

Nunawading Christian College ELC

161 Central Rd, Nunawading

Sustainability Management Plan

Issued: 31 May 2024

Status: Final

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Issue and change log

Date	Purpose of issue and changes	Status	Author
31 May 2024	For Planning Approval	Final	PG
20 May 2024	For design team comment	Draft	PG

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1 Executive summary

1.1 Sustainability Management Plan (SMP)

This Sustainability Management Plan (SMP) provides a detailed sustainability assessment of the project at the planning stage. It addresses key sustainable design criteria and demonstrates that a detailed and holistic ESD (environmentally or ecologically sustainable development) review has been undertaken. This document also identifies responsibilities for the implementation of the various ESD aspects through the life of the project (design through construction to operation and maintenance).

The report is consistent with the SDAPP (Sustainable Design Assessment in the Planning Process) framework as developed by Victorian local governments. The categories appearing in this framework are fully covered in Section 3 of this document although the terminology and order of categories is slightly different.

1.2 BESS (Built Environment Sustainability Scorecard) assessment

BESS assesses energy and water efficiency, thermal comfort, and overall environmental sustainability performance of new buildings or alterations. It was created to assist builders and developers to demonstrate that they meet sustainability information requirements as part of a planning permit applications. The BESS tool assesses projects against a benchmark in nine (9) environmental categories as listed below with points available in each category for relevant design strategies.

- | | |
|---------------------------------------|------------------|
| 1. Management | 6. Transport |
| 2. Water * | 7. Waste |
| 3. Energy * | 8. Urban ecology |
| 4. Stormwater * | 9. Innovation |
| 5. Indoor environment quality (IEQ) * | 10. Materials ** |

* mandatory category with minimum pass rates.

** supplementary category for council that is additional to BESS.

The overall BESS score is shown as a percentage improvement over a benchmark project.

- A score of 50% and higher is the minimum requirement and equates to "best practice".
- A score of 70% and higher denotes improved performance and equates to BESS "excellence".

This SMP has a target "best practice" rating and the adjacent table shows the outcomes of the assessment. Further details including the measures needed to achieve the target rating are identified in Section 3 and Appendix A.

- The BESS score of 60 exceeds the target score of 50.
- **The project therefore achieves the target best practice rating.**

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1.3 Key ESD attributes of the development

The development will meet the requirements of the Whitehorse City Council Planning Scheme with enhanced ESD attributes as outlined in this SMP. This will ensure an appropriate level of sustainability for the development; and, in doing so, will: provide community benefits; manage environmental impact; improve the indoor environment; and facilitate the efficient use of existing energy, water and transportation infrastructure.

Key ESD attributes of the project include:

- An "all-electric" design.
- Water efficient products.
- Rainwater harvesting and reuse enables potable water use reductions.
- Efficient lighting systems, air conditioning systems and appliances.
- Reduced peak demand on electrical infrastructure.
- Thermal imaging to confirm insulation quality.
- Best practice water sensitive urban design (WSUD).
- Low-VOC products mean lower health risks associated with indoor pollutants.
- Reduced obtrusive effects of lighting to neighbours and the night sky.
- Minimum demolition and construction waste recycling rate of 90%.
- Building tuning ensures ongoing optimum energy efficiency.

2 Introduction

2.1 Description of the project

The proposed development is located at 161 Central Rd, Nunawading.

Key project data includes:

- Site area 3100 m²
- Gross floor area 990 m²

The following bicycle trail on the Principle Bicycle Network is accessible: Box Hill - Ringwood Trail which is immediately adjacent the development. There are many bicycle friendly streets around the development that provide good cycling access to the local community.

The development includes a new single storey early learning centre.

The development is located at 161 Central Rd Nunawading. The Blackburn Lake Sanctuary is located within 10 minutes walking distance of the development. A bus stop on Centre Rd adjacent the development and connects the development to Blackburn, Forrest Hill Chase, The Glen, Vermont South and Mitcham shopping centres via the 736 bus route; these centres provide full amenity to social infrastructure, entertainment and shopping and many are within a 20 min bus ride. Various modes of public transport connection to the broader Melbourne Metropolitan are available at many of these shopping centres.

The Box Hill - Ringwood Bicycle Trail is immediately adjacent the development. There are many bicycle friendly streets around the development that provide good cycling access to the local community

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Walk Score
54

Somewhat Walkable

Some errands can be accomplished on foot.

Transit Score
58

Good Transit

Many nearby public transportation options.

About your score

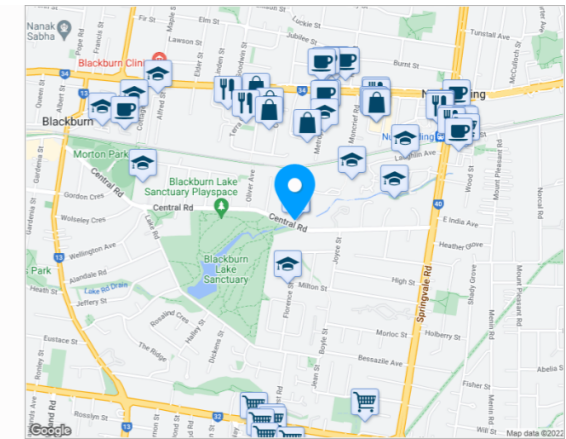


Figure 2: Walkability score

2.2 Council Planning Scheme

Following is a summary of the relevant Whitehorse City Council Planning Scheme objectives and the project response in relation to ESD aspects of these objectives.

21.03 Municipal Strategic Statement - A Vision for the City of Whitehorse

Objectives:

- Maintain and enhance our built environment to ensure a liveable and sustainable city.

Project response:

- The development achieves a best practice rating using the BESS ESD assessment tool and significantly exceeds the required energy score using the BESS ESD assessment tool (refer to Section 1.2). Energy appliances and air conditioning systems. (refer to items ene-5 and ene-7).

53.18 Stormwater Management (WSUD)

Objectives:

- Stormwater management to protect the environmental values and receiving waters from degradation; that maximises the retention and reuse of stormwater.

Project response:

- The design response includes best practice WSUD (refer to item sto-1 and Appendix D).

52.34 Bicycle Facilities

Objectives:

- To encourage cycling as a mode of transport.

Project response:

- Bicycle facilities are proposed (refer to item trn-1).

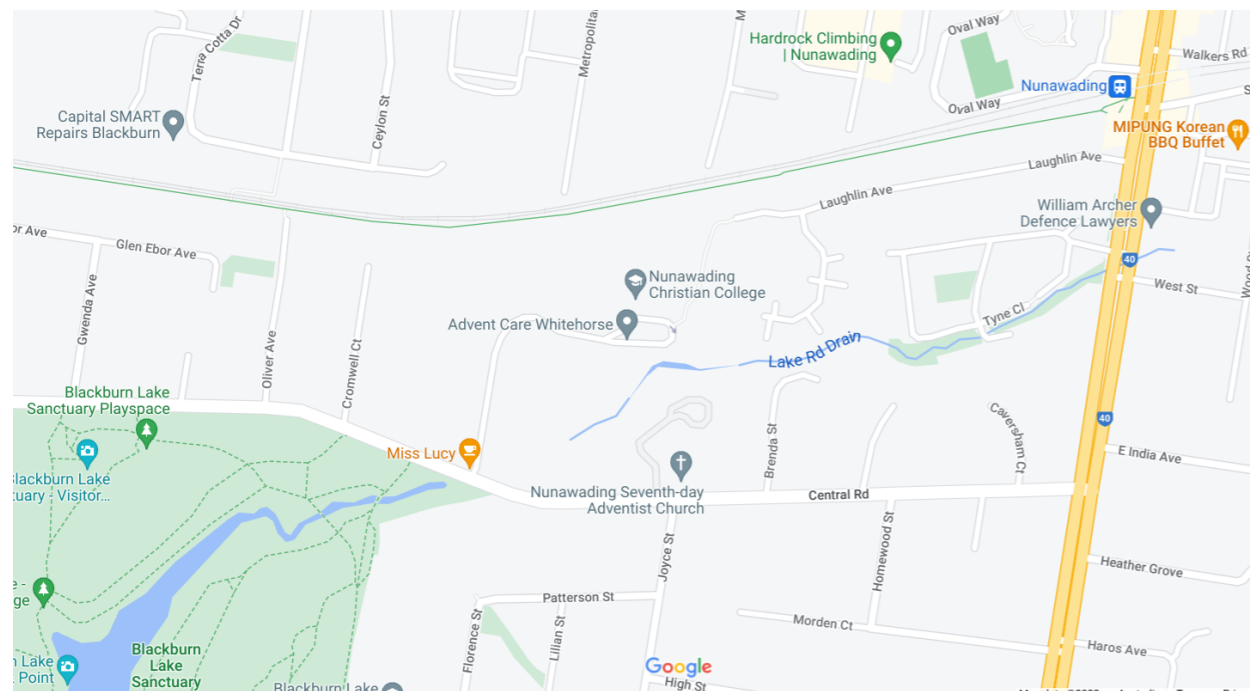


Figure 1: Site location map

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2.3 Sustainable Design Assessment in the Planning Process (SDAPP)

Victorian local governments have developed a consistent and rigorous framework, known as the Sustainable Design Assessment in the Planning Process (SDAPP) framework.

The SDAPP framework:

- Recognises the role of local governments as a statutory authority for planning matters.
- Provides a framework for consideration of sustainable design elements of planning applications.
- Offers a consistent method for identifying opportunities for improved environmental building performance.
- Ensures that sustainability is considered at the very early design phase – the best time to maximise opportunities for good orientation and other initiatives that create liveable, comfortable, efficient buildings.

SDAPP categories include:

- Indoor environment quality (IEQ).
- Transport.
- Energy efficiency.
- Waste management.
- Water efficiency.
- Urban ecology.
- Stormwater management.
- Innovation and ESD excellence.
- Building materials.
- Construction and building management.

These categories are fully covered in Section 3 of this document (although the terminology and order used varies slightly from the SDAPP categories).

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3 ESD design responses

The following tables outline the various ESD strategies for the project and include, as appropriate, additional information to enable the project team to meet the project's ESD goals.

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3.1 Management

Objective: Ensure that sustainability is integrated from concept design through the construction process and into operations. Good decisions made early will always deliver the maximum benefit for the lowest cost. Best practice building management also means giving future occupants the information they need to be able to run their buildings in the most efficient way.

