified Green Star Rating
        - This discussion can seen in Section 4.2.2.
- Preliminary ESD Certification Pathway to demonstrate where and how the target points shall be achieved.
    - See Appendix A

2.1 Background

SJG Richmond Hospital has a contract with The Australian Government Department of Veterans' Affairs to deliver care to veterans with Trauma and Stressors Related Disorders. SJG Richmond Hospital's current physical environment now fails to support contemporary models of clinical care; is, for the most part, past its expected lifespan; and is significantly out of step with both patient expectations and competitor standards of a mental health clinic care environment.

Consequently, SJGHC has proposed a complete redevelopment of the site. The redevelopment will involve rebuilding the inpatient areas and remodelling selected existing buildings to accommodate outpatient and other selected services.

Further to the historical buildings, Richmond Hill is of significant Aboriginal heritage. The site was once an Aboriginal meeting ground and in 1795 many Burruberongal people were killed there as part of a series of confrontations between Europeans and the local people.

2.2 Site Description

The site is located at 177 Grose Vale Road, North Richmond, within Richmond LGA and approximately 15km north of Penrith City centre. It is flanked by the Hawkesbury river to the east and surrounded by pastureland and sporadic residential living. Located on Richmond Hill,

Existing development on the site includes "Belmont House" with two wings and decommissioned operating theatres, 24 bed accommodation for Post Traumatic Stress Disorder Patients (PTSD) and a 10-bed transition accommodation, "the Lodge", and three accommodations for patient family short stay accommodation.

The site at 177 Grose Vale Road comprises 2 lots, lot 11 and lot 12. The proposed redevelopment is located on lot 11 which has total area of approximately 97,700m^2.

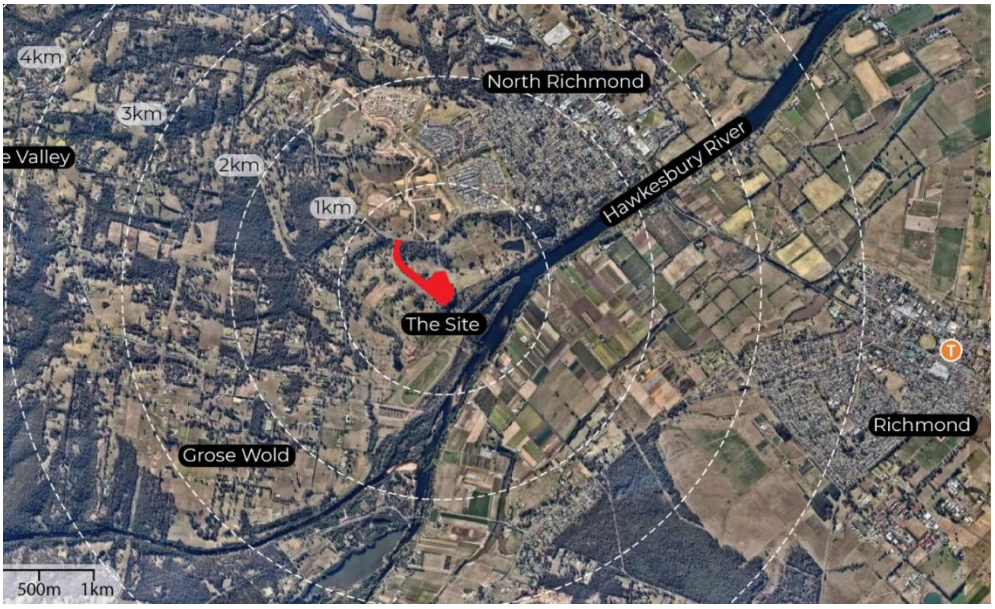


Figure 1 - Site Context, *Source: https://www.planningportal.nsw.gov.au/major-projects/project/25876*

2.3 Overview of the Proposed Development

The SSD DA seeks approval for:

- Retention of key buildings including Xavier Building, Admin Building, Belmont House
- Construction of:
  - four pavilions and support areas.
  - café, dining and food services
  - A wellness centre
- Landscaping including the provision of a terrace and open green space

Figure 2 - Site Aerial, Source: Nearmap

2.4 Secretary's Environmental Assessment Requirements

DPIE has issued Secretary's Environmental Assessment Requirements (SEARs) for the proposed development. This report has been prepared having regard to the relevant SEARs as follows:

SEAR	Comment / Reference
8. Ecologically Sustainable Development (ESD)	
Detail 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.	Refer to Section 4.1 of this report.
Include a framework for how the future development will be designed to consider and reflect national best practice sustainable building principles to improve environmental performance and reduce ecological impact. This should be based on a materiality assessment and include waste reduction design measures, future proofing, use of sustainable and low-carbon materials, energy and water efficient design (including water sensitive urban design) and technology and use of renewable energy.	Refer to Section 4.2 of this report.
Include preliminary consideration of building performance and mitigation of climate change, including consideration of Green Star Performance.	Refer to Section 4.2 & Section 4.3 of this report.
Include an assessment against an accredited ESD rating system or an equivalent program of ESD performance. This should include a minimum rating scheme target level.	Refer to Section 4.2 of this report.
Provide a statement regarding how the design of the future development is responsive to the CSIRO projected impacts of climate change, specifically: • **hotter days and more frequent heatwave events.** • **extended drought periods.** • **more extreme rainfall events.** • **gustier wind conditions.** • **how these will inform landscape design, material selection and social equity aspects (respite/shelter areas).**	Refer to Section 4.3 of this report.

3. Project Drivers

The following section presents an overview of the applicable drivers for this project.

3.1 SEARS Requirements

DPIE has issued Secretary's Environmental Assessment Requirements (SEARs) for the proposed development. This report has been prepared having regard to the relevant SEARs as follows:

- Detail 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.
- Include a framework for how the future development will be designed to consider and reflect national best practice sustainable building principles to improve environmental performance and reduce ecological impact. This should be based on a materiality assessment and include waste reduction design measures, future proofing, use of sustainable and low-carbon materials, energy and water efficient design (including water sensitive urban design) and technology and use of renewable energy.
- Include preliminary consideration of building performance and mitigation of climate change, including **consideration of Green Star Performance**. Include an assessment against an accredited ESD rating system or an equivalent program of ESD performance. This should include a minimum rating scheme target level.
- Provide a statement regarding how the design of the future development is responsive to the CSIRO projected **impacts of climate change**, specifically:
  - hotter days and more frequent heatwave events
  - extended drought periods
  - more extreme rainfall events
  - gustier wind conditions
  - how these will inform landscape design, material selection and social equity aspects (respite/shelter areas).

3.2 NSW Environmental Planning and Assessment Regulation 2000

A requirement of the SEARs is to address ESD principles (as defined in clause 7(4) of Schedule 2 of the Environmental Planning and Assessment Regulation 2000) that will be incorporated in the design and ongoing operation phases of the development.

