



ESD Development Approval Report

19 December 2019
Version 3

Project: QPRC Head Office and Smart Hub
Client: Queanbeyan-Palerang Regional Council (QPRC)

Document Control					
Version	Date	Author		Reviewer	
		Name	Initials	Name	Initials
1	12-August-2019	Jovana Klikovac	JK	Jonathan Dalton	JD
2	16-August-2019	Jovana Klikovac	JK	Jonathan Dalton	JD
3	19-December-2019	Jovana Klikovac	JK	Jonathan Dalton	JD

© Viridis Australasia Pty Ltd, 2019 All Rights Reserved. No part of the content of this document may be used, sold, transferred, copied, published or reproduced in any manner without the prior written consent of Viridis Australasia Pty Ltd.

This document is produced by Viridis Australasia Pty Ltd solely for the benefit of and use by the client. Viridis Australasia Pty Ltd does not accept any liability whatsoever to any third party arising out of any use or reliance by any third party on the content of this document.

This document is made available to the recipient on the express understanding that the information contained in it be regarded and treated by the recipient as strictly confidential. The content of this document is intended only for the sole use of the recipient and should not be disclosed or furnished to any other person.

Table of Contents

1	Executive Summary	2
2	Project Overview	4
2.1	Council's Sustainable Vision	4
2.2	Development Description	4
2.3	Development Summary	4
3	Sustainable Building Certification Schemes	6
3.1	Green Star	6
3.2	NABERS	7
4	QPRC Sustainable Development Principles	8
4.1	Principle 01.1: Reduced energy consumption	9
4.2	Principle 01.2: Reduced water use	10
4.3	Principle 01.3: Reduced waste	11
4.4	Principle 02: Reduced on-going operating and maintenance costs	12
4.5	Principle 03: Demonstrating community leadership in implementing renewable energy and passive solar design	13
4.6	Principle 04: Using alternative water sources and improving stormwater water quality	14
4.7	Principle 05: Better occupant health and comfort	15
4.8	Principle 06: Continued Council growth and development with reduced environmental footprint	16
4.9	Principle 07: Increased staff and community awareness of sustainability	17
4.10	Other ESD Principles	18
5	Green Star Pathway	19
	Appendix 1: Green Star Credit Strategy	20

1 Executive Summary

This Ecologically Sustainable Development (ESD) report has been prepared as part of the Development Application for the proposed development QPRC Head Office and Smart Hub (HOSH), located within the Crawford / Lowe Street area, on 257 Crawford St, Queanbeyan.

The developer and design team have incorporated ESD initiatives into the fundamental development of the project design and are targeting these principles through to construction and operation of the development to achieve the sustainable outcomes required to minimise consumption of Queanbeyan's precious resources, create a healthy environment for building users, a hub for community activity, and a sustainable development appropriate for the Queanbeyan environment.

This report reflects the aspirations of the applicant relating to ESD initiatives. The sustainability ratings and ESD initiatives targeted in this report may be subject to review and evaluation during the detailed design phase.

The key sustainability initiatives included in the design are summarised in the table below:

Sustainable Development Principles	Targeted Project Initiatives
1.1 Reduced energy consumption	• 5-star NABERS Energy Commitment Agreement (meaning targeting close to 5.5-star performance); • NCC 2019 Section J compliance; • Environmental performance targets; • Performance glazing and facade materials, external fixed shading; • Highly efficient building systems and plant (in particularly for Office part of the building); • LED lighting with intelligent control; • Optimised control through Building Management System (BMS);
1.2. Reduced water use	• Highly efficient fittings and fixtures combined efficient irrigation system and minimisation of fire test water expelling to reduce potable water consumption. Rainwater capture and reuse for flushing and irrigation advised; • Water metering and monitoring of all major water uses, to better control water consumption and detect possible leaks.
1.3. Reduced waste	• Project specific Waste Management Plan (WMP) to be followed; • Minimum 90% of all demolition and construction waste to be diverted from landfill; • Provision of sorting and storage areas for operational waste and convenient access for waste vehicles.
2. Reduced on-going operating and maintenance cost	• Low energy passive fixed external shading and high performance façade to reduce heat loads; • Explore use of photovoltaics to reduce peak energy and running costs for owner and tenants; • Full commissioning and commissioning management process to be undertaken in design and construction, and 12-month building tuning period after completion to ensure systems operate efficiently and as designed in all seasons.
3. Demonstrating community leadership in implementing renewable energy and passive solar design	• Explore use of photovoltaics to demonstrate community leadership; • Showcase passive solar design solutions incorporated into the design;

Sustainable Development Principles	Targeted Project Initiatives
4. Using alternative water sources and improving stormwater water quality	• Peak stormwater flow reductions and reduced pollutants in stormwater leaving site; • Onsite rainwater reuse considerations
5. Better occupant health and comfort	• Increased fresh air for building users with 50% above Australian Standards; • Reduced VOCs due to using low emission products; • Dedicated tenant exhaust system to remove pollutants from occupied space; • Provide external views and daylight to occupants, while limiting solar radiation and glare; • Create comfortable internal acoustics levels and thermal comfort levels;
6. Continued Council growth and development with reduced environmental footprint	• Targeting highest practicable levels of energy-, water- and waste-efficiency for the development; • Targeting 5-star Green Star D&AB v1.2 rating, signifying 'Australian Excellence'; • Targeting 5-star NABERS Energy Formal Commitment Agreement;
7. Increased staff and community awareness of sustainability	• Design Intent Report and training provided to building owner and building managers; • Building Users' Guide to be provided to all building occupants; • Showcase ESD measures incorporated into the design (e.g. via case-studies'); • Showcase real-time operational performance (e.g. digital board in the lobby);
8. Other initiatives	• Supporting green transport solutions; • Selection of durable, low-embodied materials, to minimise their environmental impact and embodied energy; • Heat Island reduction; • Light pollution reduction • Roof garden incorporation

Table 1: QPRC's key sustainability initiatives

2 Project Overview

2.1 Council's Sustainable Vision

As per the Council's 'Sustainable Design Policy for Council Buildings', zero net impact on greenhouse gas and water use is to be maintained by Council as compared to previous years. What this means in practice is that any Council's building or infrastructure development (Council's growth) have as low environmental impact as practical. This translates to energy- and water- efficient buildings and infrastructure as well as achievement of high waste recovery rates.

2.2 Development Description

Location: The proposed development site is in the Queanbeyan's CBD, on 257 Crawford Street. The site is located in close proximity to The Q – Queanbeyan Performing Arts Centre, Queanbeyan Bicentennial Hall and Queanbeyan River. The development site location is shown in the satellite image below.



Figure 1: Satellite view of the site location

2.3 Development Summary

The developer is seeking to develop this site into a 7-storey QPRC HOSH building with ground floor being commercial space opening onto the street, smart hub-co-working space on the mezzanine level, and 5 office levels, most of which will be used for the Councils operations.

The new building is envisaged to adjoin The Q and Bicentennial Hall with an integrated foyer to link three buildings. The smart hub will provide space for new business start-ups in an incubator environment, as well as space for agency staff, adding more workers into the CBD to activate the cafes and retail strip.

The table below shows the proposed development areas and transport facilities:

QPRC Head Office and Smart Hub	
Development Areas ¹	
Building Total Area	8,879 m ² GFA + 330 m ² GFA Bicentennial extension
Kiosk	2 m ² GFA
Shopfront/Smart Hub/Lobby	656 m ² GFA
Community/Conference	1,176 m ² GFA
Office Area	4,994 m ² GFA
Roof Garden	505 m ² GFA
Service	1,543 m ² GFA
Parking Facilities	
Standard Car Parking Basement Spaces	108 ²
Public Car Parking Ground Floor Spaces	118 ³
Disabled Car Parking Spaces	TBC
Van Parking Spaces	TBC
Motorcycle Parking Spaces	TBC
Green Transport Facilities ⁴	
Cyclist Spaces	68 provided in total ⁵
Visitor Cyclist Spaces	TBC ⁶
Lockers	TBC ⁷
Showers	8 ⁸
Notes: ¹ Based on Area Schedule – GFA issued on 28/11/2010 ² Based on basement drawing information issued on 28/11/2019 ³ Based on site plan issued on 28/11/2019 ⁴ Green Transport Facilities Green Star requirements for 650 building occupants and 90 peak visitors (based on information provided via email on 19/12/2019). Should number of regular occupants and/or peak visitors change, number of bike spaces, lockers and showers will change accordingly. ⁵ 49 regular building occupant bike spaces required for Green Star. ⁶ 5 visitor bike spaces required for Green Star. ⁷ 59 lockers required for Green Star. ⁸ Based on drawings issued on 28/11/2019, total of 8 showers are envisaged on ground floor. Please be noted that for 10 showers in total are required for Green Star for the given number of regular occupants and peak visitors.	

