

1-12 Bills Street, Hawthorn

Sustainability Brief

Prepared for: Hayball

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Date: 27 August 2021

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**PLANNING and ENVIRONMENT ACT
BAROONDARA PLANNING SCHEME**

CONSENT UNDER CLAUSE 52.20

VPP2101334

ENDORSED PLAN

Sheet 1 of 27

Signed:

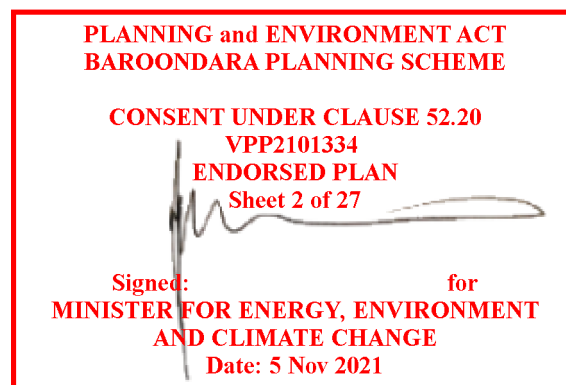
for

**MINISTER FOR ENERGY, ENVIRONMENT
AND CLIMATE CHANGE**

Date: 5 Nov 2021

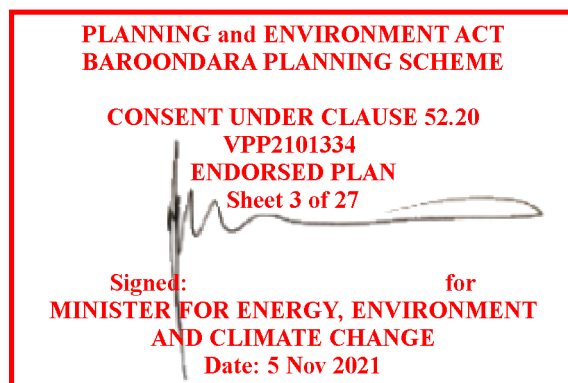
Revision

Issue	Date	Comment	Prepared By	Approved By
01	06/08/2020	Preliminary issue for review	CBK	CBK
02	30/03/2021	90% DD Issue	CBK	CBK
03	01/06/2021	Updated Design Package (100% DD)	CBK	CBK
04	16/06/2021	Updated Design Package (100%DD)	MVS	CBK
05	23/06/2021	Updated Design Package (100%DD)	MVS	CBK
06	27/08/2021	Updated Design Package (100%DD)	MVS	CBK



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Qualifications to this Document

The following qualifications apply to this document:

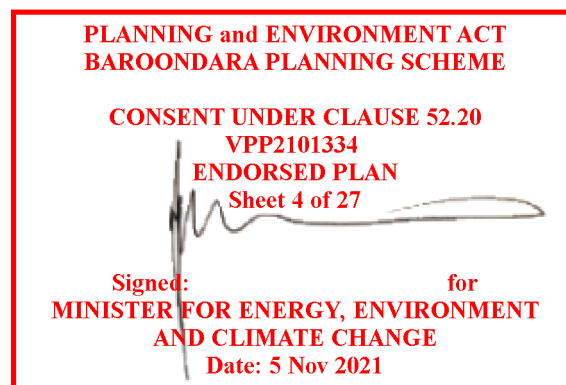
- Information has been based on our understanding of the proposed buildings and documentation provided to date.

Disclaimer

This is a working document and is therefore subject to change or modification through the course of the design phase of this project.

Sustainability rating schemes are tools used to assist a design team in quantifying the potential for a project to achieve an aspirational level of sustainability. This estimate is based on a necessarily simplified and idealised versions of the design and operation of a development that does not and cannot fully represent all of its intricacies once built. As a result, outcomes represent an interpretation of the potential sustainability performance of the site. No guarantee or warrantee of a project's performance in practice can be based on these results alone.

All information presented within this document is based on reasonable design standard assumptions. Please note the following comments are indicative only and should not be taken as fixed. They should only be used as a guide to assist in the decision-making process.



1. Executive Summary

This Sustainability Brief has been prepared at the request of Hayball for the proposed redevelopment of the Bills Street residential development located at 1-12 Bills Street, Hawthorn. This brief is designed to identify Environmentally Sustainable Design (ESD) elements that are to be considered for inclusion within the design to provide social, economic and environmental benefits to the project.

We note that designs presented to us are in continuous development and as such the strategies noted within are subject to design review.

This brief has been based on design discussions and identifies items to be included in the design going forward to ensure the project aligns with DHHS' project requirements. Specifically, this assessment is based on the two parcel site noted within the Project Requirements received 18 May 2020 and does not consider the adjacent university campus.

1.1 Target/Objectives

DHHS have imposed the following strategies and initiatives on the project:

- The development must achieve a minimum 5 Star Green Star Design and As Built certified rating
- A number of mandatory Green Star credits must be achieved for the social housing portion of the development
- Each individual building is required to achieve an average NatHERS (Nationwide House Energy Rating Scheme) rating of at least 7 Stars, with no individual dwelling achieving less than 6 Stars

In addition to the above requirements, ESD enhancements are also strongly encouraged. These enhancements are over and above the minimum project requirements. To assist in the identification of said enhancements, DHHS have developed the following four ESD Objectives:

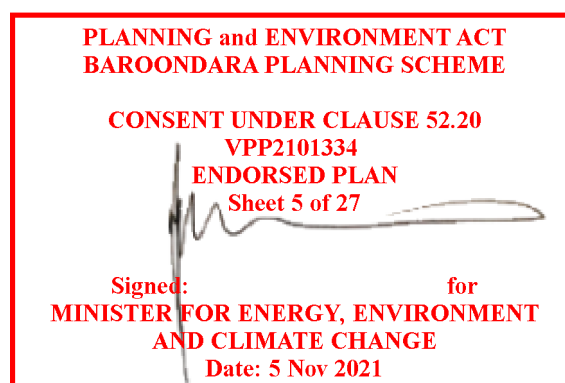
- Human Health and Wellbeing
- Resource Consumption and Environmental Impacts
- Future Readiness
- Target, Evaluate and Learn

While not mandatory, it is highly encouraged that the proponent present ESD enhancements which address the these four ESD Objectives. To that end the following initiatives have been noted for further discussion. All of which are yet to be interrogated and confirmed if they are to be pursued:

- Design the dwellings such that the internal temperature of any dwelling is within a certain range without the use of air-conditioning. *DHHS have noted that they will conduct air tightness testing and thermal imaging as part of their practical completion and defects inspection processes, at its own cost.* It is recommended however, that the contractor engage with a building sealing expert to review and advise on their build approach.
- Incorporation of rooftop solar photovoltaics to offset common areas energy consumption
- Remove the need for natural gas from the development



1-12 Bills Street, Hawthorn

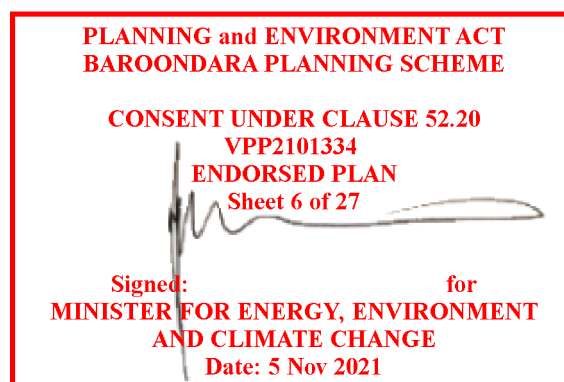


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1.2 Critical Items

The following are the critical items, at this time:

