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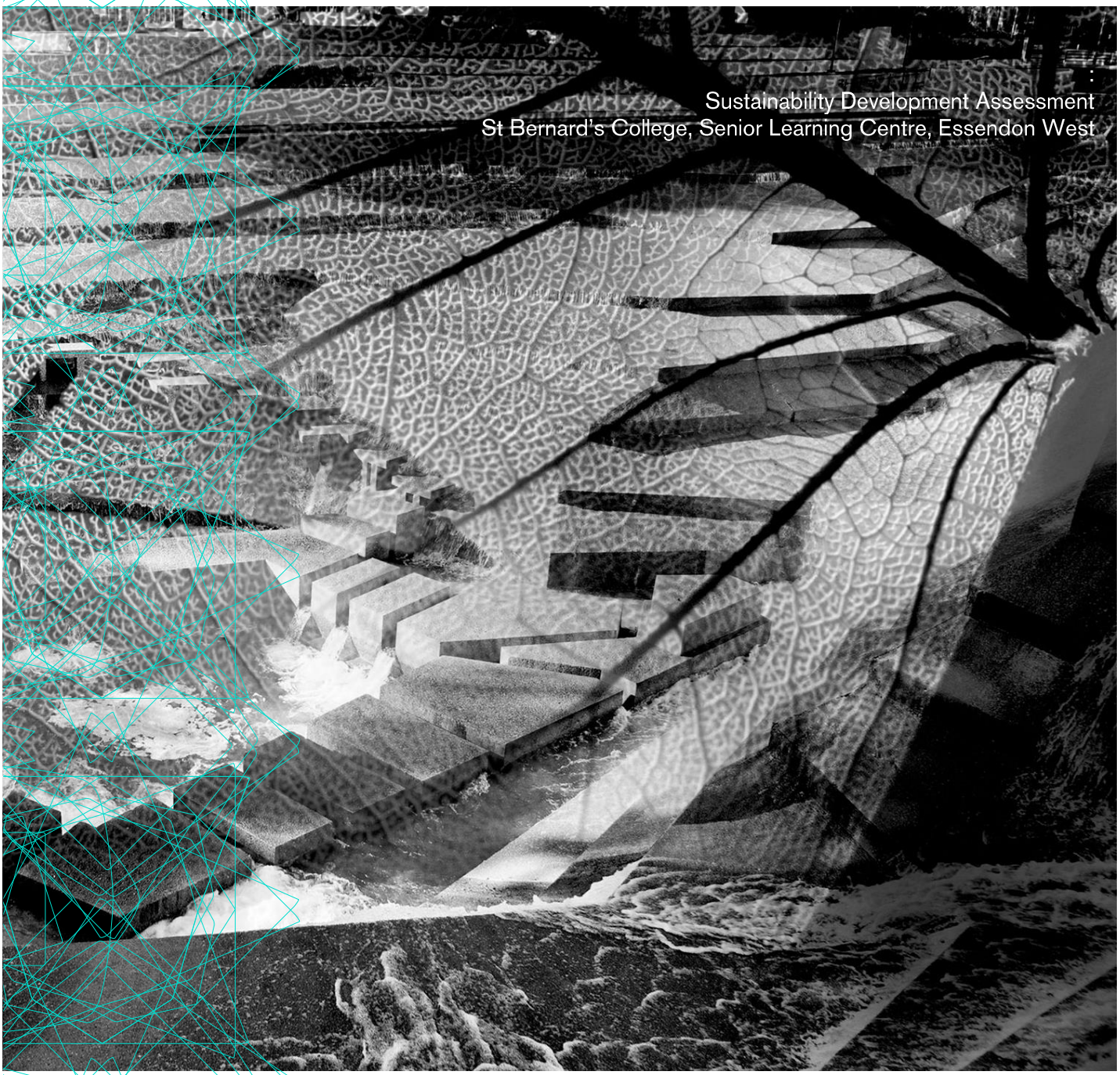

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Sustainability Development Assessment
St Bernard's College, Senior Learning Centre, Essendon West

SUSTAINABLE DEVELOPMENT
_CONSULTANTS

St Bernard's College, Senior Learning Centre, Essendon West

Sustainable Development Assessment

April 2021

S4370 SMP.V1

PREPARED BY:

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Version	Date of Issue	Description	Author	Approved
V1	09-04-2021	For Council Submission	ZS	BdW

1. Introduction

This Sustainable Development Assessment (SDA) has been prepared to assist the design, construction and operation of the proposed St Bernard's College, Senior Learning Centre. This is a new building proposed for St Bernard's College Essendon West campus.