Table 1: Management

ID	Category/Item	Performance standard	Project response	Maintenance	Responsibility
mgt-1	Utility metering	Utility meters to be provided for all individual commercial tenants.	Utility meters are to be provided for the following: • Electrical: - Building meter • Water: - Site meter (existing) Refer to additional sub-metering requirements also.	-	Design: - Elec-Des - Hyd-Des Construction: - Elec-Inst - Hyd-Inst Operation: - N/A
mgt-2	Metering – Non Residential	Provide separate sub metering of major common area services.	Sub-metering is proposed to enable improved management and troubleshooting to manage consumption. Electrical: air conditioning. Water: harvested rainwater quantity utilised by end uses.	Check meters should be validated per NABERS protocols. This involves checking elec meter connections / accuracy using a calibrated portable meter for min 1 hour to verify results. Check meters should be amended to ensure monitoring accuracy. Validation should be performed at initial installation, when changes are made that affect the meter and at least every 10 years.	Design: - Elec-Des - Hyd-Des Construction: - Elec-Inst - Hyd-Inst Operation: - Bld-Mgr - Elec-Maint - Hyd-Maint
mgt-3	Building Users Guide	Clear and simple information that assists building users to optimise the buildings environmental performance.	A Building User’s Guide will be prepared. This will enable building users to optimise energy consumption, water consumption and manage internal comfort and amenity.	-	Design: - PM - Arch Construction: - PM - Bldr Operation: - Bld-Mgr
mgt-4	Construction Management Plan (CMP)	Preparation of a Construction Management Plan (CMP) to Authority requirements.	A Construction Management Plan will be prepared as required by the relevant Authorities. The CMP will manage and monitor that activities are undertaken in such a way that: contaminated run-off is not discharged into drains or waterways; the site is managed to reduce impacts on neighbours such as noise, traffic, etc; the handover process is properly managed and waste is minimised.	The CMP should include a handover process that ensures the building is ready for the ongoing maintenance phase and handed over properly to the building management.	Design: - Arch Construction: - Bldr Operation: - N/A

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Table 1: Management

ID	Category/Item	Performance standard	Project response	Maintenance	Responsibility
mgt-5	Building Tuning	Ensure optimum energy efficient services into operation.	All systems nominated below must be tuned after practical completion. Tuning is to include quarterly adjustments and measurement for the first 12 months after occupation. <ul style="list-style-type: none"> • Air conditioning • Ventilation • Lighting controls 	Properly commissioned building services should improve operational performance.	Design: <ul style="list-style-type: none"> • Mech-Des: Specification clauses on tuning • Elec-Des: Specification clauses on tuning Construction: <ul style="list-style-type: none"> • Mech-Inst • Elec-Inst Operation: <ul style="list-style-type: none"> • Mech-Maint: Tuning activities • Elec-Maint: Tuning activities
mgt-6	Post occupancy evaluation	Perform an ESD post occupancy performance evaluation to generate feedback to generate opportunities for continual improvement.	Conduct a post-occupancy ESD evaluation of the building's performance after 12 months occupation and identify opportunities for operational improvement. The Post Occupancy Evaluation (POE) will: <ul style="list-style-type: none"> • Highlight teething problems that can quickly and easily be addressed and solved. • Identify gaps in communication and understanding that impact on the building operation. • Provide lessons that can be used to improve design and procurement on future projects. • Act as a benchmarking aid to compare across projects and over time. Depending on project details and requirements, POE activities could include (but is not limited to): <ul style="list-style-type: none"> • Occupant/ client consultation. • Evaluate environmental conditions (e.g. temperature, noise, light, air quality, ventilation and relative humidity). • Input to briefing on building tuning activities to ensure the building operates as intended. • Building impact on productivity and performance, staff and user retention and motivation. • Customer/user experience and satisfaction with amenities, image and layout. • Review design/procurement/ construction/handover processes. • Assessment of design quality and building performance. • Sustainability and utility audits to measure and demonstrate the environmental performance of the facility in use (with respect to strategies for energy efficiency, water efficiency, recycling, etc). 	-	Design: <ul style="list-style-type: none"> - Construction: <ul style="list-style-type: none"> - Operation: <ul style="list-style-type: none"> - PM <div style="border: 1px solid red; padding: 10px; margin-top: 20px; text-align: center;"> <p>This copied document to be made available for the sole purpose of enabling its consideration and review as part of a planning process under the Planning and Environment Act 1987. The document must not be used for any purpose which may breach any copyright</p> </div>

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3.2 Water

Objective: To ensure the efficient use of water, to reduce total operating potable water consumption and to encourage the appropriate use of alternative water sources.

Table 2: Water

ID	Category/Item	Performance standard	Project response	Maintenance	Responsibility
wat-1	Potable Water Use Reduction (Interior Uses)	Enable potable water demand reduction by installing water efficient fixtures and appliances. Achieve the target 50% water score on the BESS tool.	New fittings and fixtures will be water efficient types as nominated below: - Basin taps: 5 stars - Dishwashers (domestic type): 4 stars - Kitchen taps: 4 stars - Other taps: 4 stars - Showers: 4 stars (> 4.5 but <= 6 lpm) - Toilets: 4 stars - Urinals: 5 stars All air conditioning systems in the building will be air-cooled. No water-based heat rejection systems will be installed.	Water efficient fixtures and appliances are not expected to create an adverse maintenance impact.	Design: - Arch Construction: - Bldr - Hyd-Inst Operation: - N/A
wat-2	Rainwater Collection & Reuse	Reduce potable (mains) water use using rainwater harvesting. Achieve the target 50% water score on the BESS tool.	Initiatives include rainwater harvesting as follows. "Clean" roof catchment: 980sqm minimum Total volume of rainwater tanks: 20,000 litres minimum Connect to all toilets Refer to the stormwater management section for further information.	Refer to the stormwater management section for further details.	Design: - Arch - Hyd-Des Construction: - Bldr - Hyd-Inst Operation: - Bld-Mgr - Hyd-Maint
wat-3	Water Efficient Landscaping	Use water efficiency principles to reduce water demand from landscaped areas.	Reduce water demand from landscaped areas by: - Irrigated landscaped areas should have water efficient irrigation including: mulching and drip irrigation to garden beds; timers and rain sensors for all irrigated areas (or more water efficient method appropriate for the garden type and use).	Maintain landscaped areas to promote longevity of the low water use plantings.	Design: - L'scape Des Construction: - L'scape Cont Operation: - L'scape Maint

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3.3 Energy

Objective: To ensure the efficient use of energy to reduce total operating greenhouse gas emissions and to reduce energy peak demand.

Table 3: Energy

ID	Category/Item	Performance standard	Project response	Maintenance	Responsibility
ene-1	Passive design	Consider and incorporate opportunities for passive design	The building layout responds to local schhol environment including the main entry orientation to the eastern carpark and children’s rooms that are oriented toward the south.Passive design features include: • Internal adjustable blinds allow for summer solar radiation to be reduced. • Manually operated windows/louvres allow for natural ventilation.	-	Design: - Arch Construction: - Bldr Operation: - Bld-Mgr
ene-2	Energy efficient lighting	Provide a high degree of natural daylighting. Improve upon NCC minimum requirements for energy density. Select energy efficient light fittings and lamps.	A high degree of daylighting has been provided. Refer to the daylighting section below. The NCC maximum illumination power density requirements will be complied with and reduced by a further 20% in at least 90% of the building area. This will be through the correct design of lighting levels and the selection of energy efficient lamps such as: LED lighting (predominately).	Light fitting locations and selections should ensure that the system is readily maintainable. Lamp cleaning is important to ensure good quality lighting and changing of lamps is to be safe and reasonably easy.	Design: - Elec-Des Construction: - Elec-Inst Operation: - Bld-Mgr - Elec-Maint
ene-3	Efficient lighting control	Provide efficient lighting controls to ensure adequate lighting based on occupancy and time schedules without excess lighting.	All rooms/spaces are to include occupancy and daylight sensing. Additional/alternate lighting controls are to include: - Circulation/access (external): time clock, PE daylight cell. - Security (external): PE daylight cell. - Kitchen: with manual switch. - Learning Studios: with manual switch.	-	Design: - Elec-Des Construction: - Elec-Inst Operation: - Bld-Mgr - Elec-Maint
ene-4	Efficient air conditioning equipment	Heating and cooling systems should incorporate energy efficiency in the selection criteria.	Airconditioning systems are to be within one star of the best available, or coefficient of performance (cop) & energy efficiency ratios (eer) 85% or better than the most efficient equivalent unit / capacity. Refrigerative type air conditioning systems should incorporate variable speed fans and compressors.	Air conditioning systems should be selected from well established brands that have a proven low maintenance requirement.	Design: - Mech-Des Construction: - Mech-Inst Operation: - Mech-Maint
ene-5	Efficient air-conditioning control	Ensure controls are provided and commissioned for the efficient operation of air-conditioning systems.	Time clock control.	Control functions nominated should be checked for correct operation during building tuning and at least annually.	Design: - Mech-Des - Elec-Des Construction: - Mech-Inst - Elec-Inst Operation: - Bldg-Mgr

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Table 3: Energy

ID	Category/Item	Performance standard	Project response	Maintenance	Responsibility
ene-6	Energy efficient appliances	Provide energy efficient appliances.	All appliances installed by the Developer will have an energy efficiency rating within 1 star of the best available equivalent appliance (an exception is where appliance types do not have energy ratings (such as commercial kitchen equipment), in this case consider energy efficiency in the selection process).	Appliances should be selected from well established brands that have a proven low maintenance requirement.	Design: - Arch Construction: - Bldr Operation: - N/A
ene-7	Peak demand	Reduce peak demand loads on electrical infrastructure to the building.	The strategies outlined in this section such as efficient air-conditioning and lighting systems act to reduce peak electrical demands to the site in the order of 10%.		
ene-8	Thermal imaging test report	Commission an independent 3rd party thermal imaging test/report.	Prior to the applying for Practical Completion, commission an independent 3rd party infrared inspection and report on the energy gain/loss, air leakage and latent moisture with respect to the NCC Section J building envelope. The non-invasive inspection and qualitative report is to be in accordance with the "Standard for Infrared Inspection of Building Envelopes 2016" (USA Infrasppection Institute). Note that the inspection standard requires appropriate indoor / outdoor temperature variation and operation of the airconditioning systems prior to the inspection. The inspection is to be performed both internally and externally to the building envelope.		Design: - Arch Construction: - Bldr Operation: -
ene-9	Energy efficient water heating	A high efficiency hot water system to reduce greenhouse emissions by at least 15% when compared to a standard efficiency gas fired storage system.	The heated water plant selection is part of the project's "all electric" strategy. The heated water plant shall be heat pump hot water. The circulating loop shall be well insulated to reduce parasitic heat losses.		
ene-10	Ventilation	Enable occupants to improve indoor air quality and extend the comfortable hours in the space before requiring cooling via the air conditioners.	Provide Natural ventilation with manually operable windows: as noted on the plans Provide Ceiling fans where ceiling height permits: to all classrooms.	-	Design: • Arch: Specify operable windows • Arch: Co-ordinate/document ceiling fans • Elec-Des: Co-ordinate/document ceiling fans Construction: • Bldr • Elec-Inst Operation: • Bld-Mgr: Monitor. Take corrective action if req'd • Occupants: Operate to the instructions

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3.4 Stormwater

Objective: To reduce the impact of stormwater runoff, to improve the water quality of stormwater runoff, to achieve best practice stormwater quality outcomes and to incorporate the use of water sensitive urban design.