- The project has been registered with the GBCA and the project number is GS-5803DA
- The certification approach will be a Multiple Buildings Single Rating (MBSR) one, with discussion yet to be held with the GBCA about how certain credits are achieved on a building by building basis
- The potential need to engage other consultants or conduct additional assessments to address the Green Star strategy, e.g. a climate adaptation plan (CAP) or a life cycle assessment (LCA)
- The intent of DHHS to conduct air tightness testing and hence the buildability of the building envelope should be a focus
- The requirement to achieve both the thermal comfort credit and the daylight credit. At present the project achieves both.
- Confirmation that the nominated ESD strategies (above those noted as mandatory) will be adopted. While most of the Green Star strategy has been approved, there are a few items that are still outstanding
- The extent of solar PV is yet to be finalised. It is currently anticipated that a 30kW peak system will be installed as a minimum to offset common areas energy loads. However, the project is considering increasing the PV system to all areas of appropriate roof space
- The intent to have an all- electric site
- It is understood that an embedded network will be implemented for the DHW heat pump systems, but for the electricity supply strategy it is yet to be confirmed



2. Green Star Requirements

2.1 Green Star Overview

Green Star is an environmental rating tool developed by the Green Building Council of Australia (GBCA) with the specific purpose of assisting industry in enabling a consistent and measured approach to the environmental rating of buildings. Buildings are ranked between 1 and 6 Stars with only those rating 4 or above can be submitted for a formal certification by the GBCA.

2.1.1 General Requirements

All Contractors engaged on this project shall commit to meeting all of the requirements to achieve the targeted Green Star initiatives, and shall carry out work as detailed and in accordance with this brief and any other written addendums as issued, the whole of which shall be deemed to constitute one document.

This brief shall be read in conjunction with all other design and GBCA documentation and such other written instructions as may be issued during the course of the contract. It is the responsibility of all parties involved in the project to obtain a copy of said documentation from the design team and GBCA.

Where any discrepancies exist between this brief and the relevant design documentation in relation to Green Star affected design, this brief shall take precedence. However, clarification shall still be sought from the Superintendent on all discrepancies.

All of the noted Green Star credits and points form part of the total targeted credits and points to achieve the required star rating. It is the Contractor's responsibility to ensure that their tender submission allows sufficient capacity to achieve all Green Star credits targeted. The Contractor shall ensure that the targeted credits are achieved.

Contractors shall ensure they do not perform any actions to put any of the Green Star credits at risk.

2.1.2 Categories

The Green Star rating tool is made up of eight categories which represent a holistic review of the development of a building. A ninth category is available for sustainable strategies which are either innovative or are not currently measured by the tool.

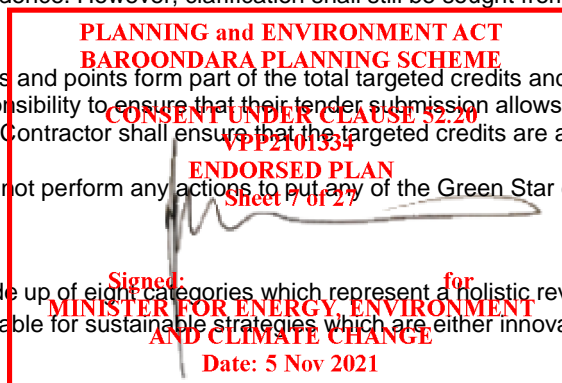
- Management
- Indoor Environmental Quality
- Energy
- Transport
- Water
- Materials
- Land Use and Ecology
- Emissions
- Innovation

2.1.3 Credits

Each category is made up of a number of Credits with varying levels of points available to each Credit. These Credits focus on specific aspects of a development within the Category they are assigned too. Due to the nature of the tool and the actual development being assessed, not all Credits are necessarily applicable to an individual project.

A minimum of 60 points are required for a 5 Star Green Star Rating. It is recommended that projects seeking formal certification target a 10% buffer as some points are likely to change during the design and construction phase of the building due to unforeseen circumstances.

The current version of the rating tool is Green Star – Design & As Built v1.3, which was released to take account of the changes to Section J of the Building Code of Australia 2019.



2.1.4 Mandated Credits

Section 5.3.3 of the Homes Victoria Housing Growth Stimulus Project Requirements outlines a list of minimum mandated Green Star credits which are to be achieved for the Social Housing component. These are noted as:

2.1.4.1 Management

Commissioning and Tuning

Building Services are to be commissioned to the ASHRAE / CIBSE standards and each building services trade will provide As-Built Drawings, Operations & Maintenance Manual, Building Log Book, Commissioning Reports and training of Building Management Staff. An air permeability test will be carried out over a minimum number of dwellings and must not exceed defined air permeability rates.

A services and maintainability review will be conducted by the head contractor or the owner's representative during design stage and prior to construction. This review will facilitate input from the design team, the facilities manager and operations staff and any relevant suppliers and subcontractors.

Following practical completion and prior to occupation, the client will commit to a tuning process for all building systems, which includes quarterly adjustments and measurement for the first 12 months after occupation and a review of building system manufacturer warranties.

An ICA has been engaged directly by DHHS to lead the commissioning and tuning process.

Adaptation and Resilience

A Climate Adaptation Plan will be prepared to assess climate change scenarios and impacts on the project, including the identification of potential risks to people will be undertaken by a qualified third party.

Building Information

A simple easy-to-use Building Users Guide is to be developed and made available to the Building Owner, Building Users and Occupants.

Metering and Monitoring

Water and energy metering will be provided for each dwelling.

Sub-metering of the body corporate energy and water consumption to allow for ongoing building tuning works by the Facility Manager. Energy loads >100kW and water uses with >10% of project's water use will be metered independently.

An automatic monitoring system will be installed to record both consumption and demand of energy and water. This system will be capable of processing the information to produce reports on quarter hourly, hourly, daily, monthly, and annual energy use for all meters in the system.

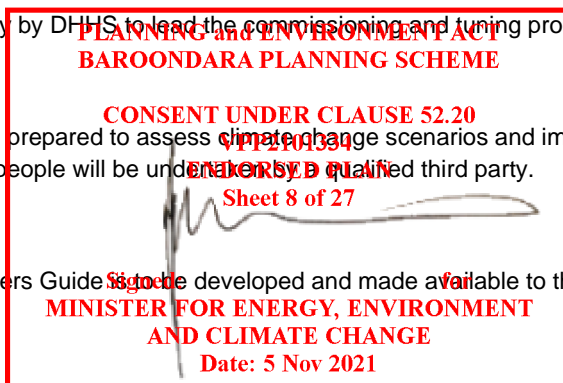
The metering network (including sub-meters) will be validated according to NMI standards and will be commissioned and calibrated at the time of completion. Metering network will be monitored to detect and produce alerts if any inaccuracies are found and correct any inaccuracies.

Responsible Building Practices

The head contractor will prepare a site specific Environmental Management Plan (EMP) and also have ISO 14001 Environmental Management System (EMS) accreditation.

Site specific and core sustainability training for contractors working on the site will be provided to increase their knowledge of sustainable design practices and encourage the incorporation of good sustainability practices into their future projects.

The contractor will implement policies and programs that go beyond the legal requirements for OHS in order to promote health and wellbeing on site.



Facility management will be required to demonstrate a commitment to extending the life of the finishes and equipment in nominated areas to at least 10 years, barring minor wear and tear or minor repairs.