Sustainable Development Consultants have assessed the proposed development and provided input to the design team. This SDA captures initiatives necessary to ensure that the development meets the sustainability requirements of the City of Moonee Valley, as outlined in Section 1.3 of this report.

This document has been prepared by Sustainable Development Consultants with reference to the architectural drawings prepared by Baldasso Cortese.

1.1 Site and Development Description

The site at St Bernard's College, Senior Learning Centre, Essendon West and is located approximately 12km north-west of the Melbourne CBD in St. Bernard's Essendon Campus on the corner of Rosehill Road and Beryl Street. The site of the proposed building (with the exception of some car parking and internal roadway) is currently undeveloped and is located on the campus.

Figure 1: Site Plan of the proposed development site within the St Benard's Essendon campus (Source: Near Map; mark-up by SDC)

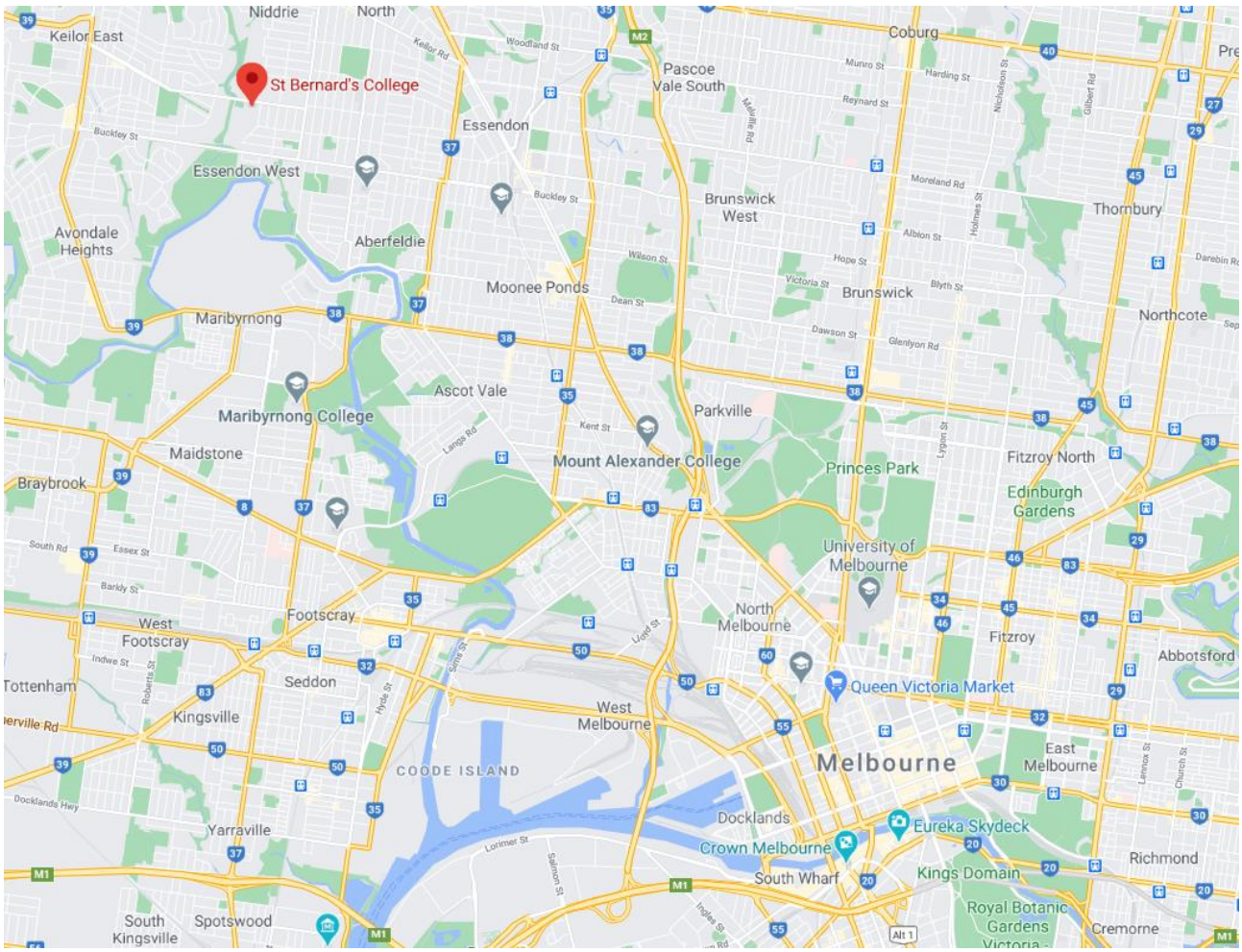


Figure 2: Location of the site in relation to the Melbourne CBD (Source: Google Maps)