Table 4: Stormwater

ID	Category/Item	Performance standard	Project response	Maintenance	Responsibility
sto-1	Urban Stormwater Best Practice Water Sensitive Urban Design	Achieve a best practice WSUD strategy.	<p>Best practice WSUD will be achieved through the following initiatives.</p> <p>Rainwater harvesting: "Clean" roof catchment: 980sqm minimum Total volume of rainwater tanks: 20,000 litres minimum Connect to all toilets Include mains backup of the system.</p> <p>WSUD initiatives (other than rainwater harvesting): Rain garden(s) with 100mm detention depth: 12sqm (min) with 300sqm (min) catchment.</p> <p>Complete design, installation, operation and maintenance of the rain water catchment, roof plumbing, storage, pumping, filtration and reticulation systems are to be in accordance with all regulations and industry standards such as (but not limited to): Victorian Building Authority; HB 230-2008 Rainwater Tank Design and Installation Handbook; and all manufacturer recommendations.</p> <p>Refer to Appendix D for further detail and requirements.</p>	Stormwater management initiatives identified create added management responsibilities during operation. Refer to Appendix D for further information.	<p>Design:</p> <ul style="list-style-type: none"> • Arch: Rainwater tank location • Arch: Liaise/document downpipes to tank • Hyd-Des: Liaise/document downpipes to tank • Hyd-Des: Rainwater tank documentation • Hyd-Des: Rainwater distribution system <p>Construction:</p> <ul style="list-style-type: none"> • Bldr • Hyd-Inst <p>Operation:</p> <ul style="list-style-type: none"> • Hyd-Maint: Rainwater system maintenance

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3.5 Indoor environment quality

Objective: Improving the indoor environment quality at home and in the workplace will generally enhance well-being and reduce the likelihood of ill-health. Through the implementation of passive design principles, good indoor environment quality also leads to energy savings due to reduced energy demands for heating, cooling and artificial lighting.

Table 5: Indoor environment quality (IEQ)

ID	Category/Item	Performance standard	Project response	Maintenance	Responsibility
ieq-1	Daylight	Best practice natural daylighting evidenced by a BESS IEQ score of at least 50%.	Daylight calculations have been performed in order to demonstrate the following: - Minimum daylight factor of 2.0% is achieved for at least 41% of these areas: Children’s Rooms, Pods, Offices/Staff, Meeting Rooms, Kitchen/Dining, Reception and Foyer. Refer to Appendix C for additional information.	-	Design: - Arch - ESD Construction: - Bldr Operation: - N/A
ieq-2	Natural Ventilation	Natural ventilation to improve indoor air quality and extend the comfortable hours before requiring cooling via the air-conditioners.	Natural ventilation has been assessed for the following areas: - Children’s Rooms, Pods, Offices/Staff, Meeting Rooms, Kitchen/Dining, Reception and Foyer The assessment methodology used was BESS, with 62% of the respective areas being assessed to achieve effective natural ventilation. This is an excellent natural ventilation outcome. The natural ventilation calculations informed the project to include the following design interventions: Operable windows have been included and positioned to facilitate natural ventilaton	-	Design: - Arch - Elec-Des - Mech-Des Construction: - Bldr - Elec-Inst - Mech-Inst Operation: - Bld Mgr - Elec-Maint - Mech-Maint
ieq-3	Low volatile organic compound (VOC) content	Achieve at least 2 out of 2 credits available in Green Star for indoor pollutants (low VOC and low formaldehyde products).	The design is to meet the Total Volatile Organic Compound (TVOC) content limits outlined in the Green Star Technical Manual for internal painted surfaces, adhesives, sealants, floor/wall/ceiling coatings, floor coverings and engineered wood products. Refer to Appendix E for further information.	Low TVOC products are to be selected with similar life spans to traditional products and to not have an adverse maintenance impact.	Design: - Arch Construction: - Bldr Operation: - N/A

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3.6 Transport

Objective: To reduce car dependency and to ensure that the built environment is designed to promote the use of public transport, walking and cycling.

Table 6: Transport

ID	Category/Item	Performance standard	Project response	Maintenance	Responsibility
trn-1	Bicycle facilities	Exceed planning scheme requirements as nominated in the BESS tool.	Bicycle parking will meet the objectives of the Whitehorse Planning Scheme with the following additional project commitments. Overall 50% increase on planning requirements for the subject building. Total number of bicycle spaces: 3 Bicycle parking spaces are to be indicated on the plans, including which rack system will be adopted and what areas need to be allowed for clearance and access to the racks. The overall number of spaces should also be notated.	Bicycle parking areas should be well maintained and access to the parking kept clear at all times.	Design: - Arch Construction: - Bldr Operation: - N/A

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3.7 Waste

Objective: To ensure waste avoidance, reuse and recycling during the construction and operation stages of the development.

Table 7: Waste

ID	Category/Item	Performance standard	Project response	Maintenance	Responsibility
was-1	Facilitate recycling	Recycling facilities to be at least as convenient for occupants as facilities for general waste.	Design phase floor plans will show recycling and waste facilities at the point of disposal (e.g. kitchens). Centralised recycling facilities for the site are unchanged. Provide appropriate signage to encourage sustainable waste management.	Waste facilities should be designed to facilitate maintenance such as: general cleaning of compounds, cubicles and cupboards; removal and washing of bins; etc.	Design: - Arch - Waste-Des Construction: - Bldr Operation: - N/A
was-2	Construction waste manag't plan	Target a minimum demolition and construction waste recycling rate in the Contract.	Specifications will include a target minimum recycling rate of 90% of demolition and construction waste.	This initiative does not have an ongoing maintenance impact.	Design: - Arch Construction: - Bldr Operation: - N/A

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3.8 Urban Ecology

Objective: Improve the urban ecosystem through the incorporation of vegetation through landscaping.

Table 8: Urban Ecology

ID	Category/Item	Performance standard	Project response	Maintenance	Responsibility
eco-1	Light pollution	Limit the amount of upward light to the night sky. Comply with AS4282 "Control of the Obtrusive Effects of Outdoor Lighting".	No external light fitting has an upward light output ratio that exceeds 5% (noting that upward lighting that illuminates a surface within the development is not included in the 5% rule). Lighting design is to comply with AS4282 "Control of the Obtrusive Effects of Outdoor Lighting".	No specific maintenance impact.	Design: - Elec-Des Construction: - Elec-Inst Operation: - N/A
eco-2	Vegetation	Use of vegetation and landscaping within and around developments.	A significant percentage of the total site area (47%) is covered with vegetation.	Vegetation will require regular maintenance.	Design: - L'scape-Des Construction: - L'scape-Inst Operation: - L'scape Maint

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3.9 Innovation

Objective: Improve sustainable building performance (e.g., reduced energy and water consumption; reduced pollution and waste; improved and more resilient communities and economies) through innovative design solutions such as: exceeding best practice standards; passive, site and climate responsive design; and identifying synergies.

1. Meeting the aims of an existing credit using a technology or process that is considered innovative.
2. Implementing a sustainability initiative that substantially contributes to the broader market transformation towards sustainable development.
3. Delivering a substantial improvement on the benchmark required to achieve full points.
4. Addressing an Innovation Challenge as defined by the Green Building Council of Australia.
5. Addressing a 'global sustainability' issue as covered by other international sustainability rating systems.

Table 9: Innovation

ID	Category/Item	Performance standard	Project response	Maintenance	Responsibility
inn-1	Materials	To reduce the environmental impacts of materials used by encouraging the use of materials with a favourable lifecycle assessment.	Innovation credit points are claimed on BESS for materials because this ESD commitment addresses a 'global sustainability' challenge covered by other international sustainability rating systems (as per the Green Star approach to innovation as noted in bullet 5 in the introduction to this Section).	Refer to Section 2.10.	Refer to Section 2.10.
inn-2	Construction waste recycling target	Specifications should include a target minimum recycling rate for demolition and construction waste.	Innovation credit points are claimed on BESS for the construction and demolition waste target of 90% because this ESD commitment addresses a 'global sustainability' challenge covered by other international sustainability rating systems (as per the Green Star approach to innovation as noted in bullet 5 in the introduction to this Section).	Refer to Section 2.07.	Refer to Section 2.07.
inn-3	Post occupancy evaluation	Perform an ESD post occupancy performance evaluation to generate feedback to advise on opportunities for continual improvement.	An ESD post occupancy evaluation is to be performed to generate feedback to generate opportunities for continual improvement. Apart from assisting to improve performance of the specific facility, a POE also form part of a knowledge base to inform improvements in policy and implementation of sustainable buildings. This innovation point(s) is (are) targeted because the feedback from actual operation is lacking in the market and the post occupancy evaluation is a part of the broader market transformation towards sustainable development. This is as per the Green Star approach to innovation as noted in bullet 2 in the introduction to this Section.	Refer to Section 2.01.	Refer to Section 2.01. <div style="border: 1px solid red; padding: 5px; text-align: center; color: red; font-weight: bold;">This copied document to be made available for the sole purpose of enabling its consideration and review as part of a planning process under the Planning and Environment Act 1987. The document must not be used for any purpose which may breach any copyright</div>
inn-4	Building Tuning	Ensure optimum energy efficient services into operation.	Innovation credit points are claimed on BESS for building tuning because this ESD commitment addresses a 'global sustainability' challenge covered by other international sustainability rating systems (as per the Green Star approach to innovation as noted in bullet 6 in the introduction to this Section).	Refer to Section 2.01.	Refer to Section 2.01.