2.1.4.2 Indoor Environment Quality

Indoor Air Quality

The ventilation system will comply with ASHRAE Standard 62.1 in regard to minimum separation distances between pollution sources & outdoor air intakes. Systems are designed for ease of maintenance and cleaning and ductwork will be cleaned prior to use and occupation. Ease of maintenance requires access to both sides of moisture catching components (coils, filters, etc.).

All dwellings will be natural ventilated to provide Outdoor air. Naturally ventilated spaces will have good access to outdoor air and will meet the requirements of AS 1668.4:2012. Mechanically ventilated spaces (i.e. corridors) will be provided with outdoor air at a rate 100% greater than the minimum required by AS 1668.2:2012.

All kitchens will be ventilated in accordance with AS 1668.2-2012. A separate exhaust system will be provided for the kitchen exhaust.

All pollutants from vehicles in an enclosed space will be exhausted to a dedicated exhaust riser or directly to the outside, in accordance with Section 4 of AS 1668.2-2012. This exhaust system will not recycle air to other enclosures.

Acoustic Comfort

All enclosed spaces (residential units) will be acoustically separated to minimise crosstalk between rooms and adjacent areas. Party walls shall be constructed to achieve a weighted sound reduction index $R_w + C_{TR} > 55$. Walls between apartments and public corridors shall be constructed to achieve $R_w > 55$.

Visual Comfort

Blinds will be provided to all nominated areas. These will be controlled by the occupants within each individual space and have a visual light transmittance (VLT) of $\leq 10\%$.

40% of nominated areas to achieve high levels of daylight.

60% of nominated areas will have a clear line of sight to internal or external views. All floor areas within 8m from a compliant high quality view meet these requirements.

Indoor Pollutants

Low Volatile Organic Compounds (VOC) internally applied paints, carpets, adhesives and sealants will be selected for the project.

Low Formaldehyde engineered wood products (particleboard, plywood, MDF) will be selected for the project.

Thermal Comfort

Apartment dwellings will be provided with a high level of thermal comfort for the occupants by achieving an average of 7 Star NatHERS energy rating.

2.1.4.3 Energy

Greenhouse Gas Emissions

The Greenhouse Gas Emissions NatHERS Pathway will be used to assess the reduction in Greenhouse Gas Emissions. Refer to the NatHERS section of this report to understand our approach.

Internal artificial lighting to have lighting power density at least 10% lower than that defined in Table J6.2a.

Independent light switching will be provided to each functional room (ex, living room, kitchens).

Communal areas with automated lighting control system(s), such as occupant detection will also be provided.

Energy efficient LED and fluorescent lighting will be installed throughout.

The minimum energy star rating for the air conditioning equipment is at least 3-star (as per AS 3823.2-2013); and the rated cooling or heating capacity, whichever is greater, of the air conditioning equipment does not exceed the design cooling or heating capacity by more than 15%.

All appliances installed (supplied only) have a minimum Energy Star rating of 1-star below the maximum Energy Star rating available for that appliance type and capacity.

Domestic Hot Water System to be powered by an efficient Electric Heat Pump system with a minimum COP of 3.5.

2.1.4.4 Transport

Sustainable Transport

The development will provide bicycle spaces for the building occupants and visitors. A Green Travel Plan will be produced which will go into greater detail on the transport aspects of the project.

2.1.4.5 Water

Potable Water

Sanitary fixtures across all the development will be within one star of the WELS rating below:

- Taps – 6 Star
- Urinals – 6 Star
- Toilets – 5 Star
- Showers 3 Star (>4.5 but ≤6.0 L/min)
- Dishwashers – 6 Star (where/if supplied)
- Clothes washing machines – 5 Star (where/if supplied)

Site wide strategies have been developed using multiple rainwater tanks which will be installed to collect and re-use rainwater for toilet flushing and irrigation.

No water will be used for HVAC heat rejection.

Landscape irrigation will be addressed through a drip irrigation system with moisture sensor override.

At a minimum, 80% of fire system test water shall be recycled.

2.1.4.6 Emissions

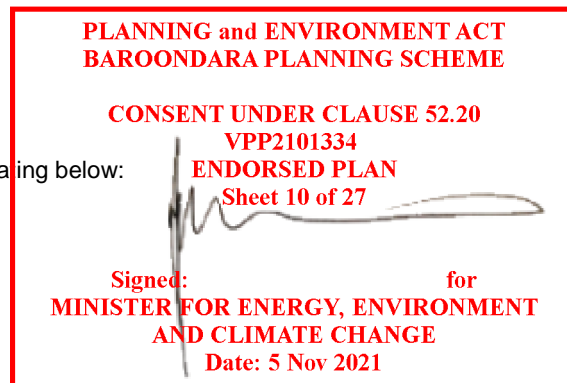
Stormwater

Post development peak event discharge from the site will not exceed the predevelopment peak event discharge. All stormwater discharged from site will meet the following Pollution Reduction Targets.

- Total Suspended Solids (TSS) – 80%
- Gross Pollutants – 90%
- Total Nitrogen (TN) – 45%
- Total Phosphorus (TP) – 60%
- Total Petroleum Hydrocarbons – 90%
- Free Oils – 90%

The project team will develop a Water Sensitive Urban Design (WSUD) strategy, inclusive of MUSIC modelling, to exceed the BPED Guidelines and meet the above Green Star Pollution Reduction Targets.

Light Pollution



External lighting design will be designed to comply with AS 4282:1997 Control of Obtrusive Effects of Outdoor Lighting to minimise any light pollution to night sky. In addition, no external luminaire on the project will have an ULOR that exceeds 5%, relative to its actual mounted orientation.

Microbial Control

The building shall utilise waterless heat rejection systems.

2.1.5 Certification Approach – Multiple Buildings Single Rating

This was introduced in 2009 and was replaced by the Volume approach, however GBCA may still work with applicants on this approach in exceptional circumstances. It allows for buildings with a very high level of commonality and in close proximity to be assessed under one single process with one single certification awarded. This approach only works where the buildings are extremely similar and will never be sold independently of each other. For this project, we understand all buildings will be retained by DHHS.

This pathway includes one single submission with all documentation of the standardised approach, as well as any elements that may differ from building to building. For example, it can relate to how orientation impacts on daylighting and thermal performance. For this reason, credits related to those elements must be submitted for each building, and the building with the lowest score for the credit will be used for the MBSR rating. The project team will need to work with the GBCA to confirm these credits and the approach well ahead of the submission process.

2.1.6 Green Star Pathway

In order for the project to appropriately address the requirement to achieve a 5 star Green Star Design & As Built certified rating, a Green Star Pathway has been prepared based on scope of works completed to date. This Pathway (attached in Appendix A) has been developed based on various discussions with the design team and our knowledge of experience in managing Green Star certification submissions. It identifies the initiatives which are anticipated to be targeted to meet the required 5 Star rating and highlights the mandated Green Star credits for public and affordable housing component.

The approach will continue to be coordinated with the project design team throughout the design phase of the project. While the specific pathway and the non-mandatory targeted credits may be modified during the course of the design stage, the overarching target of achieving a certified 5 star Green Star Design & As Built rating will remain, that is, a minimum score of 60 points.