Table 2: Proposed development areas and transport facilities

3 Sustainable Building Certification Schemes

The QPRC HOSH development, as a 'Showcase project' (QPRC's Sustainable Design Policy for Council Buildings) will target both Green Star D&AB v1.2 rating and NABERS as a form of External third-party review and certification.

The Green Star 'Design and As-built' tool is used primarily to rate the building attributes and potential of a development in regard to various ESD aspects, while the actual operational performance of a building will be evaluated using the NABERS benchmark tool. The operational performance of a building will be a combination of the building attributes and how the building is operated. Achieving sustainable outcomes will require sustainable design, construction, and efficient operation by building users and managers, and monitoring and management of performance.

3.1 Green Star

Green Star is a rating system designed to provide guidance and a 'common language' for environmentally sustainable design and construction of buildings. It is a national and voluntary system administered by the Green Building Council of Australia (GBCA). Green Star has transformed Australia's property and construction market, raising the bar for sustainability and allowing sustainable construction to be consistently planned and constructed.

Green Star covers the following categories, aiming to measure the sustainability of the entire development process from site selection, design, construction, and maintenance:

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

The QPRC HOSH development will be targeting a 5-star Green Star Design & As Built (D&AB) version 1.2 Certified Rating (please see Green star pathway in appendix for more information).

A 5-star Green Star rating signifies 'Australian Excellence' in environmentally sustainable design and construction.

The targeted ratings and particular sustainability initiatives targeted may be affected and altered during the detailed design and construction phases as the project team continue to develop, evaluate, and monitor the project's sustainability strategy to deliver the desired sustainable outcomes.

For office developments targeting an 'A grade' PCA quality level, the following Green Star D&AB v1.2 outcomes are required to be achieved as a minimum (all of which have been targeted):

- *5-star Green Star D&AB v1.2 certified rating*
- *3 points under 'Water' category*
- *'Operational waste' credit achieved under Management category*
- *Minimum 60% of Indoor Environmental Quality points, including 'Thermal comfort' credit*
- *'Adaptation and Resilience' full credit points under Management category*
- *EoT facilities as required by 'Sustainable Transport' Credit*

3.2 NABERS

The National Australian Built Environment Rating System (NABERS) is a performance based rating system which evaluates the actual resources consumed during operation, and allows an indication of how the development compares to neighbouring buildings.

The NABERS rating system is managed by the NSW Office of Environment and Heritage (OEH).

The NABERS rating system has separate performance ratings for the following categories for base buildings, whole buildings, or tenancy areas:

- NABERS Energy
- NABERS Water
- NABERS Waste
- NABERS Indoor Environment

The QPRC HOSH development will be targeting the following NABERS rating (subject to detailed design considerations):

- 5 Star NABERS Energy (Base Building) Commitment Agreement (meaning that performance close to 5.5-star level is targeted - modelling margin to account for unforeseen circumstances)
- 5 Star NABERS Energy (Base Building) Operational Rating

For office developments targeting an 'A grade' PCA quality level, one of the requirements is having a 5.5-star NABERS Office Energy (Base Building) formal Commitment Agreement in place, which is not targeted for this development. However, alternative compliance with this criterion is considered achieved, being that the development will be complying with the NCC 2019 Section J. It is envisaged that NCC 2019 Section J will be complied with through JV3 Verification method for building fabric compliance and DTS or JV3 for building systems compliance.

4 QPRC Sustainable Development Principles

The development's design has been assessed against the following 7 Council's Sustainability goals, as outlined in QPRC's Sustainable Design Policy for Council Buildings:

1. Reduced energy consumption, water use and waste
2. Reduced on-going operating and maintenance costs
3. Demonstrating community leadership in implementing renewable energy and passive solar design
4. Using alternative water sources and improving stormwater water quality
5. Better occupant health and comfort
6. Continued Council growth and development with reduced environmental footprint
7. Increased staff and community awareness of sustainability

4.1 Principle 01.1: Reduced energy consumption

Energy management involves considering the nature of the development and key energy uses during operation, planning to minimise energy use and incorporating renewable energy sources. Reducing energy demand will result in fewer greenhouse gas emissions, help reduce and create less dependence on non-renewable energy sources.

The QPRC HOSH has been envisaged as an energy efficient building and has been designed in accordance with high market requirements.

Although the transitional compliance with NCC 2016 Section J is available up to 30 April 2020) the design team has opted to pursue compliance with NCC 2019 Section J, which is significantly more stringent than its predecessor and will result in significantly higher level of energy efficiency for the development and consequently operational energy savings.

The QPRC HOSH development is targeting 5-star NABERS Base Building Energy Operational Rating to be achieved after completion and at least 12 months of operation. In order to facilitate this, a 5-star NABERS Energy Formal Commitment Agreement is to be pursued, which is based on energy modelling. As the modelling is conducted prior to construction and operation, a modelling margin is used to account for various unforeseen circumstances that may occur during operation and prevent the building from reaching the targeted rating. This in turn means that the building design will be aiming for approximately 5.5-star modelled performance target to allow 5-star target is achieved during operation.

A 5-star Green Star D&AB v1.2 rating requires at least 3 points under the GHG credit to be achieved as a prerequisite for 5-star certification. Being that targeted modelled performance for NABERS will be close to 5.5-star NABERS level, it has been estimated that approximately 5 points are within reach under the NABERS pathway 'GHG Emissions' credit of Green Star D&AB v1.2.

The project team has been focussing on improving the passive design elements of the development, which results in reduced energy loads required to be met by the building services systems. This approach is fundamental to delivering a more sustainable development. The building fabric has been designed as compliant to NCC 2019 Section J building fabric minimum requirements (Part J1). This resulted in minimisation of excessive heat loads while maximising natural daylighting, and was achieved by decreasing WWR (window to wall ratio), incorporation of extensive external shading into the design and opting for high performance glazing with high daylight performance (VLT>50%), low solar heat gain (SHGC<0.27), double glazed low-E IGU (maximum glazing U-value=1.6/ window U<2). This is in line with 5-star NABERS target.

A 5-5 star NABERS modelled target means building fabric performance slightly above NCC 2019 Section J DTS requirements, lighting design at least as per NCC 2019 Section J DTS minimum requirements and highly efficient HVAC systems and plant for Office parts of the building.

Lighting efficiency is advised to be addressed by installing low energy lighting throughout, intelligent lighting control systems, smaller and individually switched light zoning and switches to reduce energy wastage.

'Metering and monitoring' credits have been targeted, including metering and monitoring system consideration and implementation. Metering and monitoring strategy is to be developed in line with NABERS and Green Star requirements.

It is envisaged that NCC 2019 Section J will be complied with through JV3 Verification method for building fabric compliance and DTS or JV3 for building systems compliance. Due to this, the 5.5-star NABERS requirement of an 'A grade' PCA quality level is considered to be achieved by complying with NCC 2019 Section J.

4.2 Principle 01.2: Reduced water use

Sustainable potable water management involves considering the nature of the development and key water uses during operation, planning and design incorporating water-efficient fixtures, fittings and systems to minimise use of water and incorporating water reuse strategies.

The development will minimise consumption of Queanbeyan's precious potable water resource through the use of highly efficient hydraulic fixtures and fittings, efficient irrigation system, and firewater capture and reuse, all of which are estimated to result in 3 points under Green Star D&AB v1.2 category. Rainwater capture and storage facility of approximately 90kL would allow for further potable water savings and achievement of 1 additional Green Star point.

All water fixtures are to be within one star of the WELS ratings recommended by Green Star (6-star WELS taps and urinals, 5-star WELS toilets and 3-star WELS showers with less than 6l/min flow rate).

Water meters will be installed on all major water uses in the development, and will monitor and track the water consumption and generate reports for analysis. Water meters will be connected to the Building Management System (BMS) to allow water system leaks or above average consumption to be detected and addressed to minimise wastage or misuse.

In addition, extensive external shading and low-SHGC glazing incorporated into the facade substantially reduce the load on the A/C system. This significantly reduces the largest component of a building water consumption –cooling tower water.