Figure 3: Aerial view of the site at 41 Rosehill Road, Essendon West (Source: Nearmap)

The development summary is as follows:

Area Type	Inclusions
Total Site Area	2,150m^2
Ground Floor	515m^2
Level 1	1,500m^2
Level 2	1,500m^2

1.2 City of Moonee Valley Council Requirements

The Moonee Valley City Council requires development of a non-residential buildings with a gross floor area of less than 10,000m^2 within their municipality to include as part of the town planning application a Sustainable Development Assessment (SDA). The SDA will be in line with the SDAPP guidelines and will address sustainability considerations to ensure that the development is designed, built and maintained at a level that reflects best practice outcomes. This will be in line with expectations set for similar development proposals in other parts of the municipality. This SDA captures initiatives to ensure that the ESD requirements of the City of Moonee Valley are met, including relevant objectives within Clause 15.02 *Sustainable Development* of the Moonee Valley Planning Scheme. The City of Moonee Valley has identified the following categories to be addressed:

- Energy Performance
- Water Resources
- Stormwater Management
- Indoor Environment Quality
- Transport
- Waste Management
- Urban Ecology

This SDA will also capture initiatives under 'Construction and Building Management' and 'Building Materials' in line with the Key Sustainable Building Categories of SDAPP.

This requires a Sustainability Development Assessment (SDA) which demonstrates how for this project, the relevant policy objectives will be achieved.

The City of Moonee Valley also requires that this project addressed the following planning scheme provisions:

- Clause 52.34 *Bicycle Facilities*
- Clause 53.18 *Stormwater Management in Urban Development*
- *Clause 56.07-4 Integrated Water Management*

1.3 ESD Assessment Tools

There are several calculators and modelling programs available in Victoria to assess proposed developments against benchmarks set by the Victorian government, local councils and the Building Code of Australia. Different tools are used to assess different aspects of the development including the:

- Built Environment Sustainability Scorecard (BESS), which covers the overall sustainability of the development; and
- The Stormwater Treatment Objective – Relative Measure (STORM) calculator, which addresses stormwater quality considerations for the entire development.

All tools have minimum compliance requirements. The BESS tool is typically used to demonstrate how a level of compliance has been achieved to meet the typical planning requirements set by the City of Moonee Valley.

1.3.1 BUILT ENVIRONMENT SUSTAINABILITY SCORECARD (BESS)

BESS was developed by the Council Alliance for a Sustainable Built Environment (CASBE). This tool assesses the energy and water efficiency, thermal comfort and overall environmental sustainability performance of new buildings or alterations. It was created to demonstrate that new developments meet sustainability requirements as part of a planning permit application.

A BESS assessment has been conducted for the proposed development. This provides a guide as to the level of sustainability achieved by the proposed development in line with the Whitehouse City Council ESD requirements.

Each target area within the BESS tool generally receives a score of between 1% and 100%. A minimum score of 50% is required for the energy, water, stormwater and IEQ areas. An overall score of 50% for the project represents 'Best Practice' while a score over 70% represents 'Excellence'.

Results of the BESS assessment can be found in Appendix 1.

1.3.2 MELBOURNE WATER STORM TOOL

Melbourne Water has developed the Stormwater Treatment Objective – Relative Measure (STORM) Calculator to simplify the analysis of stormwater treatment methods. This calculator is designed for the general public to be able to assess simple Water Sensitive Urban Design (WSUD) measures on their property and has been developed specifically for small residential and industrial developments. The STORM Calculator displays the amount of treatment that is required to meet best practice targets, using WSUD treatment measures. The tool is capable of calculating the performance of a range of commonly implemented treatment measures including, rainwater tanks, ponds, wetlands, rain gardens, infiltration systems, buffers and swales[1]. The result of the STORM assessment is included as Appendix 2.