Schedule 2 7(4) of the Environmental Planning and Assessment Regulation 2000 states:

"The principles of ecologically sustainable development are as follows:

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

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

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

d) improved valuation, pricing and incentive mechanisms, namely, that environmental factors should be included in the valuation of assets and services, such as:
   (i) polluter pays, that is, those who generate pollution and waste should bear the cost of containment, avoidance or abatement,

(ii) the users of goods and services should pay prices based on the full life cycle of costs of providing goods and services, including the use of natural resources and assets and the ultimate disposal of any waste,

(iii) environmental goals, having been established, should be pursued in the most cost effective way, by establishing incentive structures, including market mechanisms, that enable those best placed to maximise benefits or minimise costs to develop their own solutions and responses to environmental problems."

3.3 NCC Section J – Energy Efficiency

The project will be required to demonstrate compliance with the new provisions outlined within NCC Section J 2019. NCC 2019 method represents a significant overhaul of the previous version of the NCC (2016) with significant amendments to Section J – energy efficiency provisions.

Section J outlines minimum performance requirements including,

- Maximum greenhouse gas emissions (GHG) levels;
- Minimum thermal envelope performance for building elements such as walls, floors, roof and external glazing;
- Treatment of thermal bridging across construction systems;
- Minimum performance requirements for building sealing;
- Maximum lighting power densities for internal lighting design;
- Minimum performance levels for building air-conditioning and ventilation systems;
- Minimum requirements for energy and water metering;
- Minimum requirements for energy and water data collection; and
- Minimum access for maintenance requirements.

The proposed new performance standards for Section J (2019) will increase the thermal performance requirements for code compliant façade designs, meaning consideration must be shown for exposed glazing included within the façade design.

4. Project Design Response

The following sections document the project's response to the ESD requirements outlined in the sections above. It is noted that several the ESD requirements are duplicated within the applicable drivers for this project and the responses below may apply to multiple requirements.

4.1 Principles of Ecologically Sustainable Design

In response to the expected SEARs requirements, the principles of ecologically sustainable development (as documented within the Environmental Planning and Assessment Regulation 2000 are defined within Section 2.3 above. The following provides a direct response to the specific principles a) through d) as follows:

The Precautionary Principle:

There are no threats of serious or irreversible environmental damage as a result of upgrading the SJG Richmond Hospital. The proposed new buildings are to be located on a previously developed sites within an established urban area. As the proposed development is not a greenfield project, the risk of creating environmental damage often associated with building on a greenfield site is considered low. No threatened or endangered species are located on the land due to the previous development of the site.

The proposed development is proposed to carry out predominantly the same use as the current building(s) on the site. Therefore, no serious or irreversible environmental damage is expected due to the operation of the proposed building. Supporting design such as stormwater management, sediment & erosion control, environmental management plan during construction shall all be implemented to ensure the precautionary principle for the proposed development is supported.

Inter-generational equity:

The proposed development conserves inter-generational equity through minimising the consumption of resources whilst providing both an education facility and workplace which will ensure the health and well-being of students, staff and visitors into the future. The project will ensure a lower demand for resources than a standard practice development by introducing several best practice energy and water conservation measures. These initiatives will conserve more resources for future generations, instead of their immediate consumption by the current generation.

As the site is already developed, the existing environment condition is unlikely to be significantly altered. The proposed development shall include new landscaping which will maintain pockets of planted environment like those currently present on the site.

All waste streams will be dealt with in ecologically safe methods; wastewater and stormwater will be plumbed to the sewers or stormwater drains as required by law. In addition, wastewater will be lower for this development compared with a standard practice development as low-flow fixtures and fittings will be used to reduce water consumption throughout the building. Existing services infrastructure upgrades will be documented & included within the project where relevant and connect to the existing major services infrastructure currently serving the site.

Conservation of biological diversity and ecological integrity:

There is limited biological diversity on the current site due to the property being previously developed. As such, the proposed upgrade will have very limited impact on the current level of biological diversity and ecological integrity.

The project will target an improvement in the conservation of resources in comparison to standard development practices. This means that the proposed development is likely to have a smaller gross biological and ecological footprint than other similar projects.

Energy conservation measures will reduce the project's demand for electricity and gas, which will slow or reduce the need for new energy infrastructure in the broader energy markets. This indirectly reduces the land required for new infrastructure, and the pollution caused by electricity generation.

Improved valuation, pricing and incentive mechanisms:

This project will integrate several initiatives which aim to minimise pollution and other undesirable environmental outcomes. Contractors will be requested to provide and abide by an Environmental Management Plan and Environmental Management System which are in accordance with NSW Environmental Management Systems Guidelines or a similar standard. This places a value on environmentally responsible building practices and places a form of “polluter pays” onto the contractors to ensure they are held responsible for the environmental management of the building site as they complete their work.

The Head Contractor shall be required to target 90% recycling of construction waste. This may have a greater financial cost to the project, however it provides a more accurate reflection of the full life cycle costs of the materials which were on the site, and the waste from the new materials as a result of the construction. The increased cost of recycling construction materials will also incentivise the purchase of less materials, thereby reducing over-ordering and material wastage.

The costs of producing the following pollution: sewage, landfill waste, and CO_2 emissions are partially borne by the project team and accounted for in the project’s sustainability initiatives. The project has voluntarily elected to:

- improve water consumption efficiency, thereby paying to reduce production of sewage;
- reduce energy consumption, which means solutions to reducing CO_2 emissions will be paid to be investigated during the design phase;
- recycle waste streams in the construction and operation of the project, which will cost more than standard practice where all material waste is directed to landfill.

4.2 Best Practice Sustainable Development Framework – "Green Star Design & As Built"

The SEARs call for the identification of a framework which reflects 'national best practice sustainable building principles' as a minimum performance requirement. **The project has been designed to a level that will enable the building to be benchmarked against an equivalent 4 Star Green Star building.**

4.2.1 Overview of Green Star Design and As Built Certification Process

Widely considered as the benchmark environmental assessment tool within the Australian Property Industry, Green Star is an independent accreditation framework which delivers sustainable built outcomes throughout the project lifecycle. Green Star is a credits-based star rating system ranging from one through to six stars.

Green Star assesses the environmental performance of projects in design, construction and operation via the following category frameworks:

- Management
- Indoor Environment Quality
- Energy
- Transport
- Water
- Materials
- Land use & Ecology
- Emissions; and
- Innovation

Each of the above categories have a varying number of "credits", each with their own respective requirements. Each credit is worth points, typically one. Complying with requirements of a credit will award the project the points assigned for that credit. To reach "National Best Practice", 45 points from the 100 available need to be achieved.