Where landscape irrigation is required, systems to be automated (rain-shutoff, time-clock automated) and integrated with rainwater/stormwater storage, if applicable. Landscaping irrigation requirements is advised to be minimised and fed from the rainwater supply to reduce potable water consumption. Landscaping design will incorporate water minimisation techniques such as mulching and planting low water use species, and using drip irrigation.

For office developments targeting an 'A grade' PCA quality level, one of the requirements is achieving at least 3 points under the Green Star D&AB v1.2 Water Category. This requirement will be achieved by following targeted green Star pathway.

4.3 Principle 01.3: Reduced waste

Avoidance and minimisation of waste through the development and building process and ongoing operation will relieve pressure on landfills and natural resources.

A project specific waste management plan will be developed and followed by the head contractor, highlighting waste streams and reuse strategies for construction waste. It is planned that a minimum of 90% of all building waste (demolition and construction) will be diverted from landfill.

All waste contractors and waste processing facilities are to be audited and certified to comply with 'Green Star Construction and Demolition Waste Operational and Reporting Criteria' or shall disclose the extent that they have implemented the Criteria and provide a timeline for compliance.

The recycling waste storage area will be easily accessible and sized to encourage and satisfy the sorting and storage of recycling waste, and provide convenient access to recycling waste vehicles for the collection. The waste and recycling area designed to be designed to facilitate the sorting and recycling of waste to minimise the projects ongoing operational contributions into landfill. As Queanbeyan Head Office and Smart Hub building is envisaged as an 'A-grade' building, the PCA (Property Council of Australia) requires Green Star Design & As Built v1.2 'Operational Waste' credit to be achieved. Waste collection and dedicated storage areas are to be provided, including separate bins for general waste, paper and cardboard, glass, plastic, and at least one other waste stream (e.g. metal). Compostable waste collection and processing is advised to be considered.

QPRC is to develop internal document committing to extending the life of the interior fit out/finishes to 10 years+, as this is a requirement from Green Star and PCA for A-grade buildings.



4.4 Principle 02: Reduced on-going operating and maintenance costs

Operational costs are often hidden or not accounted for but can dramatically add up over the individual, and in the case of public infrastructure, for Council and other providers. Whole of life cycle analysis is important to ensure that cost-efficiency and affordability over time is addressed.

Modularity, standardisation, and warranty will be considered in material and system selections and design development as extended product life, multiple uses for products, and greater availability and low cost of replacement will reduce costs during the building's life.

Using passive measures such as external shading and high-performance façade to reduce heat loads, combined with energy efficient HVAC systems and plant will reduce operational running costs for the owner and tenants, as well as reduce the peak energy demand loads of the building which will assist in reducing pressure on energy infrastructure.

Building envelope commissioning has been recommended to ensure the building fabric is sealed to the satisfactory levels, while building systems commissioning and handover will be implemented to ensure all the systems work as designed.

All building components are to be designed for easy and safe maintenance. When building components and materials are selected, special attention is to be paid to associated maintenance and replacement aspects.

4.5 Principle 03: Demonstrating community leadership in implementing renewable energy and passive solar design

Promotion of energy efficient, passive solar building design measures and use of renewable energy through implementation within Council's buildings. This is expected to result in increase of the number of Green Star and NABERS rated developments within the region.

At this stage, on-site energy generation has not been envisaged. However, it is suggested to further explore possibilities for installation of roof PV system, noting that roof space available may be limited. This would allow for NABERS and Green Star Target levels to be reached more easily, peak energy demand to be reduced, and significant operational energy savings to be achieved.

Passive solar design principles for heating and cooling include adequate building orientation, floor zoning based on heating needs, thermal mass, shading on façade, shade treed, insulation, balanced ventilation with heat recovery, air movement and comfort, airtightness, external shading, glazing and high-performance windows.

In order to optimise winter solar gain and effective summer shading, special care has been paid to specifying roof, ceiling, floor and wall materials and their R-values, all of which are to be above minimum required by NCC 2019 Section J DTS requirements. Double low-E IGU windows with thermally broken frames have been suggested (maximum total window U-value of 2 and maximum glazing U value of 1.6). External shading has been optimised to allow as much as possible winter sun, while obstructing unwanted summer solar gains to the highest practicable and cost-effective extent.

Solar Heat Gain Coefficient of façade glazing is envisaged to be 0.27 or lower, while preserving good daylight in the space (VLT >50%).

Implementing external shading to minimise direct solar gain and/or adjustable internal blinds are some solutions that depict summer passive cooling principles, as well as implementing effective cross ventilation, use of pale and reflective roofing/wall colour palette to minimise summer heat retention, use of green roof that is low maintenance and suitable for the climate, light and wind conditions.

4.6 Principle 04: Using alternative water sources and improving stormwater water quality

By considering the whole water cycle on site and aiming to minimise ins and outs, the load on water, sewer and stormwater infrastructure will be reduced and most precious and limited resource protected. Improving stormwater quality has benefits for our waterways

While greywater and wastewater reuse/reclamation have not been planned, collection and reuse of rainwater has been recommended for toilet flushing and irrigation. This method can be considered as part of sustainable water management, which allows water to remain as an alternative water source for human activities. As a consequence, it can reduce scarcity and alleviate pressures on groundwater.

To help manage, reduce, and improve stormwater flows, the development will not increase the peak stormwater discharge from the site compared to the pre-development peak stormwater levels. In addition, it has been suggested that the stormwater leaving site is treated to meet minimum pollution reduction targets for total suspended solids, gross pollutants, nitrogen, phosphorus, petroleum hydrocarbons, and oils. The project will target 1 point in each of the '26.1 Stormwater Peak Discharge' and '26.2 Stormwater Reduced Pollution Targets' credits.

Climate change and adaptation assessment needs to be conducted in order to identify a level of risk of increased rainfall and flooding during the design life of the project. It is advised to be mindful that for 'A-grade' buildings, PCA requires whole 'Adaptation and Resilience' credit under Green Star – Design & As Built Version 1.2 to be achieved. This implies project-specific development of Climate Adaptation Plan in accordance with recognised standards and implementation with solutions being included into the building design and construction that specifically address the risk assessment component of the plan.

Water sensitive urban design principles (pervious paving, swales, minimise use of turf, etc) will be applied where practical to minimise the impacts of stormwater runoff. Landscaping irrigation requirements will be minimised and fed from the rainwater supply to reduce potable water consumption. Landscaping design will incorporate water minimisation techniques such as mulching and planting low water use species, and using drip irrigation.

4.7 Principle 05: Better occupant health and comfort

People spend a significant portion of time indoors – approximately 90% of our lives. The quality of our indoor environments can affect our health, quality of life and productivity. Use of clean and non-toxic materials, daylighting, natural ventilation and connection with the outdoors can help to create a healthy indoor environment.

The quality of the indoor environment created will have an impact on the health and productivity of the building occupants. A healthy indoor environment will be created by addressing air quality, lighting levels, access to external views, acoustic levels, thermal comfort, and only selecting materials to minimise pollutants within internal spaces.

High degree of thermal comfort is to be provided to occupants in the space. The aim is that high thermal comfort is provided for 95% of the nominated area and 98% of the year, to at least 90% of occupants in the space. This translates to PMV between -0.5 and 0.5 to be achieved.

Comfortable acoustic conditions for occupants are envisaged to be provided and fully compliant with Green Star 'Acoustic Comfort' credit by engaging an acoustic consultant to ensure that the building incorporates appropriate noise control measures into the architectural and building services design. This includes being mindful of adequate internal noise levels, reverberation and acoustic separation.

Special care to be taken to specifying and implementing paints, adhesives, sealants, carpets and engineered wood products. At least 95% of internally applied paints, adhesives, sealants and carpets and at least 95% of all engineered wood products should meet stipulated 'Total VOC Limits'.

When designing for indoor air quality, ventilation system attributes, as well as provision of outdoor air and exhaust or elimination of pollutants will be considered. This will be achieved by:

- Mitigating entry of outdoor pollutants and system design for ease of maintenance and cleaning,
- Outdoor air provision at a rate 50% greater than the minimum required by AS 1668.2:2012 or by maintaining CO₂ concentrations below 800ppm,
- Limiting nominated pollutants, such as those arising from printing equipment, cooking processes and equipment, and vehicle exhaust, by either removing the source of pollutants from the nominated area, or exhausting the pollutants directly to the outdoor while limiting their entry into other areas of the building.