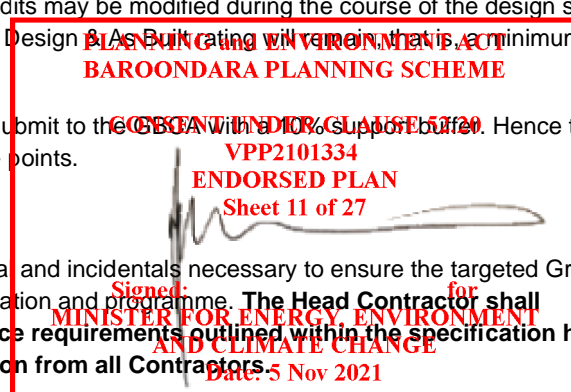
Further to that, to limit risk, it is recommended that all projects submit to the GBCA with a 10% support buffer. Hence the intent of the pathway will be to outline a strategy to achieve 65+ points.

2.1.7 Role of the Contractor

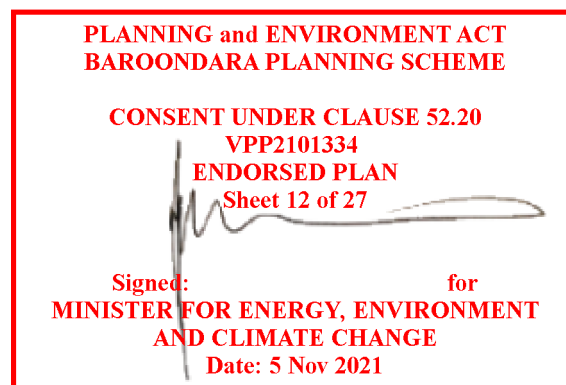
The Contractor shall provide all relevant documentation, material and incidentals necessary to ensure the targeted Green Star rating is achieved in accordance with the design documentation and programme. **The Head Contractor shall maintain primary responsibility for ensuring the performance requirements outlined within the specification have been met, including verification of evidentiary documentation from all Contractors.**

In addition, the Contractor shall comply with the following requirements:

- To raise in a timely manner, queries which require clarification from the Consulting Engineer, such as:
 - Interpretation of the Specification or any documentation
 - Non-compliance with the Specification or any documentation
 - Discrepancies in the design documentation
 - To comply with all aspects of the Contract
- The Contractor shall be aware that the GBCA assessors may request design modifications or additional documentation to achieve the targeted rating
- All relevant Contractors must have access to a copy of the appropriate Green Star Design & As Built Submission Guideline and be suitably familiar with the Green Building Council of Australia's (GBCA) standard documentation and formatting requirements



- The Contractor shall ensure all subcontractors are made aware of all of the Green Star requirements and trained to the appropriate standards
- The Head Contractor shall coordinate and manage all sub-contractors to ensure required deliverables are met in a timely manner and to a GBCA complaint standard



3. NatHERS Requirements

3.1 Target

It is understood that the project will be required to be designed in accordance with the BCA 2019 Volume 1 Section J Energy Efficiency requirements:

- Apartment buildings (Class 2) to achieve an average Nationwide House Energy Rating Scheme (NatHERS) rating of not less than 6 Stars. In addition, no individual dwelling will achieve an energy star rating of less than 5 stars.

In addition to above BCA requirements, the project shall demonstrate compliance with the overarching DHHS overarching NatHERS requirements:

- Apartment buildings (Class 2) to achieve an average Nationwide House Energy Rating Scheme (NatHERS) rating of not less than 7 Stars. In addition, no individual dwelling will achieve an energy star rating of less than 6 Stars.

3.2 Methodology

All residential components of the proposed development will be assessed for conformance with the Performance Requirement of the BCA in relation to Energy Efficiency based on the Nationwide House Energy Rating Scheme (NatHERS). This is a star rating scheme which can be used to demonstrate compliance to BCA Volume 1 Section J1 to J4 for Class 2 components and promote the energy efficiency of a dwelling.

Performance against the NatHERS Scheme is verified using a 2nd generation software packages, FirstRate5, which meets the ABCB Protocol for 2nd generation thermal simulation software and is approved for use throughout Australia.

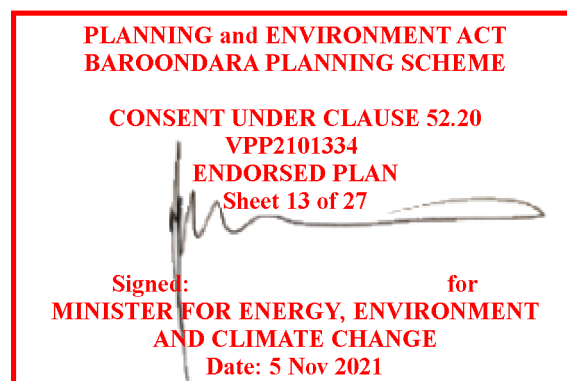
In order to achieve a compliance with the BCA. It is the responsibility of each member of the design team to include any initiatives required to achieve the noted thermal performance within their respective disciplines. This includes providing the relevant documentation required to demonstrate compliance. It is expected that the contractor constructs the building in accordance with the relevant design.

In addition, the project must also comply with the relevant prescriptive requirements of Section J.

3.3 Design Considerations

Refer to Section J report for detailed information on the thermal performance requirements.

In parallel with achieving the overarching thermal performance requirements of the project, the development aims to provide superior build quality for improved thermal comfort in support of the ESD Objectives. Good building sealing and reduced infiltration levels are aimed to be achieved. This will be further supported through adoption of thermal imaging and air permeability testing during the course of the construction works to ensure the nominated building integrity is being achieved.



4. ESD Objectives

Four ESD objectives have been established for this project to assist in developing specific ESD initiatives. The following summarises how some of the initiatives being proposed in the development scheme will integrate with the ESD objectives of the project:

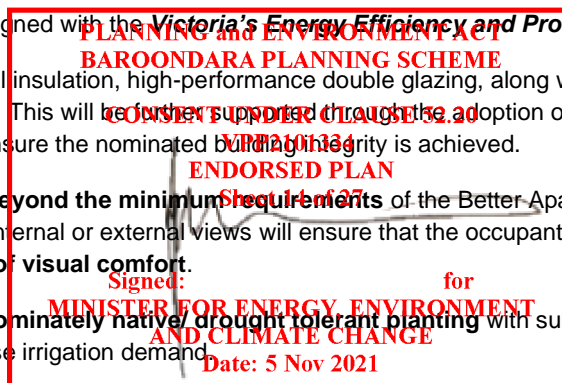
4.1 E01 Human Health & Wellbeing

Protect the health of residents, particularly the vulnerable Victorians, through a focus on safe indoor temperatures, limiting stress stemming from utility cost, and climate change adapted urban design strategies.

- **Targeted energy efficiency measures and improvements to build quality standards above minimum BCA requirements** will reduce energy bills, protect the residents' health, and aim to make homes safer and more comfortable in extreme weather conditions and more frequent and intense heat waves.
- By **providing energy efficient, good quality public housing to a similar standard as affordable housing**, the project aims to mitigate the potential for energy poverty to exist. Energy poverty impacts more and more Australians, with the most vulnerable members being the elderly or those on low incomes. It can lead to bill avoidance and subsequently disconnection, with implications on mental and physical health, safety and independence.

The above will yield outcomes aligned with the **Victoria's Energy Efficiency and Productivity Statement**.

- Improved levels of thermal insulation, high-performance double glazing, along with good building sealing and reduced infiltration levels. This will be further supported through the adoption of thermal imaging and air permeability reviews to ensure the nominated building integrity is achieved.
- Good levels of **daylight beyond the minimum requirements** of the Better Apartment Design Guidelines and good views out to high quality internal or external views will ensure that the occupants will be provided with **well-lit spaces and high levels of visual comfort**.
- Landscaping will be **predominately native/drought tolerant planting** with subsoil drip irrigation and moisture sensor controls to minimise irrigation demand.
- Occupant health will be improved through the reduction of indoor air pollutant levels by **specifying ultra-low VOC paints, low VOC levels for adhesives, sealants and carpets, and low formaldehyde engineered wood products**.