To demonstrate to the Green Building Council of Australia (GBCA) that the project has fulfilled the requirements of each credit, credit submission templates are infilled justifying how the projects design meets the criteria. The justification of each credit will refer to relevant evidence attached the appendix of each submission template.

For Green Star Design & As Built, it is recommended but not mandatory to submit a Design Review submission to the GBCA. This is usually completed when the building has been designed but not built to ensure the GBCA accept the design to be compliant with all the credits targeted. After practical completion, a mandatory submission must be packaged and sent to the GBCA proving that the project, at an "As Built" state, has complied with all the requirements of the targeted credits.

Design for this project commenced in 2019. Given the timelines for the project, the evaluation tool most suited to this project is the "Green Star Design & As Built v1.3" tool. This tool has been developed for new buildings and major refurbishments and aligns with the project's NCC 2019 Section J requirement.

4.2.2 Overview of the Alternative ESD Certification Methodology

The Alternative ESD Framework is not dissimilar to the Green Star Design & As Built v1.3 framework. All credits requirements will remain identical to GS DAB v1.3.

Since the alternative ESD framework mimics Green Star Design & As Built v1.3, a minimum of 45 points will need to be achieved to demonstrate "National Best Practice". The current design is in line with the pathway can be seen attached within Appendix A, demonstrating 51 points.

The only distinguishable step between a Certified Green Star Rating and the desired approach for SJOG is that the 'As Built' package will be assessed by a Green Star Accredited Professional rather than a Green Star Assessor. The design would not be assessed by the GBCA rather an external review of an 'As Built' package will be carried out by a reputable third party Ecological Sustainable Design team consisting of Green Star Accredited Professionals (GSAP). This third party ESD team will then issue a statement of compliance explaining that the project is an example of Green Star Design & As Built v1.3 4 Star equivalency, representing national best practice.

This is the same approach that many other state significant developments have taken particularly Health Infrastructure and Schools Infrastructure NSW.

Credit submissions would not use Green Star Submission Templates as the face of each bundled credit. They would simply justify how the design has achieved the requirements of the credit while referencing respective evidence within the appendix of the same pdf. This is to prevent abuse of intellectual property from the Green Building Council of Australia.

To further bolster the legitimacy of the design, the SJOG project will ensure all design disciplines provide a statement of compliance confirming the design they have provided is in line with the requirements of the credit(s) their respective discipline is responsible for. Similarly, each contractor will provide a statement of compliance confirming that their works are both in line with the design and the sustainability specification. These statements of compliance are beyond the scope of a Certified Green Star Rating.

Please see the table below which compares a Certified Green Star Design & As Built v1.3 compliance pathway against the proposed approach for SJOG.

Table 1 - Comparison between Certified Green Star compliance and SJOG GS Equivalency Approach

Step in process	**Method**		
	GS DAB method	*SINSW and HI preapproved method*	*SJOG Alternative Approach*
Feasibility Assessment	x	x	x
Design Integration	x	x	x
Collation of information from each design discipline	x	x	x
As Built Package	x	x	x
- Independently reviewed GSAP		x	x
- Independently reviewed by Green Star Assessor	x		
- Designers and Contractors statement of compliance			x

A Green Star analysis and matrix demonstrating the projects' ability to achieve the minimum 4 Star Green Star performance outcome is included in **Appendix A** of this report.

4.3 Projected Impacts of Climate Change

In response to the expected SEARs requirements, an assessment of project risks associated with the predicted impacts of Climate Change has been undertaken for the proposed development. The assessment has been undertaken to ensure the project design allows for suitable provisions for the predicted impact of climate change scenarios.

The project design team has conducted a site-specific analysis of the likely scenarios which represent the most significant projected impacts of climate change. The assessment is summarised within the table below inclusive of specific categories as defined within expected SEARs.

The assessment has been undertaken in accordance with CSIRO and Australian Bureau of Meteorology data.

The table below summarises the projected impacts of climate change across two scenarios (RCP4.5 and RCP8.5*): the near future 2020-2039 (referred to 2030) and far future 2080-2099 (referred to 2090). These projections are generalised for the 'East Coast (South) Cluster' region as defined by the CSIRO and BOM (2015) and is taken as the most representative of the proposed site's future climate-change enhanced conditions in Sydney.

*Representative Conservation Pathway – 4.5 represents normalised emission levels. 8.5 represents worst case scenario based upon 2005 emissions trends.

Climate Variable	Climate Projections (change relative to 1986 – 2005 baseline)			
	2030		2090	
	RCP4.5	RCP8.5	RCP4.5	RCP8.5
Mean temperature change (°C)	0.9 (0.6 to 1.1)	1.0 (0.7 to 1.3)	1.8 (1.3 to 2.5)	3.7 (2.9 to 4.6)
Extreme temperature (days per year over 35°C)	7.21	7.82	11.12	19.84
	Substantial increase in intensity and frequency of extreme temperature days			
Mean annual rainfall change (%)	-3 (-10 to 6)	-1 (-11 to 6)	-2 (-16 to 9)	-3 (-20 to 16)
Extreme rainfall	Extreme rainfall events to increase in intensity			
Drought	Time spent in drought conditions to increase			
Bushfire weather (Number of severe fire danger days; FFDA > 50)	Severity of fire-weather climate to increase			
Solar radiation (%)	0.5 (-0.5 to 1.9)	0.8 (-0.7 to 2.7)	1.5 (-0.3 to 3.7)	1.3 (-1.2 to 3.4)
Relative humidity (%, absolute)	-0.5 (-1.6 to 0.8)	-0.6 (-1.4 to 0.9)	-1.0 (-3.1 to 0.3)	-1.5 (-3.8 to 1.3)
Wind Speed (%)	-1.1 (-2.9 to 0.5)	-0.5 (-2.3 to 1.9)	-1.0 (-4.2 to 0.2)	-1.1 (-6.9 to 4.2)
Sea level rise (m)	0.13 (0.09 to 0.18)	0.14 (0.10 to 0.19)	0.47 (0.30 to 0.65)	0.66 (0.45 to 0.88)

Table 1: Summary of Climate Change Projects (CSIRO, 2015)

4.3.1 Summary of major impacts assessment:

Mean & Extreme Temperature

With very high confidence, air temperatures are projected to increase due to continued substantial warming from a mean warming of around 0.4 to 1.3°C by 2030 relative to the climate of 1986-2005 with minor difference between RCPs up to 1.3 to 2.5°C under RCP4.5 and 2.7 to 4.7°C under RCP8.5 by 2090 (CSIRO and BOM, 2015). This projection is in line with the current rising trend of local mean temperatures which has resulted in Year 2019 being Australia's warmest year on record (Bureau of Meteorology, 2020b).

Because of rising temperatures, peak temperature events will become more frequent whereby the number of days above 35°C are expected to double under RCP4.5 and nearly triple under RCP8.5 by 2090 (CSIRO and BOM, 2015).