Visual comfort will be explored through glare reduction, daylight and views. Direct glare will be controlled via combination of fixed shading and use of internal blinds. Glare modelling is to be performed to determine if certain spaces do not require installation of internal blinds or alternatively those are to be provided to all spaces.

Daylighting modelling will be performed. While at least 40% of nominated area is expected to receive high levels of daylight during 80% of nominated hours, modelling may show higher percentage of nominated area to be achieved, especially due to the high glazing Visual Light Transmittance performance (VLT of 51%).

At least 60% of nominated area is to have a direct and clear line of sight no more than 8m/45° to a high quality internal (landscaping, people movement, water feature) or external view (landscaping or vegetation, movement of people, cars or animals, water feature, sky).

All lighting should be LED and have a minimum Colour Rendering Index (CRI) of 80 unless activity in area is not impeded by a lower CRI. Lighting levels and quality will comply with best practice guidelines and glare will be limited.

An 'A-grade' PCA quality level requires achievement of at least 11 IEQ points (min 60% of 17 available) including at least one of two points under 'Thermal Comfort' credit. The QPRC HOSH development is currently targeting 14 IEQ points with some additional points pending further investigations. These include both points under 'Thermal comfort' credit.

4.8 Principle 06: Continued Council growth and development with reduced environmental footprint

The Council's 'Sustainable Design Policy for Council Buildings calls for Zero net impact on greenhouse gas and water use is to be maintained by Council as compared to previous years. What this means in practice is that any Council's building or infrastructure development (Council's growth) have as low environmental impact as practical. This translates to energy- and water- efficient buildings and infrastructure as well as achievement of high waste recovery rates.

The QPRC HOSH Building being envisaged as energy-, water-, and waste- efficient to the highest practicable extent and targeting 5-star NABERS Energy formal Commitment Agreement is in line with this Council's Goal. However, the achievement of this goal will depend on operational performance of other Council's assets.

The development aims to embrace the existing ecological environment and create a development that is appropriate for building location and climate, with a focus on fundamental passive design over complex technological solutions to achieve sustainable outcomes in greenhouse gas emissions. The design will provide a sustainable balance between building footprint, external spaces, and centralisation. The mixed-use element of the design further utilises the building footprint with retail incorporated into the site to provide services to building users and minimise further land development to cater for office workers.

4.9 Principle 07: Increased staff and community awareness of sustainability

Good intentions and design can be wasted if the ultimate owner, resident or user does not understand the sustainability features. Appropriate user guidance will ensure that original design intents and operational savings are delivered.

To ensure the building meets the intended design and goals, and that the building managers and occupants are provided and educated on how to operate their building to realise the potential of the building design, the following guidance documents and training will be provided:

Design Intent Report: Provide the building owner and building managers (Management and facilities managers) with information to summarise the building design and building systems.

Operations and Maintenance Manuals: Information for building facilities managers and future subcontractors, that includes the detailed specialist information about the building services systems and how to correctly operate and maintain this equipment.

Building Users' Guide: Simple and easy to understand guidance for the building users, occupants and tenants' representatives to understand the building and building systems, in order to allow them to optimise the building's environmental performance.

Building Facility Manager Training: The builder will coordinate subcontractor representatives to provide training to building facility management staff on:

- Building operation (including start-up operation, normal operation, unoccupied operation, seasonal changeover, and shutdown);
- Review of controls set-up, programming, alarms and troubleshooting;
- Operation and Maintenance manuals;
- Building systems interaction;
- Energy efficiency optimisation measures; and
- WHS issues.

Full 'As-built' drawings: A full set of 'As-built' drawings will be provided to the owner as a record of what has been built, and allow informed future building management decisions and changes, based on current and accurate drawings.

To increase Community awareness of ESD measures implemented within the building, it is suggested that QPRC share building design and operational performance achievements in a transparent way. Design achievements may be shared via case studies and similar modes, while examples of communicating operational performance achievements include having a digital board in the lobby, showing different operational achievements in real time.

4.10 Other ESD Principles

In addition to QPRC's key sustainable goals and principles, additional ESD aspects have been covered by the design.

Sustainable Transport

A significant greenhouse gas emission come from the use of the fossil fuels throughout our daily transport routines. It is advised to consider supporting green transport and incorporate into the further design stages. By combining active transport facilities, public transport services, fuel efficient vehicle parking, and reduced vehicle parking will substantially reduce carbon emissions from commuting and also reduce pressure from traffic congestion.

Provision of end of trip cyclist and pedestrian facilities is considered to encourage active transport. Based on 650 regular occupant and 90 peak visitors, 49 occupant and 5 visitor bike spaces, 59 lockers and 10 showers are required for achievement of 'Sustainable Transport' credit within Green Star and complying with relevant criterion of 'A-grade' PCA building quality matrix.

Use of low emission vehicles such as motorbikes, hybrid or electric vehicles is encouraged as preferred parking spaces closest to the lift entrance or core and clearly will be sign-posted and marked with a separate colour from other spaces.

Sustainable Materials Selection

Life Cycle Assessment and modelling could provide more information on hotspots in environmental impacts, focusing on both operational and embodied energy and other environmental impacts of materials. Project design complying to NCC 2019 façade requirements is expected to provide Green Star points for energy improvement. Implementation of responsible building materials is considered through the following:

- 95% of steel sourced from a Responsible Steel Manufacturer and 60% by mass of all reinforcing bar and mesh is produced using energy-reducing processes
- 95% of timber will meet GBCA 'Essential' criteria or will be reused, including formwork, hoardings, structural, non-structural, cladding finishes, joinery, windows, doors, furniture, etc.
- 90% by cost of cables, pipes, floors and blinds will be non-PVC or will meet Best Practice Guidelines for PVC
- Minimum of 3% of all materials used in the project will meet transparency and sustainability requirements under one of the following initiatives: reused products, recycled content products, environmental product declarations, third-party certifications or stewardship programs after identifying compliant materials for key components of the building

Heat Island Effect

Ecological impacts from occupied spaces are envisaged to be reduced by lowering the impact of heat island effects from hard surfaces. At least 75% of the total project site area will comprise building or landscape elements that reduce the impact of the heat island effect, combining vegetation, roof garden, hardscape and roofing materials including shading structures with given Green Star Solar Reflectance (SRI) guidelines.

5 Green Star Pathway

The Green Star Pathway table below lists the Green Star Credits that will be targeted for the QPRC HOSH project. The project is targeting a 5-star Green Star Design & As-built v1.2 rating. The Green Star pathway has been developed by the ESD consultants and the entire design team in a collaborative process. The credit strategy will be continually monitored and adjusted during the detailed design phase to ensure the most appropriate strategy is employed to achieve the targeted Green Star ratings.

The Green Star Design & As-built rating is based on design and as-constructed documentation, to ensure that the specified design initiatives are incorporated into the constructed building. Targeting Design & As-built rating requires management of the sustainable initiatives from the design phases, throughout the construction phase, commissioning, and through to project delivery.

To protect against the risks encountered in the Green Star Assessment process and the issues that arise during the continuously evolving design and construction, the project team is targeting more points than are required for a 5-star rating. The project team will target an additional 5% of points above the level required as a 'risk buffer' to manage these risks as a minimum, with further investigation required into credits marked as 'Tier 2 and Tier 3 Investigation Required' points for further security buffer.

All management credits will be targeted as ESD management, waste management, and commissioning are all critical to delivering the required sustainability initiatives.

A number of credits above those required for 5 Star Rating have been marked as "To be Confirmed" and will be further investigated by the project during the Detailed Design (DD Phase), while innovative initiatives being considered in the design will be investigated in DD to determine which credits can be targeted in the Innovation category.

Category	Pts Available	Pts Targeted	Category Percentage
Management	14	14	100%
Indoor Env. Quality	17	14	82%
Energy	22	6	27%
Transport	10	3	30%
Water	12	4	33%
Materials	14	10	71%
Land Use and Ecology	6	3	50%
Emissions	5	3	60%
Innovation	10	6	60%
Total	110 Pts	63 Pts	5 Star

See Appendix 1 for detailed Green Star credit strategy.