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Table 9: Innovation

ID	Category/Item	Performance standard	Project response	Maintenance	Responsibility
inn-5	Thermal imaging test report	Commission an independent 3rd party thermal imaging test/report.	The thermal imaging test/report is claimed as an innovation in BESS because of the related sustainability benefits (quality of insulation and air tightness implementation) and the fact that this testing is not common in Victoria.	Refer to Section 2.03.	Refer to Section 2.03.

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3.10 Materials

Objective: To reduce the environmental impacts of materials used by encouraging the use of materials with a favourable lifecycle assessment.

Table 10: Materials

ID	Category/Item	Performance standard	Project response	Maintenance	Responsibility
mat-1	Sustainable materials	Specify timber from a sustainably managed source with proof of audit trail.	Specify sustainably certified (recycled and plantation) timber only. All timber should be certified through an accredited certification scheme such as the Forrest Stewardship Council (FSC) or the Programme for the Endorsement of Forest Certification (PEFC).	Selection of sustainably certified timber is not expected to have a maintenance impact.	Design: - Arch - Str-Des - Civil-Des - L'scape Des Construction: - Bldr - Civil-Inst - L'scape Inst Operation: - N/A
mat-2	Responsible selection of materials	Select healthy and environmentally preferable materials.	Materials are to be durable and of low toxicity. Preference should be given to products with recycled content where these meet requirements for efficacy, durability, etc. (e.g. insulation such as fibreglass, recycled aggregate for non-structural applications). Refrigerant ODP to be zero. Insitu concrete to target a minimum of 20% replacement cementitious material such as fly ash or blast furnace slag. These replacement materials are waste products and reduce the embodied energy and CO2 emissions of conventional concrete that uses only Portland cement. This commitment is subject to availability of the replacement material, structural requirements and project management constraints.	Material selections should be durable and the selection of environmentally preferable materials is not expected to create an adverse maintenance impact.	Design: - All Construction: - All Operation: - N/A

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Appendices

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A BESS Report

The BESS printout report follows in this appendix.

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BESS Report

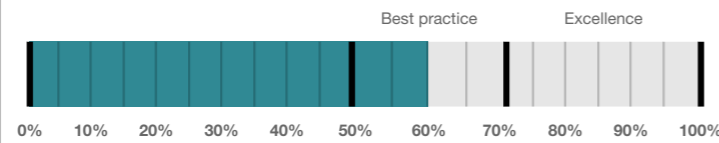
Built Environment Sustainability Scorecard



This BESS report outlines the sustainable design commitments of the proposed development at 161 Central Rd Nunawading Victoria 3131. The BESS report and accompanying documents and evidence are submitted in response to the requirement for a Sustainable Design Assessment or Sustainability Management Plan at Whitehorse City Council.

Note that where a Sustainability Management Plan is required, the BESS report must be accompanied by a report that further demonstrates the development's potential to achieve the relevant environmental performance outcomes and documents the means by which the performance outcomes can be achieved.

Your BESS Score



60%

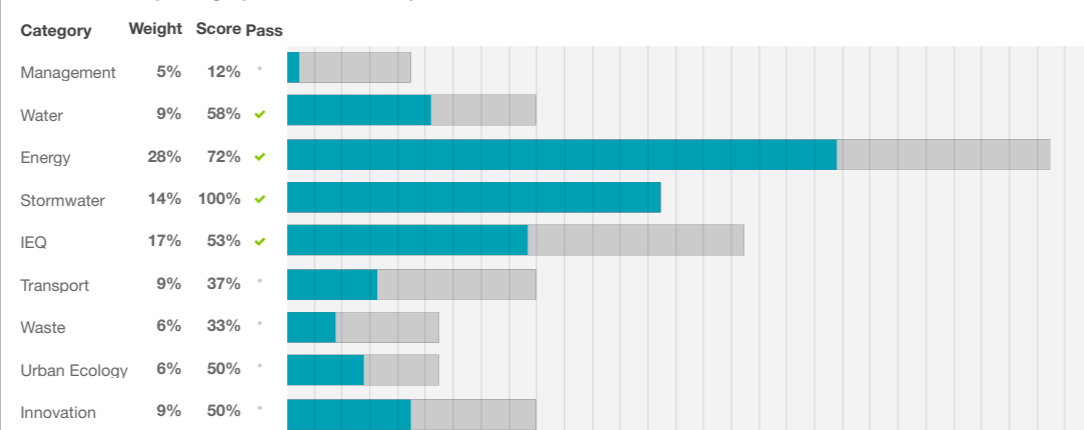
Project details

Address 161 Central Rd Nunawading Victoria 3131
 Project no C340E509-R1
 BESS Version BESS-8

Site type Non-residential development
 Account admin@co-perform.com.au
 Application no.
 Site area 3,114.00 m²
 Building floor area 893.00 m²
 Date 31 May 2024
 Software version 1.8.1-B.407



Performance by category



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Buildings

Name	Height	Footprint	% of total footprint
ELC	1	893 m ²	100%

Dwellings & Non Res Spaces

Non-Res Spaces

Name	Quantity	Area	Building	% of total area
Other building				
ELC	1	893 m ²	ELC	100%
Total	1	893 m²	100%	

Supporting information

Floorplans & elevation notes

Credit	Requirement	Response	Status
Water 3.1	Annotation: Water efficient garden details		-
Stormwater 1.1	Location of any stormwater management systems (rainwater tanks, raingardens, buffer strips)		-
Transport 1.4	Location of non-residential bicycle parking spaces		-
Transport 1.5	Location of non-residential visitor bicycle parking spaces		-
Waste 2.2	Location of recycling facilities		-
Urban Ecology 1.1	Location and size of communal spaces		-
Urban Ecology 2.1	Location and size of vegetated areas		-

Supporting evidence

Credit	Requirement	Response	Status
Energy 1.1	Energy Report showing calculations of reference case and proposed buildings		-
Energy 3.7	Average lighting power density and lighting type(s) to be used		-
Stormwater 1.1	STORM report or MUSIC model		-
IEQ 1.4	A short report detailing assumptions used and results achieved.		-

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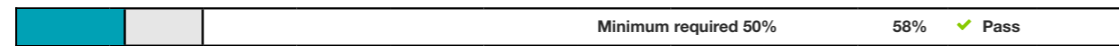
Credit summary

Management Overall contribution 4.5%



1.1 Pre-Application Meeting	0%
2.3 Thermal Performance Modelling - Non-Residential	0%
3.2 Metering - Non-Residential	0%
3.3 Metering - Common Areas	0%
4.1 Building Users Guide	100%

Water Overall contribution 9.0%



1.1 Potable Water Use Reduction	50%	
3.1 Water Efficient Landscaping	100%	
4.1 Building Systems Water Use Reduction	N/A	Scoped Out
The building does not have a sprinkler system and water based heat rejection systems.		

Energy Overall contribution 27.5%

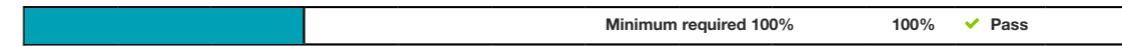


1.1 Thermal Performance Rating - Non-Residential	37%	
2.1 Greenhouse Gas Emissions	100%	
2.2 Peak Demand	100%	
2.6 Electrification	100%	
2.7 Energy consumption	100%	
3.1 Carpark Ventilation	N/A	Scoped Out
There are no enclosed carparks.		
3.2 Hot Water	100%	
3.7 Internal Lighting - Non-Residential	100%	
4.1 Combined Heat and Power (cogeneration / trigeneration)	N/A	Scoped Out
No cogeneration or trigeneration system in use.		
4.2 Renewable Energy Systems - Solar	0%	Disabled
No solar PV renewable energy is in use.		
4.4 Renewable Energy Systems - Other	N/A	Scoped Out
No other (non-solar PV) renewable energy is in use.		

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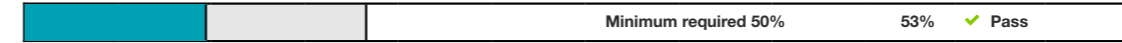
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Stormwater Overall contribution 13.5%



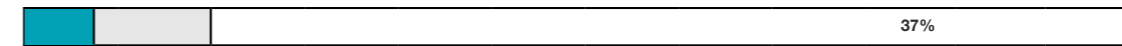
1.1 Stormwater Treatment	100%
--------------------------	------

IEQ Overall contribution 16.5%



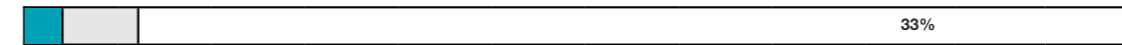
1.4 Daylight Access - Non-Residential	41%	Achieved
2.3 Ventilation - Non-Residential	34%	Achieved
3.4 Thermal comfort - Shading - Non-Residential	87%	
3.5 Thermal Comfort - Ceiling Fans - Non-Residential	100%	
4.1 Air Quality - Non-Residential	100%	

Transport Overall contribution 9.0%



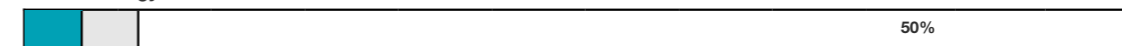
1.4 Bicycle Parking - Non-Residential	100%
1.5 Bicycle Parking - Non-Residential Visitor	100%
1.6 End of Trip Facilities - Non-Residential	0%
2.1 Electric Vehicle Infrastructure	0%
2.2 Car Share Scheme	0%
2.3 Motorbikes / Mopeds	0%

Waste Overall contribution 5.5%



1.1 - Construction Waste - Building Re-Use	0%
2.1 - Operational Waste - Food & Garden Waste	0%
2.2 - Operational Waste - Convenience of Recycling	100%

Urban Ecology Overall contribution 5.5%



1.1 Communal Spaces	100%
2.1 Vegetation	75%
2.2 Green Roofs	0%
2.3 Green Walls and Facades	0%
3.2 Food Production - Non-Residential	0%

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Innovation Overall contribution 9.0%