In response to the above, the project design seeks to ensure the passive thermal design elements are fundamentally sound ensuring that average daily temperature and peak extreme temperature days are managed as best as possible. External shading, glazing design, HVAC and natural ventilation shall all be fundamentally proven to ensure the proposed project design responds appropriately to the projected risks of climate change.

Drought & Bushfire weather

The frequency and duration of harsher fire-weather climate and drought events could possibly increase under RCP8.5 but will be heavily dictated by the amount of rainfall events (CSIRO and BOM, 2015). With Year 2019 being Australia's driest year on record since 1900 (Bureau of Meteorology, 2020b), droughts & bushfire events are anticipated to become more frequent, even under RCP4.5, based on the amount of annual rainfalls received over the recent years as described in Section 3.2.

In response to the above, the project is seeking to reduce the amount of potable water use within the development to minimise stress on potable water supplies. The project will also be using a waterless heat rejection system to further reduce consumption.

Extreme rainfall and storms

Heavy rainfall events are expected to intensify, however, the magnitude of change and the time when any change may be evident against natural variability cannot be reliably estimated (CSIRO and BOM, 2015).

Wind speeds along the East Coast South region is expected to remain the same under all RCPs by 2030 and may decrease during the winter period by 2090 under RCP8.5. According to global and regional studies, tropical cyclones are foreseen to become less frequent but with increases in the proportion of the most intense storms (CSIRO and BOM, 2015).

The project seeks to provide rainwater collection to assist in reducing rainwater runoff from the site to minimise impacts on existing infrastructure and reduce the possibility of flooding. In addition, the project's WSUD system will be designed to cope with extreme rainfall events.

4.4 NCC 2019 Section J

The project is subject to the new provisions outlined within NCC Section J 2019.

The proposed new performance standards for NCC Section J will increase the thermal performance requirements for code compliant façade designs, meaning consideration must be shown for exposed glazing included within the façade design. Glazing thermal performance, solar control, visible light transmittance and inclusion of appropriate shading features within the design response must be considered in accordance with the increased performance requirements of NCC Section J 2019.

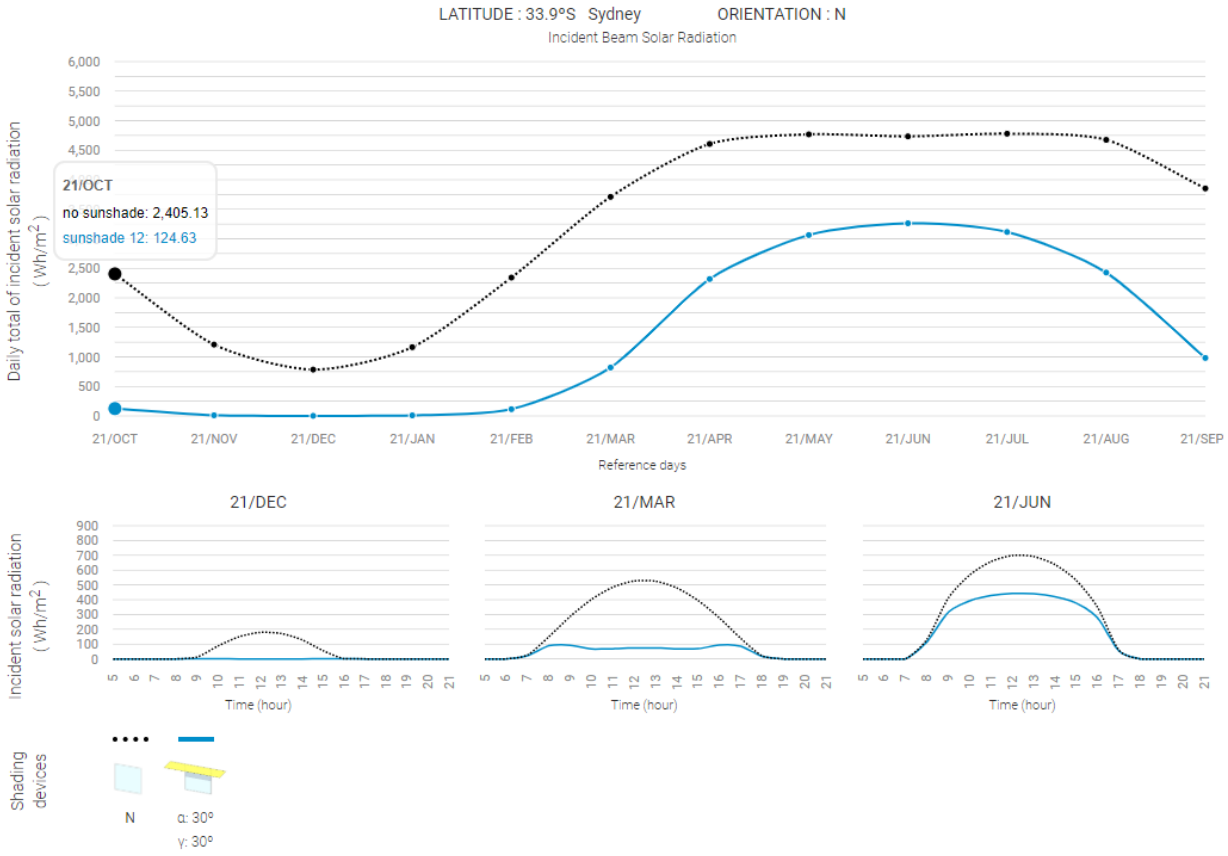
The proposed development will seek to optimise energy efficiency & thermal performance to comply with Section J 2019 via design external façade design elements which improve the building passive thermal performance (i.e. fixed external shading, insulated façade elements, etc.).

In addition to the above, thermal comfort modelling will be included to demonstrate compliance with the new NCC 2019 code, with a minimum performance of -1.0 < PMV <1.0 in each mechanically conditioned zone. The design of the building fabric will demonstrate compliance with this clause through dynamic modelling of the building against a reference case.