Appendix 1: Green Star Credit Strategy

Green Star Design & As-Built v1.2

QPRC HQ

Rev 4

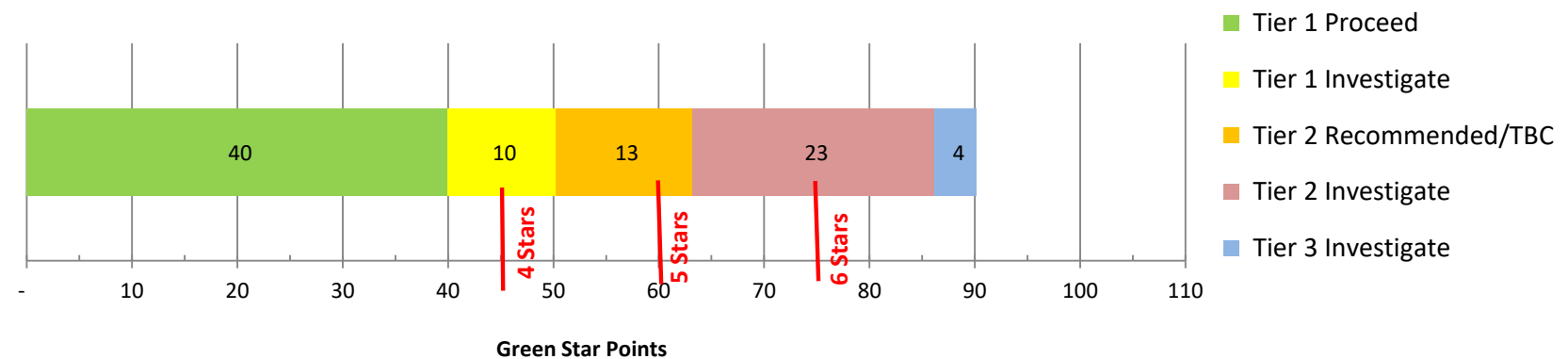
Thursday, 19 December 2019

Green Star Pathway

Points Summary		Points Avail	Tier 1 Proceed	Tier 1 Investigate	Tier 2 Recommended/TBC	Tier 2 Investigate	Tier 3 Investigate
	Totals	104	40	10	13	23	4
	Cumulative Totals	-	40	50	63	86	90
	Star Rating		FAIL	FAIL	5 Star	6 Star	6 Star

Project State: ACT

Green Star Points Targeted and TBC



Credit Details

Credit Code	Credit	Credit Title	Points Avail	Targeted Points				Tier 3 Investigate	Credit Strategy	Action (next steps)	Comment
				Tier 1 Proceed	Tier 1 Investigate	Tier 2 Recommended/TBC	Tier 2 Investigate				
	GBCA Registration Fee									Register with GBCA to lock-in requirements (particularly relating to energy)	

Management

1.1	Green Star Accredited	Accredited Professional	1	1						Project to be registered for Green Star with the GBCA.	Viridis have available multiple GSAPs.
2.0	Commissioning and Tuning	Environmental Performance Targets	0	BASE					Create a 'Design Intent Report or Owners Project Requirement document (or 'Building User Guide') to explain how building systems work.	Required items to be included in OPR, design and commissioning documentation.	
2.1		Services and Maintainability Review	1	1					Services and maintainability review to be completed at design and prior to construction	Services review to be completed during design phase.	Highly recommended as owner-occupier
2.2		Building Commissioning	1			1			Commissioning and tuning to be completed - includes: Commissioning Specs, Commissioning Plan and Air permeability commissioning (Building fabric permeability test or so-called 'Blower-door test")	1. The commissioning requirements for each system to be included in the contractual tender or construction documentation. 2. Commissioning plan to be developed. 3. Air permeability testing to be carried out by a suitably qualified practitioner (additional cost) TBC by QPRC (especially Air permeability testing)	Building Fabric Permeability commissioning advised in case of highly efficient building targeted as it ensures the as built façade performance reflect the designed
2.3		Building Systems Tuning	1			1			Post occupancy quarterly tuning to be completed	TBC by QPRC	Highly recommended as owner-occupier, particularly as targeting NABERS
2.4		Independent Commissioning Agent	1			1			ICA to be appointed during design stage	ICA to be appointed - may attract added costs TBC by QPRC	Highly recommend comprehensive commissioning approach, not just the tick box approach required by Green Star

Credit Code	Credit	Credit Title	Points Avail	Targeted Points				Tier 3 Investigate	Credit Strategy	Action (next steps)	Comment
				Tier 1 Proceed	Tier 1 Investigate	Tier 2 Recommended /TBC	Tier 2 Investigate				
3.1	Adaptation and Resilience	Implementation of a Climate Adaptation Plan	2		2				Detailed report of climate adaptation assessment including risk assessment to be completed. At least two risks identified to be addressed by the project design	Climate Adaptation and Resilience specialist to be appointed by QPRC Results of the assessment to be integrated into the design QPRC to inform if specialist has been engaged, and if not whether they intend to	Now required for PCA A-grade
4.0	Building Information	Building Information	1	1					Detailed O&M information, log book and User Information to be developed	O&M information and log book to be developed.	Considered good practice.
5.1	Commitment to Performance	Environmental Building Performance	1	1					Owner/occupier to commit to monitoring and reporting on two of the following each quarter: energy, waste, water and IEQ	QPRC to make formal commitment (Internal document).	Considered easily achievable and good practice. Suggested at least Energy (kWh/m2) and Water consumption (kL/m2) to be reported quarterly. OR NABERS Energy and Water commitment and reporting. Owner/occupier must commit to environmental performance targets through an internal requirement (policy, guideline, or environmental management plan) that targets are set and measured. This formal commitment must address: 1) The environmental targets that have been set; and 2) Performance measurement procedures.
5.2		End of Life Waste Performance	1	1					Owner/occupier to commit to extending the life of the interior fit out/finishes to 10 years+.	QPRC to make formal commitment (Internal document).	QPRC to have Internal commitment in place. Design life of interiors assumed to be 10y+, thus easily achievable. Note: PCA A-grade requires life-cycle maintenance >= 10y
6.0	Metering & Monitoring	Metering	0	BASE					Major energy and water use metering Submeters required (Energy & water) on building usage, connected to the existing monitoring system, and provide regular reports. Meters will need to meter different space types separately, and allow for future space subdivision.		
6.1		Monitoring Systems	1	1					Monitoring system to capture and process meter data and identify trends	Metering and monitoring strategy to be developed in line with NABERS (especially due to very high star-level required) and in line with GS requirements.	
7.0	Responsible Construction Practices	Environmental Management Plan	0	BASE					EMP to be developed and implemented		Contractor assumed to have this (good practice).
7.1		Environmental Management System	1	1					EMP to be audited (projects <\$10m) or certified (projects >\$10m)		Contractor assumed to have AS/NZS ISO 14001 in place.
7.2		High Quality Staff Support	1			1			Health and Well-being programs implemented onsite, along with sustainability training	QPRC to advise if they'd like to require this from the builder	
8.0	Operational Waste	A. Performance Pathway: Specialist Plan	1	1					Separate bins for general waste paper & cardboard, glass, plastic and at least one other waste stream (e.g. metal) Access and size of waste facility to comply with City of Sydney Guidelines	Waste collection and dedicated storage areas to be provided. Compostable waste collection and processing to be considered.	PCA A-grade requires this credit to be achieved

Credit Code	Credit	Credit Title	Points Avail	Targeted Points				Tier 3 Investigate	Credit Strategy	Action (next steps)	Comment
				Tier 1 Proceed	Tier 1 Investigate	Tier 2 Recommended /TBC	Tier 2 Investigate				
		B. Prescriptive Pathway: Facilities									
Category Totals				14	8	2	4	-			