4.2 E02 Resource Consumption & Environmental Impacts

Prioritise passive solar orientation, care of the natural environment and contribute towards the achievement of Victoria's net zero greenhouse gas emissions by 2050 strategies

- The **façade strategy is to be optimised** to carefully design glazing to wall ratios to **achieve a balance between good daylight levels, high levels of solar heat gain and low conduction losses during winter, and controlled solar heat gain in summer**.
- **Towards Net Zero Emissions:** Strategies put in place to contribute towards net zero emissions are: improved building fabric performance and built quality, and low carbon HVAC. Going fully electric removes reliance on gas – in the future, this will support the plan of sourcing electricity from a decarbonised grid.
- The development aims to provide safe and **well-lit walkways** within the site. **Secure bicycle storage** will be provided at a rate which exceeds minimum planning requirements.



4.3 E03 Future Readiness

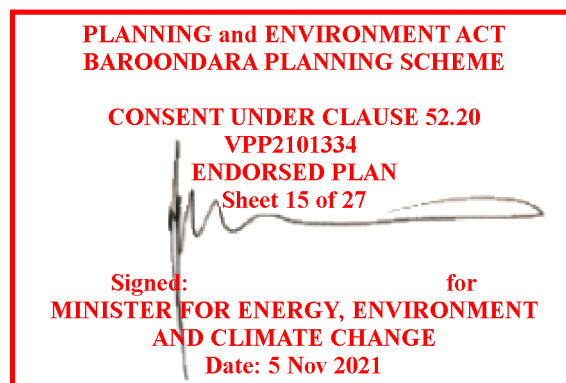
Design to incorporate future ready and resilient infrastructure and features (for example, in climate aspects of climate risk, energy security and management, water, waste, landscape and transport systems)

- A **Climate Change Adaptation Plan** will be developed for the site, taking into account the site's characteristics and climate change scenarios for the project's anticipated lifespan. Potential risks will be identified, and solutions will be included in the building design and construction which will specifically address and mitigate the risks identified through the assessment.
- Health and Wellbeing: Indoor thermal comfort considering more frequent and intense heat waves in the future will be improved through the provision of **improved energy efficiency measures and built quality beyond minimum BCA requirements**.
- Water: A growing population will change the local/regional water demand and increased frequency of heatwaves and reduction in rainfall will result in less availability of water. The development aims to provide an integrated water management strategy which will include the following initiatives: potable water demand management (**water efficient appliances, fixtures and fittings, water less heat rejection**), **rainwater harvesting and re-use**, **improvement to the stormwater quality** runoff, flood management and **provision of native landscaping** with **subsoil drip irrigation** and moisture sensor controls.

4.4 E04 Target, Evaluate & Learn

Model likely performance outcomes at design phase, validate the level of which outcomes have been delivered using post occupancy assessment tools and techniques, and incorporate learning into future/urban developments.

- **Thermal imaging and air permeability testing** during the course of the construction works to ensure the nominated building integrity is being achieved. Well-sealed buildings perform measurably better in both energy efficiency and thermal comfort. Refer to "Thermal Imaging" as an ESD Enhancement.
- Completion of a **post occupancy survey** between 6-12 months after practical completion. A recognised survey is to be used (such as BOSSA or BUS) and responses should be collected from a representative sample of regular building occupants. The surveys would typically cover: indoor air quality, thermal comfort, acoustic comfort, daylight and artificial lighting and building cleanliness.



5. ESD Enhancements

Additional ESD enhancements beyond the mandated requirements are noted below.

5.1 Towards Net Zero Emissions

The project aims to implement elements which move towards “net zero emissions”.

5.1.1 Building Fabric Performance

- High performance glazing – double glazed systems
- Improved building sealing and reduced infiltration levels
- Adoption of thermal imaging and air permeability testing during construction

5.1.2 Low Carbon HVAC

- Energy efficient appliances, efficient lighting design and heating/cooling systems.

5.1.3 On-site renewables

- Solar photovoltaics array on each building to offset base building services including common area lighting & power, lifts, electric hot water heat pumps etc.

5.2 Thermal Imaging and Air Tightness Testing

Thermal imaging and air tightness testing will be undertaken at the post construction phase of the project as part of the quality control process by DHHS. Thermal imaging works by reading temperature differentials within a defined space. It is an accurate, fast and non-invasive method of discovering potential building defects. Air tightness testing works by pressurising the test space to a specific level to ensure it is suitably airtight and thus limiting the external climate's ability to affect internal conditions and avoid excessive energy loss.

Considering that both of these initiatives are an after the fact approach to ensuring good build quality, the ESD enhancement proposed is to engage with a specialist contractor during the design and construction phase such that they conduct reviews of the proposed design and construction methodology to alleviate any potential rectification works.

The residents, environment and the project team will benefit from this process: the residents receive well-constructed apartments free of defects which will reduce their energy consumption, consequently leading to less greenhouse gas emissions to the environment, while the project team will be made more aware of lapses that can occur during the construction phase and adapt accordingly for future projects.

5.3 Waste and Composting

It is currently proposed that a three-tiered bin system (landfill, recycling and local composting) will be provided in each apartment. This could be supplemented with a waste education program for residents which could be in the form of gardening classes, signs or booklets with the goal of encouraging residents to further separate their waste into compost piles rather than disposing it into landfills. This will require the commitment of the building managers and residents in an ongoing process throughout the development's lifetime.

Redirecting this waste away from landfills into compost piles will:

- Reduce the amount of waste going into landfills
- Lower greenhouse gas emissions and leachate from said landfills
- Improve soil quality and soil water retention at compost sites (which will in turn reduce watering requirements)
- Reduce Victoria's greenhouse gas emissions from landfills

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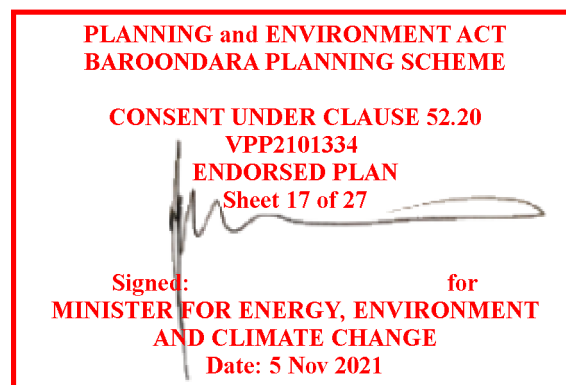
- Teach residents to care for the natural environment

The residents and the environment will benefit from this enhancement: the residents through the produce grown in the communal compost garden which can be either freely given away or sold with its proceeds used to fund other community projects, and the environment through the reduction of greenhouse gases.

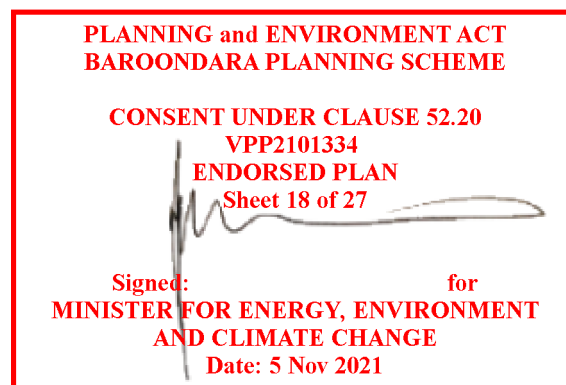
5.4 Ultra-low Volatile Organic Compound (VOC) paints

VOC's are responsible for a range of health problems including eye, nose and throat irritation, headaches, nausea and in more severe cases, damage to the liver, kidney and central nervous system.