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Credit breakdown

Management Overall contribution 1%

1.1 Pre-Application Meeting		0%
Score Contribution	This credit contributes 37.5% towards the category score.	
Criteria	Has an ESD professional been engaged to provide sustainability advice from schematic design to construction? AND Has the ESD professional been involved in a pre-application meeting with Council?	
Question	Criteria Achieved ?	
Project	No	
2.3 Thermal Performance Modelling - Non-Residential		0%
Score Contribution	This credit contributes 25.0% towards the category score.	
Criteria	Has a preliminary facade assessment been undertaken in accordance with NCC2022 Section J4D6?	
Question	Criteria Achieved ?	
Other building	No	
Criteria	Has preliminary modelling been undertaken in accordance with either NCC2022 Section J (Energy Efficiency), NABERS or Green Star?	
Question	Criteria Achieved ?	
Other building	No	
3.2 Metering - Non-Residential		0%
Score Contribution	This credit contributes 12.5% towards the category score.	
Criteria	Have utility meters been provided for all individual commercial tenants?	
Annotation	There are no commercial tenants.	
Question	Criteria Achieved ?	
Other building	-	
3.3 Metering - Common Areas		0%
Score Contribution	This credit contributes 12.5% towards the category score.	
Criteria	Have all major common area services been separately submetered?	
Question	Criteria Achieved ?	
Other building	No	
4.1 Building Users Guide		100%
Score Contribution	This credit contributes 12.5% towards the category score.	
Criteria	Will a building users guide be produced and issued to occupants?	
Question	Criteria Achieved ?	
Project	Yes	

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Water Overall contribution 5% Minimum required 50%

Water Approach	
What approach do you want to use for Water?:	Use the built in calculation tools
Project Water Profile Question	
Do you have a reticulated third pipe or an on-site water recycling system?:	No
Are you installing a swimming pool?:	No
Are you installing a rainwater tank?:	Yes
Water fixtures, fittings and connections	
Showerhead:	4 Star WELS (>= 6.0 but <= 7.5)
Bath:	Scope out
Kitchen Taps:	>= 4 Star WELS rating
Bathroom Taps:	>= 5 Star WELS rating
Dishwashers:	>= 4 Star WELS rating
WC:	>= 4 Star WELS rating
Urinals:	>= 5 Star WELS rating
Washing Machine Water Efficiency:	Scope out
Which non-potable water source is the dwelling/space connected to?:	Tank
Non-potable water source connected to Toilets:	Yes
Non-potable water source connected to Laundry (washing machine):	No
Non-potable water source connected to Hot Water System:	No
Rainwater Tank	
What is the total roof area connected to the rainwater tank?: Tank	980 m ²
Tank Size: Tank	20,000 Litres
Irrigation area connected to tank: Tank	0.0 m ²
Is connected irrigation area a water efficient garden?: Tank	No
Other external water demand connected to tank?: Tank	0.0 Litres/Day

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1.1 Potable Water Use Reduction		50%
Score Contribution	This credit contributes 83.3% towards the category score.	
Criteria	What is the reduction in total potable water use due to efficient fixtures, appliances, rainwater use and recycled water use? To achieve points in this credit there must be >25% potable water reduction.	
Output	Reference	
Project	1637 kL	
Output	Proposed (excluding rainwater and recycled water use)	
Project	1292 kL	
Output	Proposed (including rainwater and recycled water use)	
Project	1096 kL	
Output	% Reduction in Potable Water Consumption	
Project	32 %	
Output	% of connected demand met by rainwater	
Project	100 %	
Output	How often does the tank overflow?	
Project	Very Often	
Output	Opportunity for additional rainwater connection	
Project	317 kL	
3.1 Water Efficient Landscaping		100%
Score Contribution	This credit contributes 16.7% towards the category score.	
Criteria	Will water efficient landscaping be installed?	
Question	Criteria Achieved ?	
Project	Yes	
4.1 Building Systems Water Use Reduction		N/A ✦ Scoped Out
This credit was scoped out	The building does not have a sprinkler system and water based heat rejection systems.	

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Energy Overall contribution 20% Minimum required 50%

Use the BESS Deem to Satisfy (DtS) method for Energy?:	Yes
Do all exposed floors and ceilings (forming part of the envelope) demonstrate meeting the required NCC2022 insulation levels (total R-value upwards and downwards)?:	Yes
Does all wall and glazing demonstrate meeting the required NCC2022 facade calculator (or better than the total allowance)?:	Yes
Are heating and cooling systems within one Star of the most efficient equivalent capacity unit available, or Coefficient of Performance (CoP) & Energy Efficiency Ratios (EER) not less than 85% of the CoP & EER of the most efficient equivalent capacity unit available?:	Yes
Are water heating systems within one star of the best available, or 85% or better than the most efficient equivalent capacity unit?:	Yes
Non-Residential Building Energy Profile	
Heating, Cooling & Comfort Ventilation - Electricity Reference fabric & services:	-
Heating, Cooling & Comfort Ventilation - Electricity - proposed fabric and reference services:	-
Heating, Cooling & Comfort Ventilation - Electricity Proposed fabric & services:	-
Heating - Wood - reference fabric and services:	-
Heating - Wood - proposed fabric and reference services:	-
Heating - Wood - proposed fabric and services:	-
Hot Water - Electricity - Reference:	-
Hot Water - Electricity - Proposed:	-
Lighting - Reference:	-
Lighting - Proposed:	-
Peak Thermal Cooling Load - Reference:	-
Peak Thermal Cooling Load - Proposed:	-
1.1 Thermal Performance Rating - Non-Residential	37%
Score Contribution	This credit contributes 36.4% towards the category score.
Criteria	What is the % reduction in heating and cooling energy consumption against the reference case (NCC2022 Section J)?
2.1 Greenhouse Gas Emissions	100%
Score Contribution	This credit contributes 9.1% towards the category score.
Criteria	What is the % reduction in annual greenhouse gas emissions against the benchmark?
2.2 Peak Demand	100%
Score Contribution	This credit contributes 4.5% towards the category score.
Criteria	What is the % reduction in the instantaneous (peak-hour) demand against the benchmark?

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2.6 Electrification	100%
Score Contribution	This credit contributes 13.6% towards the category score.
Criteria	Is the development all-electric?
Question	Criteria Achieved?
Project	Yes
2.7 Energy consumption	100%
Score Contribution	This credit contributes 18.2% towards the category score.
Criteria	What is the % reduction in annual energy consumption against the benchmark?
3.1 Carpark Ventilation	N/A ✦ Scoped Out
This credit was scoped out	There are no enclosed carparks.
3.2 Hot Water	100%
Score Contribution	This credit contributes 4.5% towards the category score.
Criteria	What is the % reduction in annual energy consumption (gas and electricity) of the hot water system against the benchmark?
3.7 Internal Lighting - Non-Residential	100%
Score Contribution	This credit contributes 9.1% towards the category score.
Criteria	Does the maximum illumination power density (W/m2) in at least 90% of the area of the relevant building class meet the requirements in Table J7D3a of the NCC 2022 Vol 1?
Question	Criteria Achieved ?
Other building	Yes
4.1 Combined Heat and Power (cogeneration / trigeneration)	N/A ✦ Scoped Out
This credit was scoped out	No cogeneration or trigeneration system in use.
4.2 Renewable Energy Systems - Solar	0% ⊘ Disabled
This credit is disabled	No solar PV renewable energy is in use.
4.4 Renewable Energy Systems - Other	N/A ✦ Scoped Out
This credit was scoped out	No other (non-solar PV) renewable energy is in use.

Stormwater Overall contribution 14% Minimum required 100%

Which stormwater modelling are you using?:	Melbourne Water STORM tool
1.1 Stormwater Treatment	100%
Score Contribution	This credit contributes 100.0% towards the category score.
Criteria	Has best practice stormwater management been demonstrated?
Question	STORM score achieved
Project	100
Output	Min STORM Score
Project	100

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IEQ Overall contribution 9% Minimum required 50%

1.4 Daylight Access - Non-Residential		41 %	✓ Achieved
Score Contribution	This credit contributes 35.3% towards the category score.		
Criteria	What % of the nominated floor area has at least 2% daylight factor?		
Question	Percentage Achieved?		
Other building	41 %		
2.3 Ventilation - Non-Residential		34 %	✓ Achieved
Score Contribution	This credit contributes 35.3% towards the category score.		
Criteria	What % of the regular use areas are effectively naturally ventilated?		
Question	Percentage Achieved?		
Other building	62 %		
Criteria	What increase in outdoor air is available to regular use areas compared to the minimum required by AS 1668.2:2012?		
Question	What increase in outdoor air is available to regular use areas compared to the minimum required by AS 1668:2012?		
Other building	0 %		
Criteria	What CO2 concentrations are the ventilation systems designed to achieve, to monitor and to maintain?		
Question	Value		
Other building	0 ppm		
3.4 Thermal comfort - Shading - Non-Residential		87 %	
Score Contribution	This credit contributes 17.6% towards the category score.		
Criteria	What percentage of east, north and west glazing to regular use areas is effectively shaded?		
Question	Percentage Achieved?		
Other building	82 %		
3.5 Thermal Comfort - Ceiling Fans - Non-Residential		100 %	
Score Contribution	This credit contributes 5.9% towards the category score.		
Criteria	What percentage of regular use areas in tenancies have ceiling fans?		
Question	Percentage Achieved?		
Other building	100 %		
4.1 Air Quality - Non-Residential		100 %	
Score Contribution	This credit contributes 5.9% towards the category score.		
Criteria	Do all paints, sealants and adhesives meet the maximum total indoor pollutant emission limits?		
Question	Criteria Achieved ?		
Other building	Yes		

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Criteria	Does all carpet meet the maximum total indoor pollutant emission limits?
Question	Criteria Achieved ?
Other building	Yes
Criteria	Does all engineered wood meet the maximum total indoor pollutant emission limits?
Question	Criteria Achieved ?
Other building	Yes

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Transport Overall contribution 3%