Indoor Environment Quality											
9.1	Indoor Air Quality	Ventilation System Attributes	1	1					The entry of outdoor pollutants is mitigated; The system is designed for ease of maintenance and cleaning (access to both sides of coils, filters and humidifiers); and The system has been cleaned prior to occupation and use.	To be achieved by Mech design and during construction.	
9.2		Provision of Outdoor Air	2	1			1		Outside air provided at a rate 50%/100% greater than the minimum required by AS 1668.2:2012, or CO2 concentrations are maintained below 800ppm/700ppm	1. Appoint energy modeller to determine impact on energy consumption and size of plant to provide extra Outside Air. 2. Explore with GBCA potential to comply with requirement for 95% of occupied hours in 100% of primary spaces (rather than 100% of time in 95% of spaces	50% above required minimum baseline for Healthy Indoor Air Quality, and can be achieved for negligible cost in Canberra 100% above required minimum baseline, although beneficial to occupants, has potential to impact Energy consumption significantly - Assess further with energy model
9.3		Exhaust or Elimination of Pollutants	1	1					Nominated pollutants, such as those arising from printing equipment, cooking processes and equipment, and vehicle exhaust, are limited by either removing the source of pollutants from the nominated area, or exhausting the pollutants directly to the outside while limiting their entry into other areas of the project	QPRC to confirm printers and copy equipment is to be in an enclosed area (or utilise low-emission equipment)	
10.1	Acoustic Comfort	Internal Noise Levels	1	1					Internal noise levels (from outside and building services) to be no more than 5dB(A) above 'satisfactory' as per Table 1 AS/NZS 2107:2000.	Acoustic engineer to guide the project in next stage	
10.2		Reverberation	1	1					Reverberation to be below maximum 'Recommended Reverberation Time' as per Table 1AS/NZS 2107:2000.	Acoustic engineer to guide the project in next stage	
10.3		Acoustic Separation	1	1					Partitions between enclosed spaces to achieve a weighted sound reduction index (Rw) of at least 45 OR insulation of Dw + LAeqT > 75.		Partitions to meet the requirements - considered good practice for a Healthy building
11.0	Lighting Comfort	Minimum Lighting Comfort	0	BASE					All lighting to: - have Class A1 or A2 ballasts, high frequency ballasts (fluorescent), or electronic ballasts (HID lighting); AND - have a minimum Colour Rendering Index (CRI) of 80 unless activity in area not impeded by a lower CRI.	Green Star credit requirements to be met by lighting design (considered good practice).	LED lighting assumed. CRI 80+ to be achieved

Credit Code	Credit	Credit Title	Points Avail	Targeted Points				Tier 3 Investigate	Credit Strategy	Action (next steps)	Comment
				Tier 1 Proceed	Tier 1 Investigate	Tier 2 Recommended /TBC	Tier 2 Investigate				
11.1		General Illuminance and Glare Reduction	1	1					Lighting levels to meet the relevant Standard: - Industrial tasks and processes Table E1 of AS 1680.2.4 - Circulation and other general areas Table D1 of AS1680.2.1 - Healthcare spaces Table F1 of AS1680.2.5 - Office spaces Table 3.1 of AS1680.2 - Workspaces and other activities Table 3.1 of AS1680.1 - Residential spaces - see manual - Retirement living spaces Table 2 of ANS/IES RP-28-07 AND Glare to be limited by one of the following: - use of baffles, louvres, translucent diffusers, ceiling design or other method to obscure the direct light source from the view of an occupant looking directly upwards; - for uniform lighting solutions, compliance with Luminaire Selection system Section 8.3.4 of AS1680.1-2006; - Unified Glare Rating (UGR) on a representative floor to not exceed maximums in Table 8.2 of AS1680.1-2006 (calculated as per Section 8.3.3)	Green Star credit requirements to be met by lighting design (considered good practice).	
11.2		Surface Illuminance	1				1		Lighting and surfaces to provide lighting uniformity by either: - Average surface reflectance of ceilings (and 90% of all ceilings) of at least 0.75 and ceiling area to have average surface illuminance of at least 30% of the working plane lighting levels; OR - Modelling as per AS/NSZ 1680.1.2006 App B to show average ceiling illuminance does not exceed 0.5kcd/m2, maximum ceiling illuminance for any point does not exceed 1.5kcd/m2, ceiling area to have average surface illuminance of at least 30% of the working plane lighting levels, and for rooms less than 100m2 or where >20% of workstations are located within 3m of walls the wall area above the working plane has an average surface illuminance of at least 50% of the working plane lighting levels	Lighting Engineer to advise feasibility and cost (particularly around combination of direct and indirect lighting)	WSP advised this would be achievable using suspended direct/indirect suspended luminaires, however this may impact the ability to reconfigure workstations.
11.3		Localised Lighting Control	1			1			Occupants to have the ability to control lighting (on/dim/off) in their immediate environment	Lighting Engineer to advise feasibility and cost (particularly around dimming/adjusting light level)	WSP advised this may be achievable if the fit-out is defined as an 'activity-based working environment', where we can demonstrate a wide variety of working environments, each with localised lighting controls.
12.0	Visual Comfort	Glare Reduction	0	BASE					Direct glare to be controlled via combination of fixed shading, internal blinds and/or modelling of any overshadowing, orientation, etc.	Modeller to be appointed to perform glare modelling and determine which spaces would require internal blinds. OR Internal blinds to be provided to all relevant spaces in addition to designed external shading.	Internal blinds meet credit criteria, though fixed shading provides better outcome (as it is unchangeable part of building, provides energy-saving benefit and prevents the saw-tooth appearance that buildings have when some blinds are set at different levels). However, expect internal blinds already allowed for in brief, and as this meets the requirement, have not allowed for modelling of glare

Credit Code	Credit	Credit Title	Points Avail	Targeted Points				Tier 3 Investigate	Credit Strategy	Action (next steps)	Comment
				Tier 1 Proceed	Tier 1 Investigate	Tier 2 Recommended /TBC	Tier 2 Investigate				
12.1		Daylight	2	1			1		40/60% of nominated area (1pt/2pts) to receive high levels of daylight (2.0% daylight factor OR 160lux Daylight Illuminance) during 80% of nominated hours	Daylight modeler to be appointed. Daylight modelling to be performed. Compliance will depend directly on external shading design and glazing performance (balance with solar gain reduction and glare reduction)	Viridis expect building would achieve 1 point, with possibility of 2nd (depending on glazing and shading options)
12.2		Views	1	1					60% of nominated area to have a direct and clear line of sight no more than 8m/45o to a high quality internal (landscaping, movement of people, water feature) or external view (landscaping or vegetation, movement of people or cars or animals, water feature, sky) .		Workstation partitions must not exceed 1.5 m
13.1	Indoor Pollutants	Paints, adhesives, sealants and carpets	1	1					95% of all internal paints, sealants, adhesives, and carpets to meet low VOC requirements (or not be used in project)	To be achieved during design and construction	
13.2		Engineered wood products	1	1					95% of all internal engineered wood products to meet low formaldehyde requirements (or not be used in project)	To be achieved during design and construction	
14.1	Thermal Comfort	Thermal Comfort	1	1					For mech vent , meets PMV- 1 and +1		Considered good practice for a Healthy building, also required under NCC2019 Section J
14.2		Advanced Thermal Comfort	1		1				High degree of thermal comfort equivalent to 90% of all occupants being satisfied in the space	Info on associated energy penalty to be provided by energy modeler (when one appointed)	
Category Totals			17	12	1	1	3	-			

Energy										
15	Greenhouse Gas Emissions	Pathway choice						If NCC2019 Section J complied with under JV1 (5.5-star NABERS Commitment agreement with modelled performance equivalent to 6-star NABERS Energy for Offices), min 8.8 GS points awarded under NABERS pathway with no additional modelling required. If no NABERS Commitment agreement & NCC2019 complied with under JV3, Green star GHG Reference building pathway applies, BUT in that Case NCC2019 used as reference point (points in question). If no NABERS Commitment agreement & NCC2016 complied with under JV3, Green star GHG Reference building pathway applies, more points available.		
15-D.0		D. NABERS Pathway: Conditional Requirement	0	BASE				-	Project is subject to a NABERS Energy Commitment Agreement for a minimum of 4.5 Stars. This commitment agreement process requires a full peer review of the base building design and associated energy performance simulation assessment by a NABERS-recognised Independent Design Reviewer.	