Paints are known to be one of the largest contributors of VOCs within a building, hence, to further improve the indoor air quality of the development, ultra-low VOC paints will be used. These paints contain less than a third of the VOC's used in standard paints, with about 5mg/L compared to the standard 16mg/L. Hence, this will relate to ESD Objective E01 Human Health & Wellbeing by reducing the amount of pollutants occupants are exposed to within the building.



Appendix A – Green Star Pathway





CATEGORY / CREDIT	AIM OF THE CREDIT / SELECTION	CODE	CREDIT CRITERIA	POINTS AVAILABLE	POINTS TARGETED	POINTS AWARDED	POINTS TBC	RESPONSIBILITY	STANTEC GSAP COMMENTS		
Indoor Environment Quality						16					
Indoor Air Quality	To recognise projects that provide high air quality to occupants.	9.1	Ventilation System Attributes	1	1			Mech	Standard practice -ventilation system must be cleaned prior to installation and designed for ease of maintenance, OA intakes must meet minimum ASHRAE 62.1 standards for pollutants/exhaust. Can be managed by on-site management system from Contractor.		
		9.2	Provision of Outdoor Air	2	2			Mech	Mechanically ventilated spaces - outdoor air is provided at a rate of 50% greater (1 point) or 100% greater (2 points) than AS: 1668.2 2012. Naturally ventilated spaces to meet requirements of AS1668.4 2012		
		9.3	Exhaust or Elimination of Pollutants	1	1			Mech	Standard practice Domestic kitchens to use either (A) a non-recirculating exhaust system, exhausting directly to outside; or (B) where a recirculating system is used, utilise filtration that has been proven to effectively remove kitchen pollutants, to maintain indoor air quality.		
Acoustic Comfort	To reward projects that provide appropriate and comfortable acoustic conditions for occupants.	10.1	Internal Noise Levels	1				Acoustics	Internal ambient noise levels are not no more than 10dB (for naturally ventilated spaces and 5dB (for mechanically ventilated spaces) above satisfactory sounds levels in Table 1 of AS/NZS 2107:2000. Difficult to achieve as testing requires windows to be open. Credit not targeted		
		10.2	Reverberation	0				Acoustics	Not applicable for residential projects.		
		10.3	Acoustic Separation	C. Residential Projects	1	1			Acoustics	Typically requires additional treatments which can affect wall, floor and roof details etc. Known to instigate a higher construction cost.	
Lighting Comfort	To encourage and recognise well-lit spaces that provide a high degree of comfort to users.	11.0	Minimum Lighting Comfort	-	Complies			Elec	Standard Practice - Flicker free lighting and all light sources must have a minimum Colour Rendering Index (CRI) of 80.		
		11.1 General Illuminance and Glare Reduction	11.1.1 General Illuminance	1	1			Elec	Standard Practice - For all living spaces, kitchen, bathrooms and bedrooms the lighting design provides good maintained illuminance values for entire room, and installed light fittings have rated colour variation not exceeding 3 MacAdam Ellipses.		
			11.1.2 Glare Reduction					Elec	Generally Standard Practice - Bare light sources must be fitted with baffles, louvers, diffusers etc to obscure direct light and glare to the occupants.		
			11.2	Surface Illuminance	1	1			Elec	At least one wall in each living space, kitchen and bedroom is provided with at least one specific wall-washing or wall mounted fitting. Typically involves an uplift in cost associated with additional light fittings. Architect intends on complying with this credit.	
		11.3	Localised Lighting Control	1	1			Elec	Occupants have the ability to control the lighting in their immediate environment. The provision of sufficient power outlets for future task lights / lamps. Appropriate task lighting must be provided for kitchens, bathrooms, and service areas. Might incur additional cost for increased number of power points and lighting multi switch plates.		
		Visual Comfort	To recognise the delivery of well-lit spaces that provide high levels of visual comfort to building occupants.	12.0	Glare Reduction	-	Complies			Architect	Provision of blinds to all living rooms (bedrooms and bathrooms are exempt from complying). Blinds to be manually controlled by the occupants and have a visual light transmittance (VLT) of ≤ 10%. If it is expected that blinds will be installed by the occupiers, then these spaces are excluded from the minimum requirement. Blinds to be installed for public housing.
				12.1	Daylight	2	1			Architect	40% (or more) of the nominated area to receive a high level of daylight. May incur additional daylight modelling fees, depending on the design approach.
12.2	Views			1	1			Architect	60% of nominated area must have a clear line of sight to a high quality internal or external view. All floor areas within 8m from a compliant view can be considered to meet this credit criterion.		
Indoor Pollutants	To recognise projects that safeguard occupant health through the reduction in internal air pollutant levels.			13.1 Paints, Adhesives, Sealants and Carpets	1	1			All	Standard Practice - low VOCs	
		13.2	Engineered Wood Products	1	1			Architect	Standard Practice - low VOCs		
								All	Standard Practice - low formaldehyde		
Thermal Comfort	To encourage and recognise projects that achieve high levels of thermal comfort.	14.1	Thermal Comfort	1	1			ESD/ Architect	Residential spaces - an average NatHERS rating of 7 Stars or greater. This is aligned with the DHHS overarching 7 Star average NatHERS requirement		
		14.2	Advanced Thermal Comfort	1	0		0	ESD/ Architect	Residential spaces - an average NatHERS rating of 8 Stars or greater. Highly dependent on the thermal performance and building envelope approach.		
Total				16	13	0	0				


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Energy				22					
Greenhouse Gas Emissions	B. NatHERS Rating Pathway	15A.0	Conditional Requirement: Prescriptive Pathway	-	Complies				
		15A.1	Building Envelope	0					
		15A.2	Wall-Glazing Construction and Retail Display Glazing	0					
		15A.3	Lighting	0					
		15A.4	Ventilation and Air Conditioning	0					
		15A.5	Domestic Hot Water	0					
		15A.6	Transition Plan	0					
		15A.7	Fuel Switching	0					
		15A.8	On-Site Storage	0					
		15A.9	Vertical Transportation	0					
		15A.10	Off-Site Renewables	0					
		15B.0	Conditional Requirement: NatHERS Pathway	-	Complies				
		15B.1	Thermal and Energy Performance	6	2		0		
		15B.2 Building Services and Appliances	15B.2.1 Lighting	1	1				
			15B.2.2 Ventilation and Air Conditioning <div><div><div></div><div></div><div></div></div><div>A. Mechanically Conditioned Spaces B. Spaces With Mechanical Heating Only C. Naturally Ventilated Spaces</div></div>	2	2				
			15B.2.3 Domestic Hot Water	2	0.5		1		
			15B.2.4 Appliances & Equipment	1	1				
			15B.2.5 Fuel Switching	1	0				
			15B.2.6 On-Site Storage	1	0				
			15B.2.7 Vertical Transportation	1	0		1		
			15B.2.8 Passive Laundry Facilities	1			0		
			15B.2.9 Unoccupied Areas	1	0				
			15B.2.10 Off-Site Renewables	5	0				
		15C.0	Conditional Requirement: BASIX Pathway	-					
		15C.1	BASIX Greenhouse Gas Reductions	0					
		15C.2	Off-Site Renewables	0					
		15D.0	Conditional Requirement: NABERS Pathway	-					
		15D.1	NABERS Energy Greenhouse Gas Emissions Reduction	0					
		15D.2	Off-Site Renewables	0					
		15D.3 Additional Prescriptive Measures	15D.3.1 Transition Plan	0					
			15D.3.2 Fuel Switching	0					
			15D.3.3 On-Site Storage	0					