1.4 Bicycle Parking - Non-Residential		100%
Score Contribution	This credit contributes 25.0% towards the category score.	
Criteria	Have the planning scheme requirements for employee bicycle parking been exceeded by at least 50% (or a minimum of 2 where there is no planning scheme requirement)?	
Question	Criteria Achieved ?	
Other building	Yes	
Question	Bicycle Spaces Provided ?	
Other building	2	
1.5 Bicycle Parking - Non-Residential Visitor		100%
Score Contribution	This credit contributes 12.5% towards the category score.	
Criteria	Have the planning scheme requirements for visitor bicycle parking been exceeded by at least 50% (or a minimum of 1 where there is no planning scheme requirement)?	
Question	Criteria Achieved ?	
Other building	Yes	
Question	Bicycle Spaces Provided ?	
Other building	1	
1.6 End of Trip Facilities - Non-Residential		0%
Score Contribution	This credit contributes 12.5% towards the category score.	
Criteria	Where adequate bicycle parking has been provided. Is there also: * 1 shower for the first 5 employee bicycle spaces plus 1 to each 10 employee bicycles spaces thereafter, * changing facilities adjacent to showers, and * one secure locker per employee bicycle space in the vicinity of the changing / shower facilities?	
Question	Number of showers provided ?	
Other building	3	
Question	Number of lockers provided ?	
Other building	0	
Output	Min Showers Required	
Other building	1	
Output	Min Lockers Required	
Other building	2	
2.1 Electric Vehicle Infrastructure		0%
Score Contribution	This credit contributes 25.0% towards the category score.	
Criteria	Are facilities provided for the charging of electric vehicles?	
Question	Criteria Achieved ?	
Project	No	

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2.2 Car Share Scheme		0%
Score Contribution	This credit contributes 12.5% towards the category score.	
Criteria	Has a formal car sharing scheme been integrated into the development?	
Question	Criteria Achieved ?	
Project	No	
2.3 Motorbikes / Mopeds		0%
Score Contribution	This credit contributes 12.5% towards the category score.	
Criteria	Are a minimum of 5% of vehicle parking spaces designed and labelled for motorbikes (must be at least 5 motorbike spaces)?	
Question	Criteria Achieved ?	
Project	No	

Waste Overall contribution 2%

1.1 - Construction Waste - Building Re-Use		0%
Score Contribution	This credit contributes 33.3% towards the category score.	
Criteria	If the development is on a site that has been previously developed, has at least 30% of the existing building been re-used?	
Question	Criteria Achieved ?	
Project	No	
2.1 - Operational Waste - Food & Garden Waste		0%
Score Contribution	This credit contributes 33.3% towards the category score.	
Criteria	Are facilities provided for on-site management of food and garden waste?	
Question	Criteria Achieved ?	
Project	No	
2.2 - Operational Waste - Convenience of Recycling		100%
Score Contribution	This credit contributes 33.3% towards the category score.	
Criteria	Are the recycling facilities at least as convenient for occupants as facilities for general waste?	
Question	Criteria Achieved ?	
Project	Yes	

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Urban Ecology Overall contribution 3%

1.1 Communal Spaces	100%
Score Contribution	This credit contributes 12.5% towards the category score.
Criteria	Is there at least the following amount of common space measured in square meters : * 1m ² for each of the first 50 occupants * Additional 0.5m ² for each occupant between 51 and 250 * Additional 0.25m ² for each occupant above 251?
Question	Common space provided
Other building	392 m ²
Output	Minimum Common Space Required
Other building	44 m ²
2.1 Vegetation	75%
Score Contribution	This credit contributes 50.0% towards the category score.
Criteria	How much of the site is covered with vegetation, expressed as a percentage of the total site area?
Question	Percentage Achieved ?
Project	23 %
2.2 Green Roofs	0%
Score Contribution	This credit contributes 12.5% towards the category score.
Criteria	Does the development incorporate a green roof?
Question	Criteria Achieved ?
Project	No
2.3 Green Walls and Facades	0%
Score Contribution	This credit contributes 12.5% towards the category score.
Criteria	Does the development incorporate a green wall or green façade?
Question	Criteria Achieved ?
Project	No
3.2 Food Production - Non-Residential	0%
Score Contribution	This credit contributes 12.5% towards the category score.
Criteria	What area of space per occupant is dedicated to food production?
Question	Food Production Area
Other building	0.0 m ²
Output	Min Food Production Area
Other building	12 m ²

BESS, NCC ELC 161 Central Rd, Nunawading 3131

Innovation Overall contribution 4%

Innovations	
Description:	
Materials	Innovation credit points are claimed on BESS for materials because this ESD commitment addresses a 'global sustainability' challenge covered by other international sustainability rating systems (as per the Green Star approach to innovation).
Construction & Demolition Waste Recycling Target	Innovation credit points are claimed on BESS for the construction and demolition waste target of 90% because this ESD commitment addresses a 'global sustainability' challenge covered by other international sustainability rating systems (as per the Green Star approach to innovation).
Post occupancy evaluation	Perform an ESD post occupancy performance evaluation to generate feedback to generate opportunities for continual improvement. Apart from assisting to improve performance of the specific facility, a POE also form part of a knowledge base to inform improvements in policy and implementation of sustainable buildings. Whilst this is not an "innovation" as such, the following point(s) is (are) targeted because the related sustainability benefits extend beyond the BESS criteria (as per the Green Star approach to innovation).
Building tuning	Procedures similar to the commissioning requirements should be performed at key stages during the first 12 months of operation to ensure the base building services are operating in an energy efficient manner. Innovation credit points are claimed on BESS for building tuning because this ESD commitment addresses a 'global sustainability' challenge covered by other international sustainability rating systems (as per the Green Star approach to innovation).
Infra red inspection report	Independent 3rd party infrared inspection and report on the energy gain/loss, air leakage and latent moisture. This is claimed as an innovation in BESS because of the related sustainability benefits (quality of insulation and air tightness implementation) and the fact that this testing is not common in Victoria.
Points Targeted:	
Materials	1
Construction & Demolition Waste Recycling Target	1
Post occupancy evaluation	1
Building tuning	1
Infra red inspection report	1
1.1 Innovation	50%
Score Contribution	This credit contributes 100.0% towards the category score.
Criteria	What percentage of the Innovation points have been claimed (10 points maximum)?

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BESS, NCC ELC 161 Central Rd, Nunawading 3131

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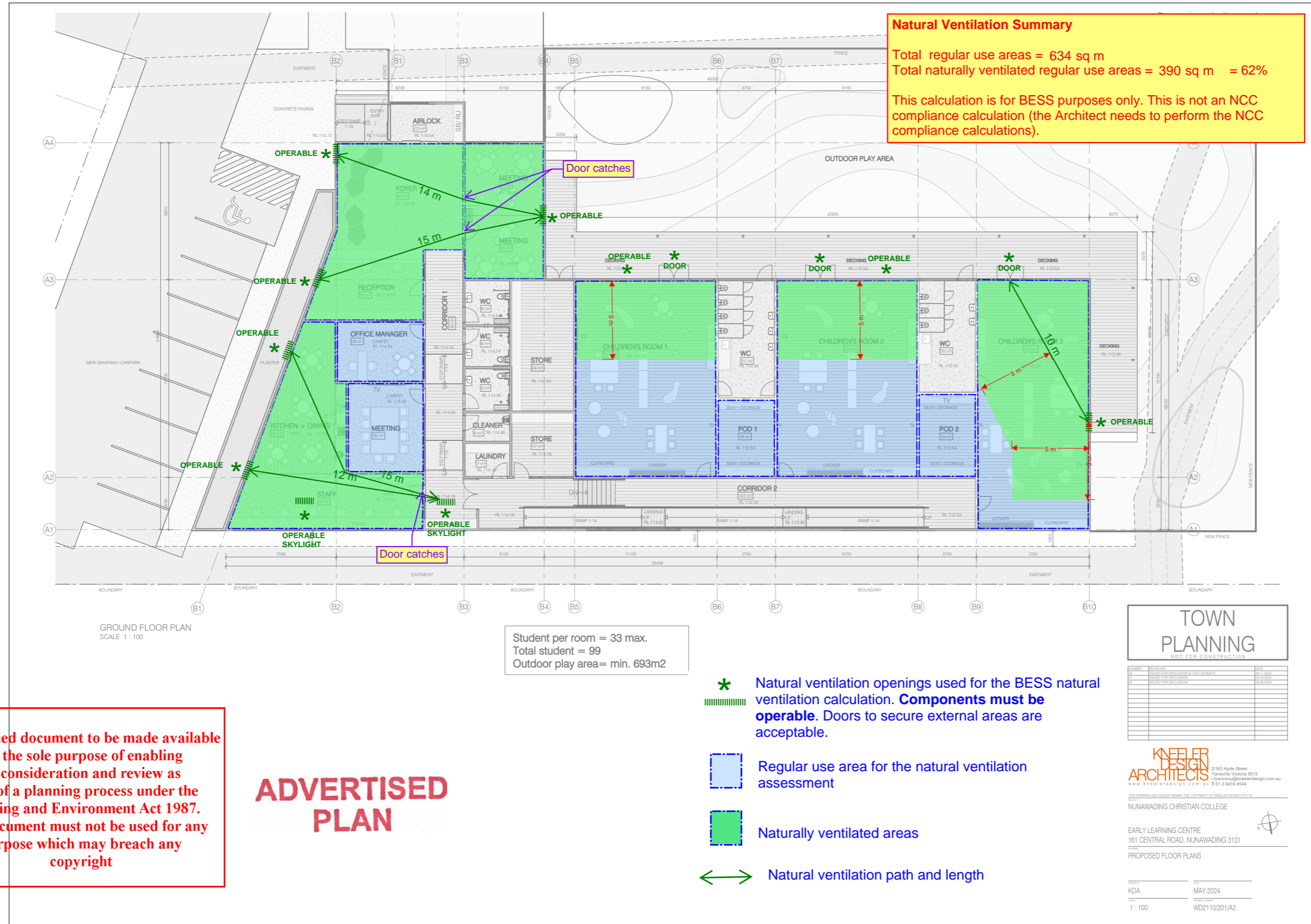
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B Supporting information



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C Preliminary daylight assessment report

C.1 General

Simulation model

The simulation model is shown in Figure 3. Some minor geometric simplifications have been made where necessary although these will have no significant impact on the outcome of the simulations.