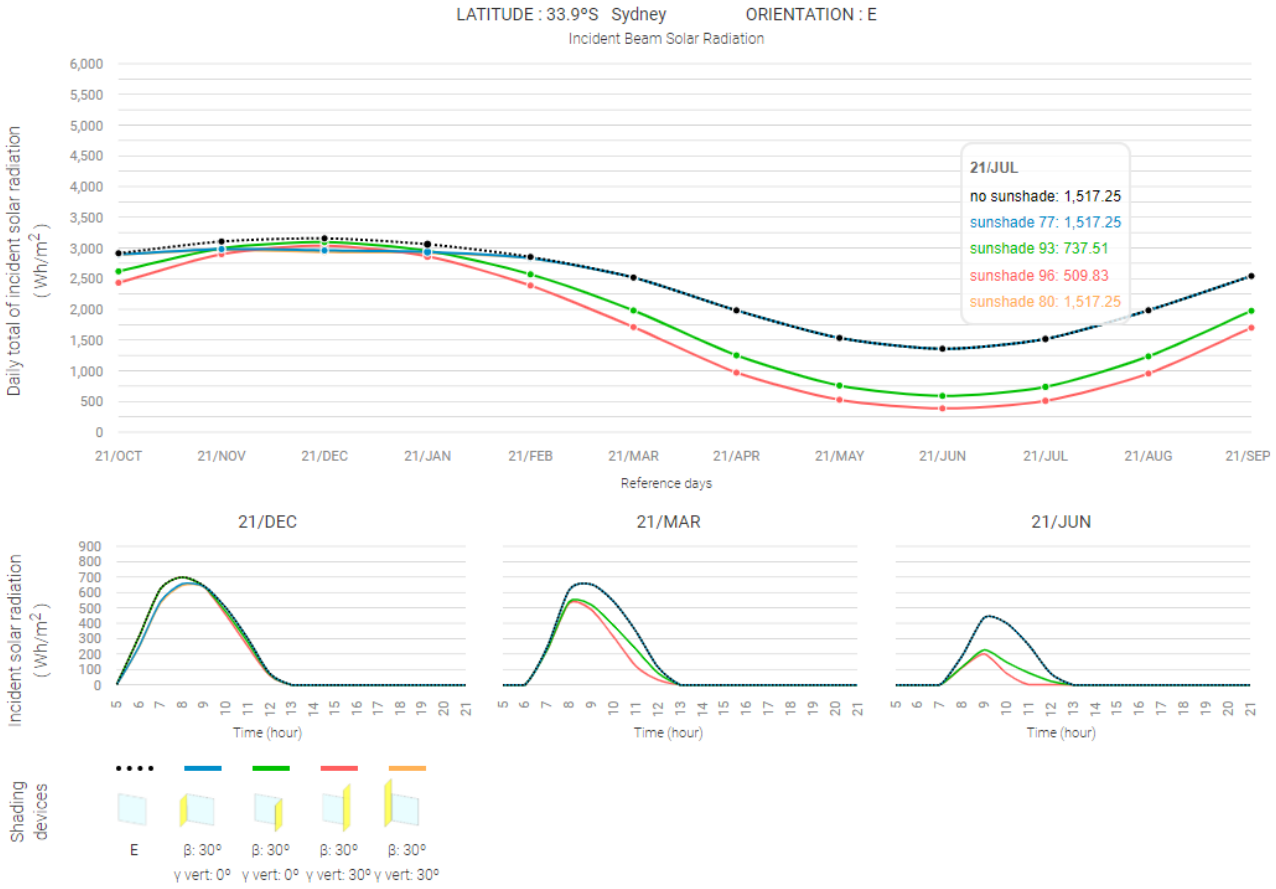
Shading

The proposed design is inclusive of externally recessed windows on all facades. This recess acts as a shading device to prevent solar radiation gain within the space to minimise cooling loads on the HVAC system. The proposed shading will have a significant impact on the overall energy performance of the building in association with the predicted climatic changes as documented within Section 4.3 above.

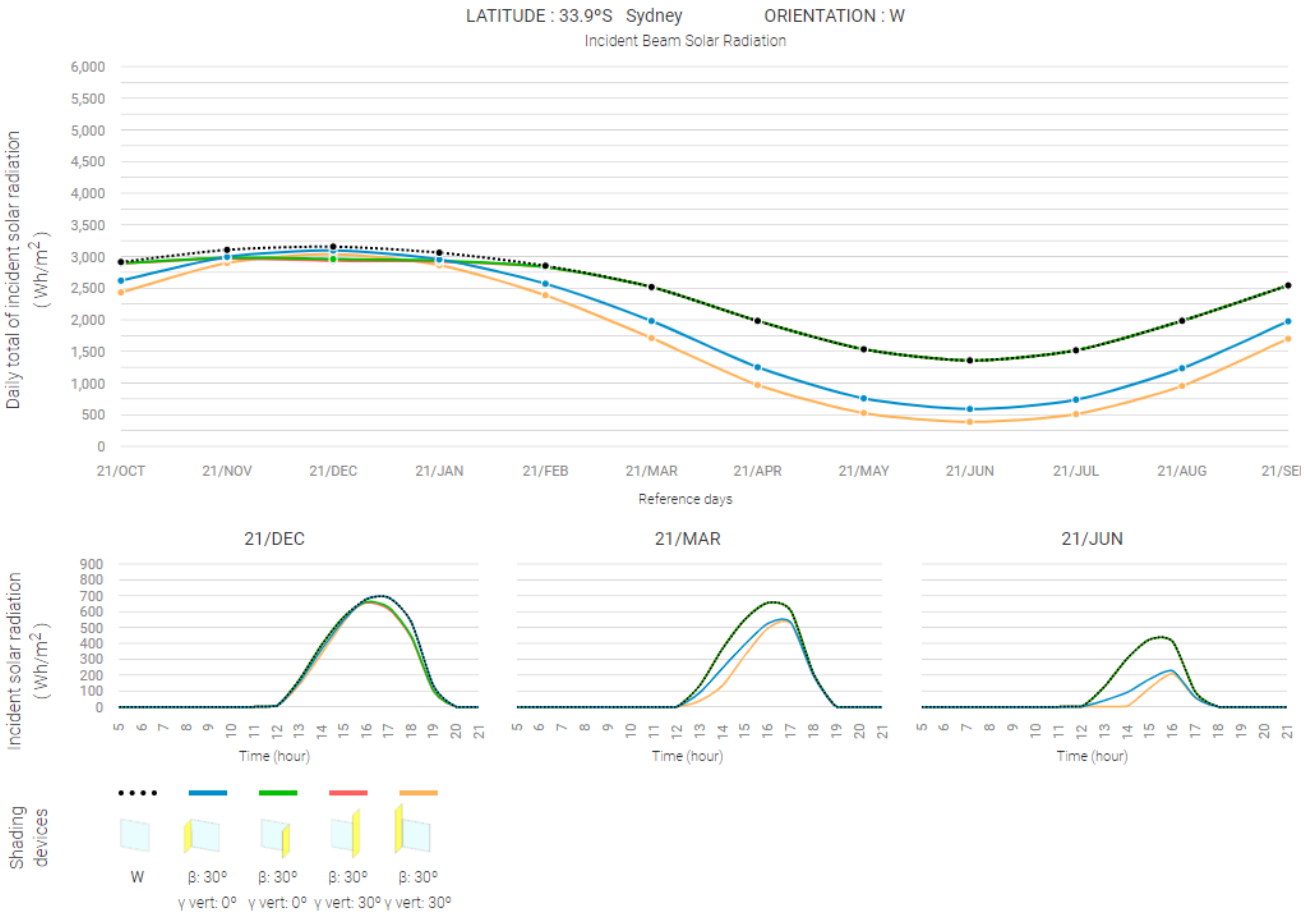
- Horizontal sunshades to the northern elevation:
  Direct solar incidence on the northern windows are observed as the blue profile. This represents an ideal shading orientation for the northern facade with a significant reduction in direct solar radiation in spring to summer and a slight reduction in autumn to winter.