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		15E.0	Conditional Requirement: Reference Building Pathway	-	
		15E.1	GHG Emissions Reduction: Building Fabric	0	
		15E.2	GHG Emissions Reduction	0	
		15E.3	Off-Site Renewables	0	
		15E.4	District Services	0	
		15E.5 Additional Prescriptive Measures	15E.5.1 Transition Plan	0	
			15E.5.2 Fuel Switching	0	
			15E.5.3 On-Site Storage	0	
Peak Electricity Demand Reduction	A. Prescriptive Pathway	16A	Prescriptive Pathway: On-Site Energy Generation	1	0
		16B	Modelled Performance Pathway: Reference Building	0	
Total				17	6.5

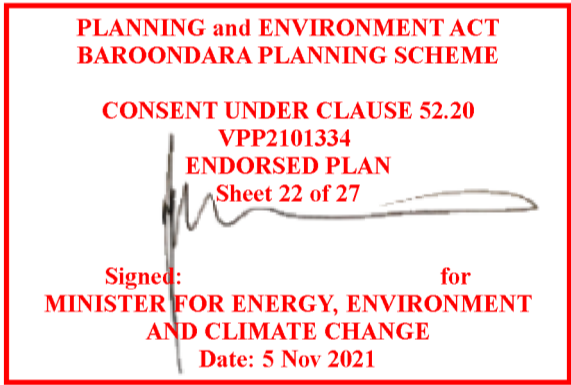
POINTS AWARDED	POINTS TBC
0	2

RESPONSIBILITY	STANTEC GSAP COMMENTS
ESD/ Client/ Electrical	Possibility for between 8-16 points(in this catagory) if solar PV is included within the project. Maximise PV on available roof space to gain most benefit (aim for >30% annual energy consumption). The associated cost may be absorbed by the embedded network provider.
ESD/ Client/ Electrical	The use of on-site electricity generation reduces the total peak electricity demand by 15%. PV by itself will not achieve this credit. Project would need to include battery storage, which is not recommended.

Transport						10	
Sustainable Transport	B. Prescriptive Pathway						
		17A Performance Pathway				0	0
		17B.1 Access by Public Transport				3	2
		17B.2 Reduced Car Parking Provision				1	0.5
		17B.3 Low Emission Vehicle Infrastructure		A. Parking for Fuel-Efficient Vehicles		1	0
		17B.4 Active Transport Facilities				1	1
17B.5 Walkable Neighbourhoods		A. Proximity to Amenities		1	0		
Total						7	3.5

POINTS AWARDED	POINTS TBC
0	1

Traffic	A Transport Plan is required to inform the inputs into the Sustainable Transport Calculator. The proposed transport initiatives are then compared to a reference building with respect to: emissions reduction, active mode encouragement, vehicle km travelled reduction and walkable location. Strategies to achieve these points include: - Walkable neighbourhoods - Dedicated EV car parks and charging stations - Bicycle spaces and secure storage cases (mandatory item) - Car share schemes - Proximity to public transport



Water				12	
Potable Water	B. Prescriptive Pathway	18A	Potable Water - Performance Pathway	0	
		18B.1	Sanitary Fixture Efficiency	1	1
		18B.2	Rainwater Reuse	1	1
		18B.3	Heat Rejection	2	2
		18B.4	Landscape Irrigation	1	1
		18B.5	Fire Protection System Test Water	1	1

POINTS AWARDED	POINTS TBC


	Performance calculator. To achieve 6 points requires all min star ratings to be achieved as per list below as well as all other prescriptive items (where applicable). Public housing has to achieve 6 points performance pathway or 5 points perscriptive
Architect	All fixtures and fittings within 1 Star of the WELS ratings noted below: Taps 6 Star Toilet 5 Star Showers 3 Star (>4.5 but <=6.0) Dishwashers 6 Star While this is common practice, this may add a premium to some FF&E selections. Note: washing machines not intended to be provided as part of base building and dishwashers are not provided for social housing
ESD/ Hydraulic	Standard practice Rainwater tanks installed to collect and reuse rainwater within the site's boundary, for toilet flushing and irrigation. Water balance calcs required
Mechanical	Waterless heat-rejection cooling system. (Split system A/C meets credit)
Hydraulic/ Landscape	Subsoil drip irrigation and moisture sensor controls to be installed. Note: rainwater to be used for irrigation, topped up by potable water when rainwater storage is not sufficient. May require an uspec of irrigation system.
Fire Protection	Standard Practice - The fire protection system includes temporary storage for 80% of the routine fire protection system test water and maintenance drain-downs for reuse on-site. Each floor must be fitted with isolation valves or shut-off points for floor-by-floor testing



CATEGORY / CREDIT	AIM OF THE CREDIT / SELECTION	CODE	CREDIT CRITERIA	POINTS AVAILABLE	POINTS TARGETED	POINTS AWARDED	POINTS TBC	RESPONSIBILITY	STANTEC GSAP COMMENTS
Total				6	6	0	0		

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Materials						14					
Life Cycle Impacts	A. Performance Pathway - Life Cycle Assessment	19A.1	Comparative Life Cycle Assessment		6	3	0	ESD	A whole-of-building, whole-of-life (cradle-to-grave) life cycle assessment (LCA) to be conducted for the project. Points are awarded based on the extent of environmental impact reduction achieved for nominated environmental impact categories, when compared to a reference building.		
		19A.2	Additional Reporting	<div>▣</div>	A. Additional Life Cycle Impact Reporting	4			1	ESD/ All	LCA to include one additional impact category (no additional cost); 1 Point TBC for additional initiative which may add cost
				<div>▣</div>	B. Material Selection Improvement						
				<div>▣</div>	C. Construction Process Improvement						
				<div>▣</div>	D. LCA Design Review						
		19B.1 Concrete	19B.1.1 Portland Cement Reduction		0				Alternatively 1 point for portland cement content reduced by 30% , additional point for 40% Structural to confirm feasibility		
			19B.1.2 Water Reduction		0	Alternatively 0.5 Point TBC - 50% of mix water must be captured or reclaimed Structural/Contractor to confirm feasibility					
			19B.1.3 Aggregates Reduction		0					Alternatively 0.5 Point TBC - 40% of course aggregates are crushed slag or other alternative material Structural/Contractor to confirm feasibility	
		19B.2 Steel	A. Reduced Mass of Steel Framing		B. Reduction in Mass				0		Alternatively 1 Point Targeted - requires 5% reduction in mass of steel framing compared to reference building *To confirm if steel framed or concrete framed building
			19B.3	Building Reuse	19B.3.1 Façade Reuse				0		Unable to target
		19B.3.2 Structure Reuse			0				Unable to target		
		19B.4	Structural Timber	19B.4.0 Responsible Sourcing		-			Complies	30%, 70%, or 90% of building's GFA must be constructed with structural timber	
19B.4.1 Reduced Embodied Impacts				0							
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	Structural/ Contractor	Standard Practice - Steel is sourced from a Responsible Steel Maker (ISO 14001 certified steel maker and member of World Steel Association's (WSA) Climate Action Programme (CAP)).		
				A. Responsible Steel Fabricator		1	1	Structural/ Contractor	Standard Practice - For steel framed buildings, at least 60% of the fabricated structural steelwork is to be supplied by a steel fabricator/steel contractor accredited to the Environmental Sustainability Charter of the Australian Steel Institute (ASI). For concrete framed buildings, at least 60% (by mass) of all reinforcing bar and mesh is to be produced using energy-reducing processed in their manufacture, like Polymer Injection Technology (PIT). *To confirm if steel framed or concrete framed building		
		20.2	Timber	<div>▣</div>	A. Certified Timber	1	1	Structural/ Architect	All timber to come from certified AFC/FSC source N/A if total cost of timber is less than 0.1% of Project Contract Value. While this is common practice, this may add a premium to some selections.		
				<div>▣</div>	B. Reused Timber						
		20.3	Permanent Formwork, Pipes, Flooring, Blinds and Cables		B. Best Practice Guidelines for PVC		1	1	All	Standard Practice - No PVC content or PVC meets Best Practice. While this is common practice, this may add a premium to some selections	
Sustainable Products	To encourage sustainability and transparency in product specification.	21.1			3	1	0	All	3%, 6% or 9% of eligible products must meet guidelines for 1, 2, or 3 points Depends on project intent and plan for materials and product sourcing - can be relatively easy or costly and complicated. Typically dictated by design choice.		
Construction and Demolition Waste	B. Percentage Benchmark	22.0	Reporting Accuracy		A. Compliance Verification Summary		-	Does not comply	Contractor	Standard Practice - Requires waste reporting to meet Green Star criteria. We understand this to be a high risk item as DHHS have already demolished the site and it may not have been done in accordance with the credit requirements.	
		22A	Fixed Benchmark		0						
		22B	Percentage Benchmark		1	0	0	Contractor	1 Point Targeted - 90% C&D waste diverted from landfill. Standard practice is 80%. However, unsure if there would be an additional cost to go to a 90% target. Depends on the contractor. We understand this to be a high risk item as DHHS have already demolished the site and it may not have been done in accordance with the credit requirements.		
Total				14	8	0	0				