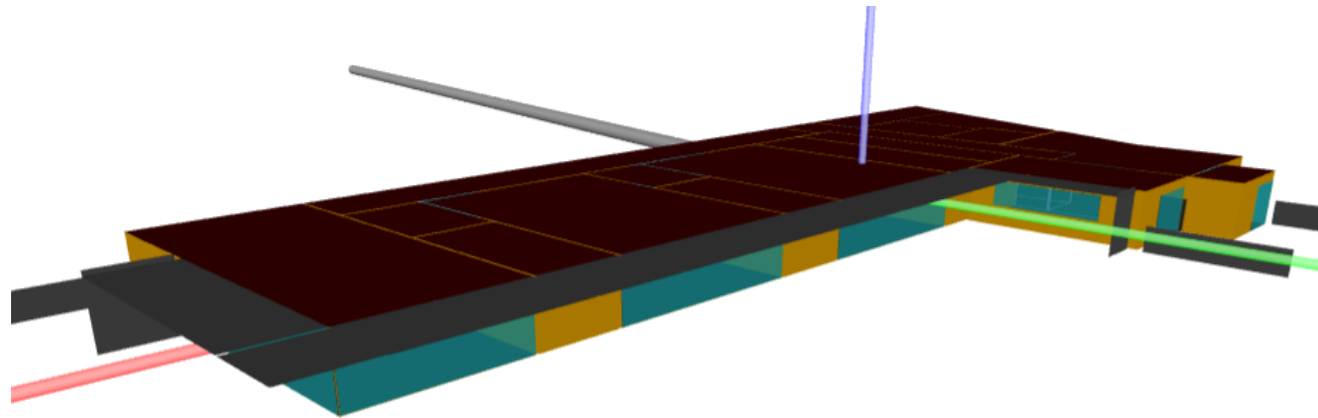


Figure 3: Perspective view of simulation model

Simulation parameters

The analysis has been completed using the Radiance synthetic imaging system. The model has been configured to calculate diffuse daylight penetration into the building.

Parameter	Value
Sky condition	CIE uniform sky
Ground reflectance	20%

C.2 Key Assumptions

The following table provides a summary of the material properties that have been used in the detailed simulation including surface reflectance for opaque elements and visible light transmittance for glazing elements. Wherever possible, material properties are based on information provided by the design team, however, some assumptions have been made where this information is not available.

Material element	Characteristic
Wall_60	60% reflectance
Floor_20	20% reflectance
Roof_80	80% reflectance
Window_45	45% transmittance
Skylight_45	45% transmittance
Screen_20	20% reflectance
Screen_50	50% transmittance
Eave_30	30% reflectance

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C.3 Daylight factor

The information below provides a summary of the daylight results achieved in each nominated space. The performance of each space is assessed by calculating the percentage of daylight that exceeds the relevant target threshold. Daylight contours are provided in the following section.

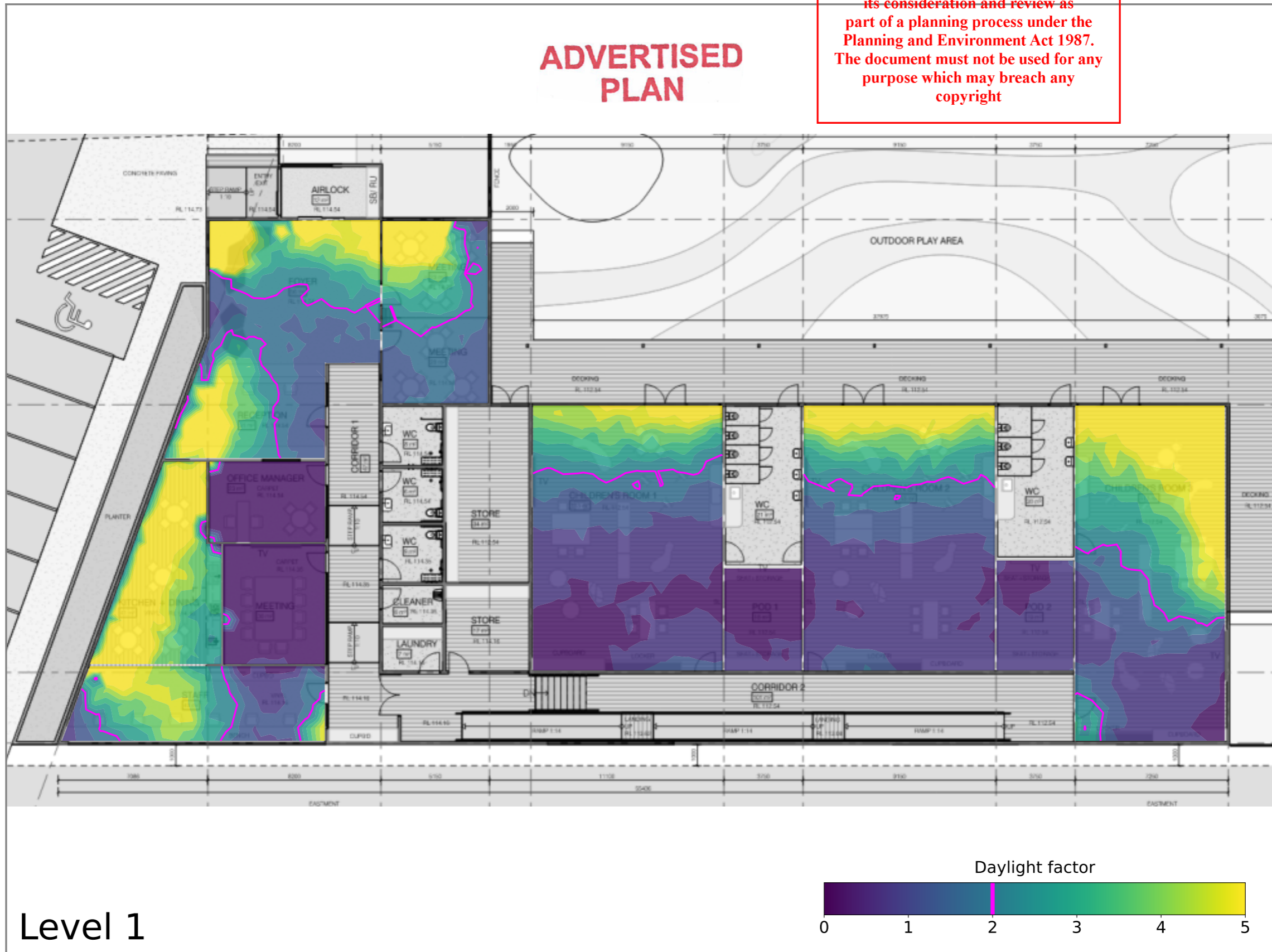
Space	Area [m2]	Area [m2] > Target	% Area
Children	338	126	37.4
Foyer	85	50	59.8
Kitchen	40	40	100.0
Meeting	70	20	29.0
Office	20	0	0.0
Pod	36	0	0.0
Staff	41	24	58.2
TOTAL	633	262	41.4

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C.4 Daylight contours

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D Best practice water sensitive urban design (WSUD)

Best practice WSUD will be achieved through the following initiatives. Rainwater harvesting: "Clean" roof catchment: 980sqm minimum Total volume of rainwater tanks: 20,000 litres minimum Connect to all toilets Include mains backup of the system. WSUD initiatives (other than rainwater harvesting): Rain garden(s) with 100mm detention depth: 12sqm (min) with 300sqm (min) catchment.

Complete design, installation, operation and maintenance of the rain water catchment, roof plumbing, storage, pumping, filtration and reticulation systems are to be in accordance with all regulations and industry standards such as (but not limited to): Victorian Building Authority; HB 230-2008 Rainwater Tank Design and Installation Handbook; and all manufacturer recommendations. Refer to Appendix C for further detail and requirements.

The following pages show the proposed best practice WSUD and rainwater harvesting concept.

Best practice WSUD has been assessed using the Melbourne Water STORM Calculator tool. Best practice WSUD will be achieved through the following initiatives.

Rainwater harvesting:

- "Clean" roof catchment: 980sqm minimum
- Total volume of rainwater tanks: 20,000 litres minimum
- Connect to all toilets Include mains backup of the system
- Complete design, installation, operation and maintenance of the rain water catchment, roof plumbing, storage, pumping, filtration and reticulation systems are to be in accordance with all regulations and industry standards such as (but not limited to): Victorian Building Authority; HB 230-2008 Rainwater Tank Design and Installation Handbook; and all manufacturer recommendations.

WSUD initiatives other than rainwater harvesting:

- Rain garden(s) with 100mm detention depth: 12sqm (min) with 300sqm (min) catchment.

Maintenance

Rainwater harvesting

Management and maintenance of the rainwater system is to be in accordance with HB 230–2008 (Rainwater Tank Design and Installation Handbook). Following is a summary of the components of the system that are to be maintained regularly:

- Annual
 - Gutters: generally inspect and clean as required.
 - Roof: check for the presence of accumulated debris and clear accumulated material; check roof condition generally.
 - Check tank inlets, insect-proofing, first flush diversion and filters and clean/repair as required.
 - Tank and tank roof: check structural integrity of the tank including the roof and access cover; repair any holes or gaps.
 - Internal inspection:
 - ✦ Check for evidence of access by animals, birds or insects including the presence of mosquito larvae. If present, identify and close access points.
 - ✦ If there is any evidence of algal growth, find and close points of light entry.
 - Check downpipes and rainwater reticulation pipework for leaks and structural integrity. Drain

- sections of pipework that are not self-draining.
- Operate pumps and check for noise, mounting resilience and for proper and reliable operation.
- 3 yearly
 - Drain tank and inspect walls, floor and roof for deterioration.
 - Check sediment levels and remove as required.
 - Pressure test and log the rainwater pipework system to check for deterioration. Rectify as required.
 - Review system management procedures and control of risks to the system and implement preventative actions.

A detailed maintenance schedule is to be included in the Maintenance Manual at Practical Completion along with as installed drawings/details and the system operational description. After the first 3 yearly inspection the maintenance schedule may be amended to better reflect the actual site conditions.

Rain garden

The rain garden maintenance checklist is shown below (adapted from information from the City of Port Phillip).

Perform the maintenance items in this checklist at 6 monthly intervals. Prepare a maintenance log and fill out when each maintenance check is complete. Upkeep of this maintenance log should continue throughout the life of the raingarden.