Credit Code	Credit	Credit Title	Points Avail	Targeted Points				Tier 3 Investigate	Credit Strategy	Action (next steps)	Comment
				Tier 1 Proceed	Tier 1 Investigate	Tier 2 Recommended /TBC	Tier 2 Investigate				
15-D.1		D. NABERS Pathway: NABERS Commitment Agreement Pathway	0	3	2		3		16/20 points available with this pathway. Applicable to Class 5 Buildings	Complete Preliminary Energy Model to explore potential Would QPRC consider external finance of renewable energy (effectively extend project budget)?	IF Model shows 5 star NABERS (for 4.5 star commitment) not eligible for Green Star rating (or pursue compliance via alternate method). 5.5 Star is 5.2 points, and 6 star is 8.8 points. WSP advised that proposed mechanical plant capable of 5 Star NABERS.
16.1.A	Demand Reduction (Former 'Peak Electricity')	On-site Energy Generation Pathway	0						1/2 points available for this pathway. On-site electricity generation reduces peak electricity demand by at least 15% NOTE: Either pathway A or pathway B must be chosen.		
16.1.B		Reference Building Pathway	2		1		1		2/2 points available for this pathway. Comparison to reference building showing reduction on peak electricity demand by at least 20/30% (1pt/2pts) NOTE: Either pathway A or pathway B must be chosen.	Evaluate with Preliminary Energy model	At least 1 point likely by utilising NCC2019 compliant façade and LED lighting in office (as owner-occupied). Energy model required to confirm, and explore potential for 2nd point (may require energy (thermal/electrical) storage, or more efficient services
Category Totals			22	3	3	-	4	-			

Transport											
17-B.1	Sustainable Transport	B. Prescriptive Pathway: Access by Public Transport	3				3		7/10 points available with this pathway. 3 pts for number of people that can access site in 45mins during peak hour	Project to register so calculator is available	
17-B.2		B. Prescriptive Pathway: Reduced Car Parking Provision	1				1		7/10 points available with this pathway. 1 pt for reduction in car spaces	QPRC have registered for Green Star but have not shared access with Viridis nor made Transport calculator available. Team to advise on final number of parking (including parking offsite but dedicated to this building)	Transport calculator needs to be consulted for more information.
17-B.3		B. Prescriptive Pathway: Low Emission Vehicle Infrastructure	1	1					7/10 points available with this pathway. 1 pt for 15% of all parking to be for fuel efficient vehicles (i.e. motorbike parking (capped at 5% of total), hybrid or electric vehicles, vehicles with a fuel efficiency of 5L/100km or better); OR 5% of all parking to be for electric vehicles with charging infrastructure provided	5% spaces for EV's or 15% of parking for fuel efficient vehicles	Aligns with NSW Government requirement for charging facilities for electric vehicles. Preferred parking spaces are defined as those closest to the lift entrance or core. Spaces must be clearly sign-posted and marked with a separate colour from other spaces and must not be double or tandem spaces. Small car spaces must be 2.3x5.0m.
17-B.4		B. Prescriptive Pathway: Active Transport Facilities	1	1					7/10 points available with this pathway. 1 pt for provision of cyclist facilities for 7.5% of regular occupants and 5% of peak visitors		Based on 650 regular occupant and 90 peak visitors, 49 occupant and 5 visitor bike spaces, 59 lockers and 10 showers are required.
17-B.5		B. Prescriptive Pathway: Walkable Neighbourhoods	1	1					7/10 points available with this pathway. 1 pt available for WalkScore over 80, or 8 amenities within 400m (max of two per category)	Achieved already	Walkscore 90 achieved
Category Totals			10	3	-	-	4	1			

Water											
18-A.1	Potable Water	A. Performance Pathway: Modelled Pathway	12					2	12/12 points available with this pathway. Modelled comparison to reference building	Complete assessment	Could complete more comprehensive assessment - likely to achieve an additional point

Credit Code	Credit	Credit Title	Points Avail	Targeted Points				Tier 3 Investigate	Credit Strategy	Action (next steps)	Comment
				Tier 1 Proceed	Tier 1 Investigate	Tier 2 Recommended /TBC	Tier 2 Investigate				
18-B.1		B. Prescriptive Pathway: Sanitary Fixture Efficiency	1	1					6/12 points available with this pathway. 1 pt where fittings are within one star of 6 Star WELS (for taps, urinals, dishwashers), 5 Star WELS (for Clothes Washing Machines and toilets, or 3 Star WELS (for showers)	Compliant fixtures to be installed	
18-B.2		B. Prescriptive Pathway: Rainwater Reuse	1			1			6/12 points available with this pathway. 1 pt for rainwater tank (sized at 10L/m2 of GFA) and reuse of the rainwater onsite	Complete rainwater assessment to determine most appropriate size	80kL rainwater tank required (as estimated 8,000 GFA)
18-B.3		B. Prescriptive Pathway: Heat Rejection	2						6/12 points available with this pathway. 2 pts where no water-based heat rejection is used.	Mech advised cooling towers will be installed (credit out of reach). Mech to ensure cooling towers and any other water-heat rejection equipment as water efficient as possible (for Performance Pathway)	
18-B.4		B. Prescriptive Pathway: Landscape Irrigation	1	1					6/12 points available with this pathway. 1 pt where landscape irrigation is drip irrigation with moisture sensor override or uses no potable water (xeriscape garden complies if any temp irrigation removed after 3 month establishment)	Landscape and irrigation to comply with the credit	Landscape (incl roof) must be at least 1% of project site area - if not the credit is not applicable. If yes, it is considered low effort.
18-B.5		B. Prescriptive Pathway: Fire System Water	1	1					6/12 points available with this pathway. 1 pt where fire system does not expel water for testing, OR where temporary storage is provided for 80% of routine test water and maintenance drain downs for re-use on site, OR isolation/shut-off valves to enable floor for floor-by-floor testing.	Fire eng to ensure credit compliance	Test and draindown water, but excludes sprinkler drain down.
Category Totals			6	3	-	1	-	2			

Materials											
19.A.1	Life Cycle Impacts	A. Life Cycle Assessment Model: Comparative Life Cycle Assessment	6		3		4		10/10 points available for this pathway. Whole-of-building whole-of-life LCA assessment of six environmental impact criteria.	LCA specialist to be engaged during schematic/concept design to enable modelling to inform design. Modelling to be performed to provide more info on available points	This focuses on both operational and embodied energy and other environmental impacts of materials. 3 points for energy improvement expected based on NCC 2019 façade
19.A.2		A. Life Cycle Assessment Model: Additional Life Cycle Impact Reporting	1						4/10 points available for this pathway. Whole-of-building whole-of-life LCA assessment of five additional environmental impact criteria (1 point), material impact (1 point) construction process (1 point), design review (1 point)	Modelling to be performed to provide more info on available points	2 points available for utilising LCA outcome to inform design, and continue as part of design development, not more than 7 points under Credit 19 possible (see points for 19.1)
20.1	Responsible Building Materials	Structural and Reinforcing Steel	1	1					95% of steel to be sourced from a Responsible Steel Manufacturer and: - Steel framed building: at least 60% of fabricated structural steelwork to be supplied by an Environmental Sustainability Charter of the ASI certified supplier; OR - Concrete framed building: at least 60% by mass of all reinforcing bar and mesh is produced using energy-reducing processes	To be achieved by the design and during construction	

Credit Code	Credit	Credit Title	Points Avail	Targeted Points				Tier 3 Investigate	Credit Strategy	Action (next steps)	Comment
				Tier 1 Proceed	Tier 1 Investigate	Tier 2 Recommended /TBC	Tier 2 Investigate				
20.2		Timber	1	1					95% of timber to meet GBCA 'Essential' criteria (i.e. FSC or PEFC incl AFS) or is reused. Note this includes formwork, hoardings, structural, non-structural, cladding, finishes, joinery, windows, doors, furniture etc.	To be achieved by the design and during construction	PEFC and AFS meet this requirement. PEFC is almost standard.
20.3		Permanent formwork, pipes, flooring, blinds and cables	1	1					90% by cost of cables, pipes, floors and blinds to be non-PVC or meet Best Practise Guidelines for PVC	To be achieved by the design and during construction	
21	Sustainable Products	Product Transparency and Sustainability	3	1		2			Up to 3 points are available when a 3/6/9% of all materials used in the project meet transparency and sustainability requirements under one of the following initiatives: A. Reused Products; B. Recycled Content Products; C. Environmental Product Declarations; D. Third-Party Certification; or E. Stewardship Programs	Identify compliant materials for key components of building (eg ceiling tiles, ceiling grid, carpet, steel, concrete, sheet-metal, cables, glazing, shading)	At least 3% of compliant products to meet criteria. 6% and 9% achievable by careful design and during construction with medium and higher effort
22	Construction and Demolition Waste	B. Percentage Benchmark	1			1			Construction waste to landfill is reduced by minimising waste against a benchmark building, or achieving 90% diversion. All waste contractors and waste processing facilities must be audited and certified to comply with 'Green Star Construction and Demolition Waste Operational and Reporting Criteria', OR shall disclose the extent that they have implemented the Criteria and provide a timeline for compliance with Part 1 of the Criteria.	Demolition waste compliance to be confirmed (some issues expected) thus credit marked as 'Tier 2' Waste from construction to comply to the highest practicable extent	
Category Totals			14	4	3	3	4	-			