2. Sustainability Initiatives

The following sections outline the initiatives that will be incorporated into the development throughout design, construction and operation. Initiatives that meet the BESS benchmark have a reference next to them, e.g. (Management 4.1). Some initiatives without the BESS reference have been included, since they contribute to the overall sustainability of the development. The following sections, as well as nominating the sustainability initiatives, also identify the party/parties responsible for implementation of the initiative, and the stage at which implementation will be demonstrated. The following are the broad project stages:

1	Design Development	• Consultants develop conceptual design drawing to a detailed stage suitable as a basis for preparing working drawings - Integration of architectural, services, structure and site attributes • Checking compliance with all statutory requirements, codes and standards • Arranging special surveys or reports as required
2	Construction Documentation	• Architectural and services drawing sets completed • All specialist reports completed • All necessary planning and building consents obtained as required by authorities
3	Construction	• All work carried out onsite – site preparation, construction, alteration, extension, demolition • Purchase of all materials / certification • Evidence gathering from subcontractors • Commissioning
4	Post Occupancy	• Operation and Maintenance • Education – Building Users Guides

[1] The STORM tool provides only the most basic of options for a typical detached urban development. For more information visit http://library.melbournewater.com.au/content/wsud/using_STORM.pdf

2.1 Energy Performance

Design Requirements	Responsibility & Implementation	Project Stage
Building Envelope (Management 2.2; Energy DTS)		
The proposed development will be designed to achieve NCC 2019 energy efficiency requirements for the conditioned spaces. All floors and ceilings (forming part of the thermal envelope) are required to have a 10% improvement over the minimum NCC 2019 insulation required.	ESD Consultant / Architect / Services Engineer	Design Development / Construction Documentation
Heating and Cooling System (Energy 2.1, 2.3)		
Heating and cooling systems are to be within one star of the most efficient equivalent capacity unit available, or Coefficient of Performance (CoP) and Energy Efficiency Ratio (EER) not less than 85% of the CoP & EER of the most efficient equivalent capacity unit available.	Services Consultant	Design Development
Hot Water (BESS Energy 3.2)		
Domestic hot water for the development will be provided via a high efficiency electric heat pump system(s). All pipework will be insulated to minimize distribution heat losses.	Services Consultant	Design Development
Internal Lighting (Energy 3.7)		
Lighting levels will be reduced by making use of LED lighting throughout the development - the development will aim to not exceed the maximum wattages listed in Table J6.2a of the 2019 BCA without the use of any adjustment factor. The following lighting levels will not be exceeded in the development: • School – general purpose learning and tutorial rooms – 4.5W/m^2 • Toilets – 3W/m^2 • Corridors– 5W/m^2 Common areas lighting will be controlled with daylight/motion sensors and energy efficient lamps such as LED will be used.	Electrical Engineer	Design Development
Lighting Controls		
All windows, doors, exhaust fans and pipe penetrations in conditioned spaces will be constructed to minimise air leakage as required by the provisions outlined in Section J3 of the 2019 BCA. This will include the use of seals around operable windows and doors as well as caulking to pipe penetrations, and the addition of self-closing louvres or dampers to exhaust fans.	Electrical Engineer	Design Development
Solar PV Array		
A minimum 20kW solar PV array will be installed on the roof of the development. These will reduce the energy consumption of services, such as lighting and air-conditioning system by producing an estimated combined 22,868kWh of renewable electricity onsite per year[2]. Solar panels will be cleaned on at least an annual basis to ensure that they continue to perform at an optimal level.	Electrical Engineer	Construction Documentation
Building Sealing		

[2] Estimated annual solar power generation from BESS Energy 4.2 Renewable Energy Systems - Solar

Design Requirements	Responsibility & Implementation	Project Stage
All windows, doors, exhaust fans and pipe penetrations will be constructed to minimise air leakage as required by the provisions outlined in Section J3 of the 2019 BCA. This will include the use of seals around operable windows and doors as well as caulking to pipe penetrations, and the addition of self-closing louvers or dampers to exhaust fans.	Architect / Builder	Design Development / Construction
Lift		

An energy efficient lift will be specified that includes:
• Measures to specifically reduce stand-by consumption such as:
  ○ Switching off control devices when the lift is not in motion & using more efficient power supply unit;
  ○ LED lights and display; and
• Suspension specifically designed to reduce friction.
The design places the lift adjacent to the stairs in the development, thus making it easier for users to have the choice of using the stairs.
	Service Consultant	Design Development