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Item	Rain garden element	Inspection item	Y/N	Likely maintenance task
1	Rain garden inlet	Is there scour or erosion where water enters the raingarden?		Re-profile with hand tools, place gravel or stones at the inlet.
		Is there rubbish, leaf litter or sediment blocking the inlet?		Remove by hand and dispose responsibly.
2	Rain garden surface level	Is the level of the rain garden surface sitting less than 100mm below the rain garden edges/borders?		Remove sediment from the surface so it is sitting about 75 to 125mm below surrounding areas.
3	Rain garden temporary detention	Is there moss or clay on the surface of the rain garden which seem to be slowing the filtration of flows?		Remove the crust from the top of the rain garden and check water will filter through exposed media.
4	Rain garden surface	Are there areas which appear to be higher and are not getting wet during rain events?		Smooth out surface with hand tools so it is flat.
		Are there areas which have been eroded away or scoured?		
5	Plants	Are the plants looking unhealthy or dying?		Prune diseased sections, irrigate and/or replace dead plants. If plants keep dying, replace with a different type which is doing well. Do not use fertilizer to improve plant health as this will pollute the rain garden.
		Are there bare patches forming between plants?		
		Are there weeds present?		Remove weeds by hand and dispose responsibly.
6	Planting media	Is the rain garden holding water for more than a couple of hours after the rain has stopped?		Remove and replace the top 100mm of planting material (loamy sand).
7	Overflow pit /pipe	Is there anything blocking the top of the overflow pit/pipe preventing water from entering?		Remove blockages and dispose responsibly.
8	Underdrainage	Is there rain draining to the bottom of the raingarden following heavy rain?		Flush the under drain or uncover it to check for blockages.
9	Stormwater network connection	Is there water ponding in the overflow pit or pipe and not entering the stormwater network?		Remove blockages and dispose responsibly.

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WSUD Report

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300sqm (minimum) of car parking draining to a minimum of 12sqm of rain gardens

SUBJECT SITE
Student per room = 33
Total student = 99
Outdoor play area = min. 693m²

Rain water tank(s) totalling 20,000 litres minimum and capturing a minimum of 980 sqm of clean roof area each. Utilised for flushing of all toilets and landscape watering. Provided with mains backup.

Complete design, installation, operation and maintenance of the rain water catchment, roof plumbing, storage, pumping, filtration and reticulation systems are to be in accordance with all regulations and industry standards such as (but not limited to): Victorian Building Authority; HB 230-2008 Rainwater Tank Design and Installation Handbook; and all manufacturer recommendations.

	Car park to rain garden	300	sq m
	Path runoff to pervious areas	200	sq m
	Roof to drain	160	sq m
	Roof to tank	980	sq m
	Site area	3,000	sq m
	Site pervious	1,050	sq m
	Site pervious	38	sq m

FLOOR PLAN LEGEND

- EXISTING BUILDING
- SUBJECT BUILDING/ SITE
- SITE DEMOLITION
- EASEMENT
- EXISTING TREE- RETAIN
- EXISTING TREE- REMOVAL
- TPZ
- SRZ
- FLOOR LEVEL

TOWN PLANNING
NOT FOR CONSTRUCTION

NUMBER	BY/DATE	DESCRIPTION	DATE
01	21/03/2024	PRELIMINARY DESIGN APPROVAL	21/03/2024
02	25/04/2024	DESIGN FOR CONSTRUCTION	25/04/2024
03	25/04/2024	DESIGN FOR CONSTRUCTION	25/04/2024
04	25/04/2024	DESIGN FOR CONSTRUCTION	25/04/2024

KNEELER DESIGN ARCHITECTS
2193 Hyde Street
Yarraville, Victoria 3013
t: 03 9416 4544
www.kneelerdesign.com.au

NUNAWADING CHRISTIAN COLLEGE
EARLY LEARNING CENTRE
161 CENTRAL ROAD, NUNAWADING 3113
PROPOSED SITE PLAN

KDA MAY 2024
As indicated WD2110/102/A3

PROPOSED SITE PLAN
SCALE 1 : 200

WSUD Figures

 **STORM Rating Report**

TransactionID: 0
 Municipality: WHITEHORSE
 Rainfall Station: WHITEHORSE
 Address: 161 Central Rd

 Nunawading
 VIC 3131
 Assessor: Paul Graham
 Development Type: Other
 Allotment Site (m2): 3,000.00
 STORM Rating %: 100

Description	Impervious Area (m2)	Treatment Type	Treatment Area/Volume (m2 or L)	Occupants / Number Of Bedrooms	Treatment %	Tank Water Supply Reliability (%)
Roof area to tank	980.00	Rainwater Tank	20,000.00	100	137.20	77.00
Impervious area to rain garden	468.00	None	0.00	0	0.00	0.00
Car park to rain garden	300.00	Raingarden 100mm	12.00	0	133.00	0.00

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Date Generated: 14-May-2024

Program Version: 1.0.0

Figure 4: STORM report

E Low VOC materials

The maximum TVOC content and emissions limits shall be followed when selecting indoor paints, sealants, adhesives, wall and ceiling coverings.

Maximum TVOC content limits for indoor paints and varnishes (g/l of ready-to-use product)

Product type	Max TVOC Content
Walls and ceilings – interior gloss	75
Walls and ceilings – interior semi gloss	16
Walls and ceilings – interior low sheen	16
Walls and ceilings- interior flat washable	16
Ceilings – interior flat	14
Timber and binding primers	30
Trim – gloss, semi gloss, satin, varnishes and wood stains	75
Latex primer for galvanized iron and zincalume	60
Interior latex undercoat	65
Interior sealer	65
One and two pack performance coatings for floors	140
Any indoor solvent-based coatings whose purpose is not covered in this table	200

Maximum TVOC content limits for indoor adhesives and sealants (g/l of product)

Product type	Max TVOC Content
Indoor carpet adhesive	50
Carpet pad adhesive	50
Wood flooring and Laminate adhesive	100
Rubber flooring adhesive	60
Sub-floor adhesive	50
Ceramic tile adhesive	65
Cove base adhesive	50
Drywall and panel adhesive	50
Multipurpose construction adhesive	70
Structural glazing adhesive	100
Architectural sealants	250
Any indoor solvent-based coatings whose purpose is not covered in this table	200

Indoor wall and ceiling covering TVOC emissions limits

Product type	Max TVOC Emission Limit (mg/m2 per hour)
TVOC at 3 days	5
TVOC at 28 days	0.5

Engineered Wood Products

The term "engineered wood products" includes composite wood products and includes raw/ unfinished as well as finished products. Items not covered by these limits include products used in exterior applications, formwork, internal car park applications, reused products, and raw timber. All emission levels must be established by a NATA or ISO/IEC 17025 registered laboratory as per the testing methodologies in the table below.

Formaldehyde emission limit values for engineered wood products

Test Protocol	Emission Limit / Unit of Measurement	Additional Notes
AS/NZS 2269:2004, testing procedure AS/NZS 2098.11:2005 method 10 for Plywood	< 1.0 mg/L	
AS/NZS 1859.1:2004 - Particle Board, with use of testing procedure AS/NZS 4266.16:2004 method 16	< 1.5 mg/L	
AS/NZS 1859.2:2004 - MDF, with use of testing procedure AS/NZS 4266.16:2004 method 16	< 1.0 mg/L	
JIS A 5908:2003- Particle Board and Plywood, with use of testing procedure JIS A 1460	< 1.0 mg/L	
JIS A 5905:2003 - MDF, with use of testing procedure JIS A 1460	< 1.0 mg/L	
JIS A1901 (not applicable to Plywood)	< 1.0 mg/L	
ASTM D5116	<0.1 (+/- 0.0005) mg/m ² hr	Equivalent unit mg/m ² /hr.
ISO 16000 part 9, 10 and 11 (also known as EN 13419)	<0.1 (+/- 0.0005) mg/m ² hr	Equivalent unit mg/m ² /hr.
ASTM D6007	0.12mg/m ³ **	
ASTM E1333	0.12mg/m ³ **	
EN 717-1 (also known as DIN EN 717-1)	0.12 mg/m ³	
EN 717-2 (also known as DIN EN 717-2)	3.5 mg/m ² hr	Equivalent unit mg/m ² /hr.

*The test report must confirm that the conditions of Table 1 comply for the particular wood product type, the final results must be presented in EN 717-1 equivalent (as presented in the table) using the correlation ratio of 0.98.

**The final results must be presented in EN 717-1 equivalent (as presented in the table), using the correlation ratio of 0.98.

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F Glossary and Nomenclature

Term	Explanation
ABCB	Australian Building Codes Board
Alternative water sources	Sources of water other than potable water delivered to site by the water authority. Examples include rain water harvesting, stormwater harvesting and grey water re-use.
BCA	Building Code of Australia.
BESS	Built Environment Sustainability Scorecard.
COP	Coefficient of Performance. An efficiency measure for cooling based on thermal capacity out versus energy capacity in.
EER	Energy Efficiency Ratio. An efficiency measure for heating based on thermal capacity out versus energy capacity in.
ESD	Ecologically Sustainable Development.
GBCA	Green Building Council of Australia
Green Star	Green Star is a national, voluntary environmental rating system that evaluates the environmental design and construction of buildings and communities across a range of environmental categories.
HVAC	Heating, ventilating and air conditioning
KCC	Kingston City Council; City of Kingston
KCC ESD Policy	City of Kingston ESD Policy for Community Buildings
N/A	Not applicable
ODP	Ozone depletion potential
Potable water	Suitable for human consumption as drinking water and in food preparation.
Rain garden	A water saving garden that is similar to a regular garden bed but designed specifically to capture stormwater from hard surfaces such as driveways, patios and roofs via downpipes and to treat the water via bioremediation before it enters the civic drainage system.
SDA	Sustainable Design Assessment.
SDAPP	Sustainable Design Assessment in the Planning Process.
SMP	Sustainability Management Plan
SOU	Sole Occupancy Unit
STORM	Melbourne Water developed the STORM Calculator to simplify the calculation and analysis of stormwater treatment methods to meet best practice WSUD targets.
VOC	Volatile organic compound.
lpm	Litres per minute.

Term	Explanation
Arch	Architect
Bld-Mgr	Building Manager
Bldr	Builder
Civil-Des	Civil Designer
ESD	ESD Consultant
Elec-Des	Electrical Designer / Engineer
Elec-Inst	Electrical Installation Contractor
Elec-Maint	Electrical Maintenance Contractor
Hyd-Des	Hydraulic Designer / Engineer
Hyd-Inst	Hydraulic Installation Contractor
Hyd-Maint	Hydraulic Maintenance Contractor
Mech-Des	Mechanical Designer / Engineer
Mech-Inst	Mechanical Installation Contractor
Mech-Maint	Mechanical Maintenance Contractor
Occupants	Building occupants
PM	Project Manager
Waste-Des	Waste Designer / Consultant

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