- Vertical sunshades to the east elevation:
  Direct solar incidence on the eastern windows are observed as the different coloured profiles. The blue profile represents a vertical the fin to the left of the window when looking east through the window. This profile represents an ideal location on the eastern facade with a marginal reduction in direct solar radiation in summer, and nil reduction in winter.



- Vertical sunshades to the west elevation:
  Direct solar incidence on the western windows are observed as the different coloured profiles. The green profile represents a vertical the fin to the right of the window when looking west through the window. This profile represents an ideal location on the western facade with a marginal reduction in direct solar radiation in summer, and nil reduction in winter.



Performance Requirements

NCC Section J – energy efficiency provisions will apply to the design & construction of the development with the intent to ensure the built form and associated building services demonstrate a level of energy efficiency performance.

The proposed building fabric will likely require the following values in order to comply with Section J Deemed-to-Satisfy requirements:

Table 2 - New Built fabric thermal performance requirements.

Building Envelope Element	Minimum Effective Total R-value	Solar Absorptance
All New Built Roof	**R_T 3.2**	0.45 or less
External Walls	**For Class 9a – Wards Areas = R_T 1.4** **For Class 9b Area = R_T 1.0 – 1.4** **For Class 5 Area = R_T 1.0 – 1.4**	0.60 average or less
Internal Walls	**R_T = 1.4**	NA
Ground Floor Slab on ground	**No minimum requirement**	NA

Final details with regards to the above shall be defined within the detailed design issue report following development application approval. A detailed NCC Section JV3 report shall be provided in association with the project detailed design demonstrating compliance with the provisions of the NCC Section J energy efficiency.

5. Summary

Ecologically Sustainable Design is a driving consideration in the development of the proposed St John of God Hospital located at 177 Grose Vale Rd, North Richmond, NSW, 2754. As described within the report above, the project will incorporate several ESD and environmentally conscious initiatives in both design and operation aimed at ensuring the principles of sustainable development are both demonstrated and achieved in accordance with the project drivers.

The development's commitment to reducing the overall environmental impact is evident of the holistic approach taken to long-term sustainability. Documented initiatives cover a range of categories including:

- Secretary's Environmental Assessment Requirements (SEARs) for the proposed development;
    - Including a description of the approach to demonstrate equivalency to an accredited ESD rating system.
- NCC 2019 Section J;

The building has been designed to a level that the building could be benchmarked to achieve a 4 Star Green Star Design & As Built v1.3 rating.

We trust this Ecologically Sustainable Development report provides enough overview of the project commitment to environmentally sustainable design and the sustainability vision for the proposed St John of God Richmond Hospital project.

Appendix A Green Star Equivalency Credit Schedule

Green Star - Design & As Built Scorecard

Project:	SJOG Richmond Hospital
Targeted Rating:	4 Star - Best Practice 44634

REV: 15.08.22

Core Points Available	Total Score Targeted
98	51

NA	CATEGORY / CREDIT	AIM OF THE CREDIT / SELECTION	CODE	CREDIT CRITERIA		POINTS AVAILABLE	CURRENT DESIGN POINTS TARGETED	Comments
	Management					14		
	Green Star Accredited Professional	To recognise the appointment and active involvement of a Green Star Accredited Professional in order to ensure that the rating tool is applied effectively and as intended.	1.1	Accredited Professional		1	1	ESD consultant involvement achieves point. Stantec GSAP engaged throughout design stage.
	Commissioning and Tuning	To encourage and recognise commissioning, handover and tuning initiatives that ensure all building services operate to their full potential.	2.0	Environmental Performance Targets		-	Complies	Environmental Performance targets (e.g. concerning the project's energy and water consumption targets). Design team shall develop design intent report after tender to describe building services, main components, intended operations, maintenance requirements, metering strategy and other related information.
			2.1	Services and Maintainability Review		1	1	Requires a series of workshops led by ICA and Contractor, with services designers prior to construction commencement. Produce a Service and Maintainability Report for updated design and close out open items from original report
			2.2	Building Commissioning		1		
			2.3	Building Systems Tuning		1	1	Contractual commitment by building Owner & Head Contractor to undertake 12 month post occupancy building systems tuning period including quarterly adjustments. Building Tuning Manual/Plan to be developed by Head Contractor. Commissioning, re-commissioning, tuning & checking to be undertaken by Head Contractor & subcontractors.
			2.4	Independent Commissioning Agent		1		
	Adaptation and Resilience	To encourage and recognise projects that are resilient to the impacts of a changing climate and natural disasters.	3.1	Implementation of a Climate Adaptation Plan		2	2	ESD to prepare a Climate Change Adaptation Plan to summarise key risks to ensure high and extreme risks are captured in the design. Head Contractor to review CCAP and implement critical recommendations as relevant
	Building Information	To recognise the development and provision of building information that facilitates understanding of a building's systems, operation and maintenance requirements, and environmental targets to enable the optimised performance.	4.1	Building Information		1	1	Building Log Book, Building Users Guide and O&M manuals to be developed by Head Contracto in line with Green Star requirements. Building information to be provided in digital format such as training matieral, phone application, website etc.
	Commitment to Performance	To recognise practices that encourage building owners, building occupants and facilities management teams to set targets and monitor environmental performance in a collaborative way.	5.1	Environmental Building Performance		1	1	Requires formally commit to setting/monitoring/reporting of at least 2 environmental targets for the facility in operation: - Greenhouse gas emissions (energy consumption); - Water usage; - Operational waste; - Indoor environment quality. Head Contractor to ensure Metering & monitoring infrastructure is installed to enable monitoring of these targets.
			5.2	End of Life Waste Performance	A. Contractual Agreements	1	1	Owner Operator - commitment letter to satisfy
	Metering and Monitoring	To recognise the implementation of effective energy and water metering and monitoring systems.	6.0	Metering		-	Complies	
			6.1	Monitoring Systems		1		
	Responsible Construction Practices	To reward projects that use best practice formal environmental management procedures during construction.	7.0	Environmental Management Plan		-	Complies	Head contractor to provide & implement a project specific Environmental Management Plan as outlined in accordance with NSW Environmental Management Systems Guidelines.
			7.1	Environmental Management System		1	1	The head contractor must provide a formal audited Environmental Management System for the project against ISO 14001
			7.2	High Quality Staff Support		1	1	Contractor to implement beyond standard health and wellbeing plan for the project. This includes staff induction on sustainable building certification pursued.
	Operational Waste	A. Performance Pathway	8A	Performance Pathway: Specialist Plan		1		Operational Waste Management Plan to be provided and followed.
			8B	Prescriptive Pathway: Facilities		0	1	
	Total					14	11	