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Land Use & Ecology						6			
Ecological Value	To reward projects that improve the ecological value of their site.	23.0	Endangered, Threatened or Vulnerable Species	C. Other Project Types	-	Complies	Complies	Client	No critically endangered or vulnerable species were present on site at time of purchase.
		23.1	Ecological Value		3	1		Landscape	Will depend on extent of landscaping & vegetation. Min. 1% improvement on base case outcome on the existing site condition. Maximising native vegetation should be prioritised
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		-	At the date of site purchase or date of option contract, the project site did not include old growth forest or wetland of 'High National Importance', or did not impact on 'Matters of National Significance'.
		24.1	Reuse of Land	A. Previously Developed Land	1	0		-	75% of the site would need to be previously developed land to be able to claim this point.
		24.2	Contamination and Hazardous Materials	A. Site Contamination	1	Client		A comprehensive hazardous materials survey to be carried out on the project site with any identified asbestos, lead or PCBs shall be stabilised, or removed and disposed of in accordance with best practice guidelines. Site must have existing 'contamination' which requires remediation to target any points under this criteria. We understand this to be a high risk item as DHHS have already demolished the site and it may not have been done in accordance with the credit requirements.	
				B. Hazardous Materials				Architect/ Landscape	Requires at least 75% of site area to comply: via a combination of light colour roofs with a high SRI, vegetation and/or solar PV
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	0		
Total					6	2	0	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		Civil	Standard Practice Post-development peak Average Recurrence Interval (ARI) event discharge from the site does not exceed the pre-development peak ARI event discharge.
		26.2	Stormwater Pollution Targets		1	1		Civil	Standard Practice All stormwater discharged from site to meet the specified Pollution Reduction Targets Column A
Light Pollution	To reward projects that minimise light pollution.	27.0	Light Pollution to Neighbouring Bodies		-	Complies		Architect/ Electrical	Standard Practice - Project to comply with AS 4282:1997 Control of the obtrusive effects of outdoor lighting. Whilst AS 4282 only refers to 'at the boundary of residential windows', the GBCE expect these levels to be applied at the site boundary, regardless of the distance to the nearest residential development.
		27.1	Light Pollution to Night Sky	A. Control of Upward Light Output Ratio (ULOR)	1	1		Architect/ Electrical	Standard Practice - No external luminaire on the project to have a ULOR that exceeds 5%, relative to its actual mounted orientation. Should be easy to achieve but prevents the use of any uplighting to façade or landscape elements. All external lighting must have a maximum upward light ratio of 5%.
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		Mechanical	Waterless heat-rejection cooling systems will be installed. (Split system AC meets credit)
Refrigerant Impacts	To encourage operational practices that minimise the environmental impacts of refrigeration equipment.	29.1	Refrigerants Impacts	C. Low Impact Refrigerants	1	0		-	Not targeted - All refrigerants to have zero ODP and a GWP of 10 or less OR the Total System Direct Environmental Impact (TSDEI) of refrigerant system is less than 15.
Total				5	4			0	0

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Innovation				10					
Innovative Technology or Process	The project meets the aims of an existing credit using a technology or process that is considered innovative in Australia or the world.	30A	Innovative Technology or Process	10					
Market Transformation	The project has undertaken a sustainability initiative that substantially contributes to the broader market transformation towards sustainable development in Australia or in the world.	30B	Market Transformation				1	Client/ Electrical	- Solar photovoltaic energy - 1 point achieved if renewable energy contributes 15% of the building load. 2 points achieved if renewable energy contributes 30% of the building load.
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		2		0	Architect	- Ultra low VOC paints . Over 50% of paints (by cost) specified in the building have a maximum TVOC content of 5g/L (ex. Ecolour) (1 point TBC)
	Where the project addresses an sustainability issue not included within any of the Credits in the existing Green Star rating tools.							Civil	- Stormwater Pollution Targets - Pollution Reduction Targets from column B (1 point)
Innovation Challenge		30D	Innovation Challenge	10	4			Client	- Local Procurement - percentage of the products and materials used in the project were produced or manufactured in Australia is significant in comparison to industry standard (1 point) - Financial Transparency – disclosing the over & above design, documentation, and construction costs of a Green Star project to the GBCA. This data would be used in the GBCA's yearly reports. (1 point) - Occupant Engagement – completion of a post occupancy survey between 6-12 months after practical completion. A recognised survey is to be used (like BOSSA or BUS) and responses should be collected from a representative sample of regular building occupants. The surveys would typically cover: indoor air quality, thermal comfort, acoustic comfort, daylight and artificial lighting and building cleanliness. (1 point) - Community Benefits - Perform a 'needs analysis' of the surrounding community. This may include community briefings, meetings or workshops; Develop a strategy for how the project will provide social/community benefits and consult with the broader community on the proposed plan; and Implement the plan and deliver outcomes as defined by the community benefits strategy.
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		1		0	ESD	- Safe-Places - from communities tool. all public areas, such as playgrounds and community food gardens, must be visible from at least one street. A crime risk assessment process is undertaken; and a design strategy has been adopted that incorporates designing out crime principles.
Total				10	7	0	1		

TOTALS	AVAILABLE	TARGETED	AWARDED	TBC
CORE POINTS	99	57.0	0.0	5.0
CATEGORY PERCENTAGE SCORE		57.6		
INNOVATION POINTS	10	7.0		
TOTAL SCORE TARGETED		64.6		

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Design with
community in mind

Level 22

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Date: 5 Nov 2021