Land Use and Ecology											
23.0	Ecological Value	Endangered, Threatened or Vulnerable Species and	0	CR					No critically endangered, endangered or vulnerable species/communities were present on site at time of purchase		
23.1		Ecological Value	3		1		2	1	Ecological value of site is improved	1. Pre-development site plan required including info on all ground cover types present (building/pavement, type of landscape, etc.) with accompanied surface areas 2. Proposed site plan required with the same info as above 3. Calculation to be performed to determine exact number of points available	
24.0	Sustainable Sites	Conditional Requirement	0	CR				-	At site purchase or option contract date (or between 5-10 years prior to Green Star registration where site owned more than 5 years) the site did not include old growth forest or 'High National Importance' wetland, and did not impact on 'Matters of National Significance'		considered achieved

Credit Code	Credit	Credit Title	Points Avail	Targeted Points				Tier 3 Investigate	Credit Strategy	Action (next steps)	Comment
				Tier 1 Proceed	Tier 1 Investigate	Tier 2 Recommended /TBC	Tier 2 Investigate				
24.1		Reuse of Land	1	1					75% of land was Previously Developed Land at site purchase or Green Star registration for previously owned land		considered achieved
24.2		Contamination and Hazardous Materials (Former 'Best Practice Site Remediation')	1				1		Site is either (or both): - Contaminated such that the intended uses are not permitted under the planning scheme, and has been remediated and signed off by an auditor; OR - Building has had a comprehensive hazardous materials survey carried out and all identified (if any) asbestos, lead or PCBs have been stabilised or removed and disposed of as per relevant Guidelines.	QPRC to confirm the existing building has asbestos, lead or PCB's	
25.1	Heat Island Effect	Heat Island Effect Reduction	1	1					75% of site area to consist of materials/landscaping that reduce heat island effect: - vegetation - green roof - roof materials and shading structures have a high SRI (3yrSRI >64 or initial SRI >82 for pitch <15o, 3yr SRI >34 or initial SRI >39 for roof pitch >15o) - unshaded hardscaping has a 3yr SRI >34 or initial SRI >39 - Hardscaping shaded by overhanging vegetation or roof structures - Water bodies/courses - Areas directly south of vertical building elements shaded by these elements at summer solstice	To be achieved by the design (reflective roof and hardscape, landscape)	
Category Totals			6	2	1	-	3	1			

Emissions											
26.1	Stormwater	Peak Discharge	1	1					Post-development peak event discharge from site to not exceed pre-development peak event discharge. Note: if project targets Adaptation and Resilience credit, and that credit identifies increased low/high risk of rainfall/flooding during project design life, then 1/5 year ARIs to be used for calculations respectively.	Credit to be assessed based on onsite stormwater investigations	considered achievable , due the site being previously developed
26.2		Pollution Targets	1			1			Point for Peak Discharge is achieved, AND: all stormwater discharged from site meets GBCA Pollution Reduction Targets	Purification required OR all stormwater to infiltrate into soil	May result in added costs for stormwater purification
27.0	Light Pollution	Light Pollution to Neighbouring Bodies	0	BASE					Meets requirements of AS 4282 'Control of the Obtrusive Effects of Outdoor Lighting' (applied to all inhabited boundaries, apart from boundaries with roads)		

Credit Code	Credit	Credit Title	Points Avail	Targeted Points				Tier 3 Investigate	Credit Strategy	Action (next steps)	Comment
				Tier 1 Proceed	Tier 1 Investigate	Tier 2 Recommended /TBC	Tier 2 Investigate				
27.1		Light Pollution to Night Sky	1	1					No external luminaire on the project has a ULOR greater than 5% (relative to actual mounting orientation) OR Direct illuminance from external luminaries produce a maximum initial point illuminance value as per AS 4282:1997 no greater than 0.5 Lux to site boundary and 0.1 Lux to 4.5 metres beyond the site into the night sky (using a calculation plane set to highest point of building).	QPRC to confirm no uplighting (such as building feature lighting), or, that lighting is focused onto target	
28.1	Microbial Control	Legionella Impacts from Cooling Systems	1						Project to be nat vent, use water-less heat rejection, or have water-based heat rejection that include compliant measures for Legionella Control and Risk Management (nb: disinfection systems and drift eliminators do not comply)		Considered Tier 3 (not included)
29.1	Refrigerant Impacts	Refrigerant Impacts	1				1		The Total System Direct Environmental Impact (TSDEI), taking into account ODP and GWP, of refrigerant systems in building is >15 OR TSDEI is >15 and <35 and a leak detection system is in place OR All refrigerants have ODP of 0 and GWP < 10 OR No refrigerants are used	Preliminary assessment to be completed	WSP advised this credit not to be targeted, due to its impact on cost and energy efficiency (other credits) indicating that low GWP equipment is not available for the systems that serve non NABERS rated areas. Viridis advised that not all the refrigeration has to comply. Therefore the credit is moved to Tier 2 investigate (medium effort) and Viridis suggest calculation is performed at the later stage when exact refrigerant quantities are known.
Category Totals			5	2	-	1	1	-			

Innovation											
30.A	Innovative Technology or Process	Innovative Technology or Process	2				2		Individual Thermal Comfort - 1 point Onsite Renewables - 2 points Building Integrated Renewable contribute 15% of building power - 1 point No single use process cooling - 1 point Vegetation used for water treatment - 1 point Warm-water microbial control - 1 point	Evaluate onsite renewable options	
30.B	Market Transformation	Market Transformation	2			1			Soft Landings commissioning and Tuning Passive Design of building Sustainable Sourcing of Concrete Aggregates	Explore softlandings (if progressing with all of the Commissioning credits)	

Credit Code	Credit	Credit Title	Points Avail	Targeted Points				Tier 3 Investigate	Credit Strategy	Action (next steps)	Comment
				Tier 1 Proceed	Tier 1 Investigate	Tier 2 Recommended /TBC	Tier 2 Investigate				
30.C	Improving on Green Star Benchmarks	Improving on Green Star Benchmarks	2	2			6		Commissioning and Tuning - Fit out Review - 1 point Indoor Pollutants (Ultra Low VOC Paints) - 1 point Greenhouse Gas Emissions (energy positive building) - 1 point 5% 2 points 10% Sustainable Transport (no new carparks) - 1 point Potable Water (90% reduction in discharge to sewer) - 1 point Life Cycle Impacts - 1 point 20%, 2 points 40% Sustainable Products - 1 point 12%, 2 points 15% Construction and Demolition Waste - <5kg/m2 -1 point Stormwater filtration- 1 or 2 points		Fit out Review - Proceed (as per Commissioning credit) Low VOC paint - Proceed renewable Energy - N/A No New Carparks - N/A LCA - Investigation Required Sustainable Products - Investigation Required C&D Waste -not possible due to demolition waste Stormwater filtration - investigation required)
30.D	Innovation Challenge	Innovation Challenge	2	1		2	5		Affordable Housing Carbon neutral buildings Community Benefits Culture, Heritage and Identity Financial Transparency High Performance Site Offices Integrating Healthy Environments Marketing Excellence Occupant Engagement Reconciliation Action Plan Social Enterprise for Affordable Housing Social Return on Investment Indoor Plants	Investigate and discuss with Council	-Community Benefit (1 point) - Investigate: need to demonstrate benefits to the community above and beyond those provided by the end use. -Culture, Heritage & Identify (1 point) - Investigate -Financial Transparency (1 point) - Proceed: project will disclose costs of sustainable practice to the GBCA for inclusion (aggregated) in an annual report -High Performance Site Office (1 point) - do not target - leave to Head Contractor -Integrating Healthy Environment (1 point) - investigate -Occupant Engagement (1 point) - On hold pending client instruction (complete a pre- and post-occupancy survey. -Reconciliation Action Plan (1 point) - on hold -Social Return on investment - 1 point (investigate further): requires a direct cost benefit analysis as well as indirect cost benefit analysis (covering productivity, health, crime reduction, employment, skills development etc).
30.E	Global Sustainability	Global Sustainability	2				2		Demonstrate compliance with an approved credit from another recognised international rating tool.	Investigate and discuss with Council	This can include things like Green Cleaning, ergonomics, quality of amenities, building related life-cycle costs, Beauty, WELL
Category Totals			10	3	-	3	4	-			