Indoor Environment Quality							
					17		
Indoor Air Quality	To recognise projects that provide high air quality to occupants.	9.1	Ventilation System Attributes		1	1	Already included into Mechnanical design
		9.2	Provision of Outdoor Air	☐ A. Comparison to Industry Standards ☐ B. Performance Based Approach ☐ C. Natural Ventilation	2		
		9.3	Exhaust or Elimination of Pollutants	☑ A. Removing the Source of Pollutants ☑ B. Exhausting the Pollutants Directly to th	1	1	Exhaust systems are provided and physically separated from supply air. No recycled air. Any printers or medical equipment that sheds pollutants to be in a separate room with an individual exhaust fan.
Acoustic Comfort	To reward projects that provide appropriate and comfortable acoustic conditions for occupants.	10.1	Internal Noise Levels		1	1	Standard acoustic design in line with AS2107.
		10.2	Reverberation		1		
		10.3	Acoustic Separation	B. Sound Insulation	1		Need to be full height walls in meeting rooms
Lighting Comfort	To encourage and recognise well-lit spaces that provide a high degree of comfort to users.	11.0	Minimum Lighting Comfort		-	Complies	All lighting in the building to be flicker free with CRI > 80 AND comply with the following: - Min class A1 & A2 ballast for all fluorescent lighting - Electronic ballasts for all High intensity discharge (HID) lighting - Electronic drivers with 12 bit or greater resolution for LED lights
		11.1 General Illuminance and Glare Reduction	11.1.1 General Illuminance	☑ A. Non Residential Spaces ☐ B. Residential Spaces	1	1	Internal lightings to meet best practice lighting levels and uniformity per AS/NZS 1680.2 and comply with Unified Glare Rating limits through calculations for glare control.
			11.1.2 Glare Reduction	☑ A. Prescriptive Method 1 ☐ B. Prescriptive Method 2 ☐ C. Performance Method			
		11.2	Surface Illuminance	☐ A. Prescriptive Method ☐ B. Performance Method ☐ C. Residential Spaces (Prescriptive Meth	1		Gimble downlight fittings can be provided to rooms, covers off most primary spaces. Not appropriate for mental health facility.
		11.3	Localised Lighting Control		1	1	Ok due to building typology
Visual Comfort	To recognise the delivery of well-lit spaces that provide high levels of visual comfort to building occupants.	12.0	Glare Reduction	☑ A. Fixed Shading Devices ☑ B. Blinds or Screens ☐ C. Daylight Glare Model	-	Does not comply	
		12.1	Daylight	☐ A. Prescriptive Methodology ☑ B. Compliance Using Daylight Factor ☐ C. Compliance Using Daylight Autonomy	2	1	No modelling done for this yet, educated guess
		12.2	Views		1	1	No modelling done for this yet, educated guess
Indoor Pollutants	To recognise projects that safeguard occupant health through the reduction in internal air pollutant levels.	13.1 Paints, Adhesives, Sealants and Carpets	13.1.1 Paints, Adhesives and Sealants	☑ A. Product Certification ☐ B. Laboratory Testing ☐ C. No Paints, Adhesives or Sealants	1	1	Rigourous materials tracking required. All sub-contractors to ensure compliance and recommended to report monthly
			13.1.2 Carpets	☑ A. Product Certification ☐ B. Laboratory Testing ☐ C. No Carpets			
		13.2	Engineered Wood Products	☑ A. Product Certification ☐ B. Laboratory Testing	1	1	Rigourous materials tracking required. All sub-contractors to ensure compliance and recommended to report monthly
Thermal Comfort	To encourage and recognise projects that achieve high levels of thermal comfort.	14.1	Thermal Comfort	☐ A. Naturally Ventilated Spaces ☐ B. Mechanically Ventilated Spaces ☐ C. Residential Spaces	1	1	Mech systems should be capable of providing PMV +/- 1 for majority of time/space - use the NCC 2019 Section J modelling to prove this
		14.2	Advanced Thermal Comfort	☐ A. Naturally Ventilated Spaces ☐ B. Mechanically Ventilated Spaces ☐ C. Residential Spaces	1		Mech systems should be capable of providing PMV +/- 0.5 for majority of time/space - Based on the current proposed mechanical systems and NCC 2019 compliant façade systems, it would be anticipated this could be achieved through modelling
Total					17	10	

Energy							
					22		
Greenhouse Gas Emissions	E. Reference Building Pathway	15E.0	Conditional Requirement: Reference Building Pathway		-	Complies	
		15E.1	GHG Emissions Reduction: Building Fabric		4		
		15E.2	GHG Emissions Reduction		16	6	SEARS requires use of renewable energy.Proposed 200 kW system to be installed
		15E.3	Off-Site Renewables		8		
		15E.4	District Services		7		
		15E.5 Additional Prescriptive Measures	15E.5.1 Transition Plan		1		Requires a future feasible design to go to all-electric (not currently feasible)
			15E.5.2 Fuel Switching		2		Requires all-electric
			15E.5.3 On-Site Storage		1		
Peak Electricity Demand Reduction	B. Performance Pathway	16A	Prescriptive Pathway: On-Site Energy Generation		0		
		16B	Modelled Performance Pathway: Reference Building		2	2	Relies on 200 kW Solar System
Total					22	8	

Transport							
					9		
Sustainable Transport	B. Prescriptive Pathway	17A	Performance Pathway		0	0	
		17B.1	Access by Public Transport		3		
		17B.2	Reduced Car Parking Provision		1		
		17B.3	Low Emission Vehicle Infrastructure	A. Parking for Fuel-Efficient Vehicles	0		
		17B.4	Active Transport Facilities		1		
		17B.5	Walkable Neighbourhoods	A. Proximity to Amenities	1		
Total					6	0	

Water							
					12		
Potable Water	B. Prescriptive Pathway	18A	Potable Water - Performance Pathway		0		
		18B.1	Sanitary Fixture Efficiency		1	1	WELS Ratings: Taps 5 Star, Urinals 5 Star, Toilet 4 Star, Showers 3 Star (> 4.5 but <= 6.0), Clothes Washing Machines 4 Star, Dishwashers 5 Star
		18B.2	Rainwater Reuse		1		
		18B.3	Heat Rejection		2	2	All mechanical systems to be air cooled
		18B.4	Landscape Irrigation		1	1	Landscape to be irrigated via non-potable water
		18B.5	Fire Protection System Test Water		1		
Total					6	4	

Materials							
					14		
Life Cycle Impacts	B. Prescriptive Pathway - Life Cycle Impacts	19A.1	Comparative Life Cycle Assessment		0		
		19A.2	Additional Reporting	☐ A. Additional Life Cycle Impact Reporting ☐ B. Material Selection Improvement ☐ C. Construction Process Improvement ☐ D. LCA Design Review	0		
		19B.1 Concrete	19B.1.1 Portland Cement Reduction		2	1	Discussion required with structural team to determine if non-cementitous replacements can be added. Can effect lead times.
			19B.1.2 Water Reduction		0.5	0.5	Discussion required with structural team to determine if the mix water for all concrete used in the project can contain at least 50% captured or reclaimed water
			19B.1.3 Aggregates Reduction	A. Course Aggregate Reduction	0.5	0.5	At least 40% of coarse aggregate in the concrete is crushed slag aggregate or another alternative material OR . At least 25% of fine aggregate (sand) inputs in the concrete are manufactured sand or other alternative materials
		19B.2 Steel	A. Reduced Mass of Steel Framing	B. Reduction in Mass	1		
		19B.3	Building Reuse	19B.3.1 Façade Reuse	2		
				19B.3.2 Structure Reuse	2		
		19B.4	Structural Timber	19B.4.0 Responsible Sourcing	-		
				19B.4.1 Reduced Embodied Impacts	3		
Responsible Building Materials	To reward projects that include materials that are responsibly sourced or have a sustainable supply chain.	20.1	Structural and Reinforcing Steel	20.1.0 Responsible Steel Maker	-	Complies	At least 95% of steel to be sourced from a responsible steel maker
				B. Energy-Reducing Processes in Steel Reinforcement Production	1	1	Target to achieve through contract requirement to have all steel sourced from responsible steel manufacturer, and energy reducing techniques. Generally achievable for concrete frames buildings if steel maker complies
		20.2	Timber	☐ A. Certified Timber ☐ B. Reused Timber	1		
		20.3	Permanent Formwork, Pipes, Flooring, Blinds and Cables	B. Best Practice Guidelines for PVC	1	1	Typically BAU for all PVC-typical products in the current market.
Sustainable Products	To encourage sustainability and transparency in product specification.	21.1	Product Transparency and Sustainability	☐ A. Reused Products ☐ B. Recycled Content Products ☑ C. Environmental Product Declarations (☑ D. Third Party Certification ☐ E. Stewardship Programs	3	1	Target 3% (1 point), 6% (2 points), 9% (3 points) of material cost in construction having a product transparency certificate (i.e. EPD) can be achieved through product specifications that emphasise use of sustainable certified products for major construction cost items including: - Steel with Environmental Product Declarations (EPDs) - Liberty Primary Steel, Bluescope, Australian Reinforcing Company, Infrabuild - Concrete with EPDs - Boral - Paints with EPDs (e.g. Dulux) - Plasterboard with Eco Certification - Knauf/Gyprock specific products - Joinery/Partitions with Eco Certification (GreenTag) - laminex specific products - Carpets with EPD (e.g. Interface, Feltex)
Construction and Demolition Waste	B. Percentage Benchmark	22.0	Reporting Accuracy	A. Compliance Verification Summary	-	Complies	
		22A	Fixed Benchmark		0		
		22B	Percentage Benchmark		1	1	
Total					12	6	

Land Use & Ecology							
					5		
Ecological Value	To reward projects that improve the ecological value of their site.	23.0	Endangered, Threatened or Vulnerable Species	A. EPBC	-	Complies	
		23.1	Ecological Value		3		
Sustainable Sites	To reward projects that choose to develop sites that have limited ecological value, re-use previously developed land and remediate contaminate land.	24.0	Conditional Requirement		-	Complies	
		24.1	Reuse of Land	A. Previously Developed Land	1		
		24.2	Contamination and Hazardous Materials	☐ A. Site Contamination ☐ B. Hazardous Materials	0		
Heat Island Effect	To encourage and recognise projects that reduce the contribution of the project site to the heat island effect.	25.1	Heat Island Effect Reduction		1	1	New Buildings to have painted in a light colour with a solar reflective index > 82. Stantec recommends Dulux - Surfmist. Vegetation may covers 75% of the site
Total					5	1	

Emissions					5		
Stormwater	To reward projects that minimise peak stormwater flows and reduce pollutants entering public sewer infrastructure.	26.1	Stormwater Peak Discharge		1	1	Post development peak discharge does not exceed Pre development scenario.
		26.2	Stormwater Pollution Targets		1	1	Pollution reduction modelling depicts percentages currently in line with Column A, justifying 1 point
Light Pollution	To reward projects that minimise light pollution.	27.0	Light Pollution to Neighbouring Bodies		-	Complies	Illuminance calculations are required demonstrating the building complies with AS 4282:1997
		27.1	Light Pollution to Night Sky	A. Control of Upward Light Output Ratio (ULOR)	1	1	Control of Direct Illuminance Calculations are required demonstrating compliance. Ensure hoods on all exterior lighting.
Microbial Control	To recognise projects that implement systems to minimise the impacts associated with harmful microbes in building systems.	28	Legionella Impacts from Cooling Systems	B. Waterless Heat Rejection Systems	1	1	All mechanical designs do not include cooling towers
Refrigerant Impacts	To encourage operational practices that minimise the environmental impacts of refrigeration equipment.	29.1	Refrigerants Impacts	C. Low Impact Refrigerants	1		
Total					5	4	

Innovation					10		
Innovative Technology or Process	The project meets the aims of an existing credit using a technology or process that is considered innovative in Australia or the world.	30A	Innovative Technology or Process				
Market Transformation	The project has undertaken a sustainability initiative that substantially contributes to the broader market transformation towards sustainable development in Australia or in the world.	30B	Market Transformation				
Improving on Green Star Benchmarks	The project has achieved full points in a Green Star credit and demonstrates a substantial improvement on the benchmark required to achieve full points.	30C	Improving on Green Star Benchmarks		10	1	- Ultra Low VOC Paints
Innovation Challenge	Where the project addresses an sustainability issue not included within any of the Credits in the existing Green Star rating tools.	30D	Innovation Challenge			3	- High Performance Site office - Contractor Education - Culture, Heritage and Identity
Global Sustainability	Project teams may adopt an approved credit from a Global Green Building Rating tool that addresses a sustainability issue that is currently outside the scope of this Green Star rating tools.	30E	Global Sustainability			2	*- Green Cleaning - Quality of Amenities
Total					10	6	

TOTALS	AVAILABLE	CURRENT DESIGN POINTS TARGETED
CORE POINTS	98	44.0
CATEGORY PERCENTAGE SCORE		44.9
INNOVATION POINTS	10	6.0
TOTAL SCORE TARGETED		50.9

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