2.2 Water Resources and Stormwater Management

Design Requirements	Responsibility & Implementation	Project Stage
Water Efficient Fixtures and Fittings (Water 1.1)		
The development will reduce its potable water usage through the inclusion of efficient fittings and fixtures to reduce the volume of mains water used. The following Water Efficiency Labelling Scheme (WELS) star ratings will be specified: • Toilets – 4 Star; and • Taps (bathroom and kitchen) – 5 Star.	Architect	Construction Documentation
Water Efficient Appliances		
All appliances provided in the development will be within one Water Efficiency Labelling Scheme (WELS) star of the best available (if provided by the developer as part of the contracted building works only).	Builder	Construction
Waterless HVAC System (Water 4.1)		
Air-conditioning units will use air-cooled condenser components which will help to reduce the development's overall water usage, while also preventing the growth of legionella bacterium which thrive in warm stagnant water.	Mechanical Engineer	Design Development
Fire Pump Test Water (Water 4.1)		
The fire pump testing will not expel water or will include temporary storage for 80% of the routine fire test water and maintenance drain-downs for reuse on site. If sprinkler systems are installed, each floor will be fitted with isolation valves for floor-by-floor testing.	Services Consultants	Design Development/ Construction Documentation
Water Efficient Landscaping		
Landscaping will be designed and constructed in accordance with water efficiency principles. All landscaping will be irrigated via sub-surface drip irrigation systems and will be mulched to help store water within the soil. Irrigation water will come from the rainwater tank.	Landscape Architect	Construction Documentation

Design Requirements	Responsibility & Implementation	Project Stage
Rainwater Collection & Reuse (Water 1.1)		
A total effective roof catchment area of 1,500m² will harvest stormwater into rainwater tank(s) with an effective storage capacity of 50,000L for the development. Collected water will be used for toilet flushing and landscape irrigation. Please refer to Appendix 2 for detailed MUSIC modelling results.	Hydraulics/ Civil Engineer	Construction Documentation
Stormwater Management (BESS Stormwater)		
The rainwater storage, for the capture and use of rainwater, will significantly reduce the stormwater being discharged from the site and will minimise the associated impacts on stormwater infrastructure and receiving streams. This will allow the development to meet the stormwater quality requirements of Moonee Valley City Council. Refer to Appendix 2 for specific requirements. Refer to Appendix 5 for raingarden design specifications.	Architect / Civil Engineer	Design Development

2.3 Indoor Environment Quality

Design Requirements	Responsibility & Implementation	Project Stage
Volatile Organic Compounds (VOCs)		
All paints, adhesives and sealants will not exceed limits listed in Appendix 3. Additionally, at least 50% of the internal paint used will be ultra-low VOC with an emission rate of <5g/L.	Builder	Construction
Formaldehyde Minimisations		
All engineered wood products will have 'low' formaldehyde emissions, certified as E0 or better. Emissions limits are listed in Appendix 3.	Builder	Construction
Daylight Access (IEQ 1.4)		
As currently designed, it is calculated that the showroom spaces will be provided with a daylight factor of 2.0% or greater across 35.3% of the frequently occupied floor area. This high level of daylight amenity will help improve the indoor environment while also reducing demand for artificial lighting during daylight hours. Refer to Appendix 4 for further details.	Architect	Design Development
Daylight Improvement		
Daylight through windows will be enhanced with the use of light internal colours, allowing better internal reflection of daylight.	Architect	Construction Documentation
Mechanical Ventilation		
All WCs will have a separate dedicated exhaust fan which will not be recycled to any enclosed space within the building; it will be ducted directly outside.	Mechanical Engineer	Design Development
Acoustic Comfort		
Noise from any mechanical services will be kept to a minimum using good quality, suitably located and baffled mechanical plant and quiet air conditioners and fans.	Mechanical Engineer	Construction Documentation

2.4 Transport

Design Requirements	Responsibility & Implementation	Project Stage
Public Transport		
The St Bernard's College has direct access to the following public transport routes within 1km walking distance: Buses • 465: Essendon Station – Keilor Park • 475: Moonee Ponds – East Keilor • 903: Altona - Mordialloc	N/A - Inherent in Location	
Bicycle Parking (Transport 1.4)		
The development will have access to shared secure bicycle parking spaces for use by staff and visitors (the nearest of which is located just north of the subject site) within the St Bernard's campus.	Architect	Design Development

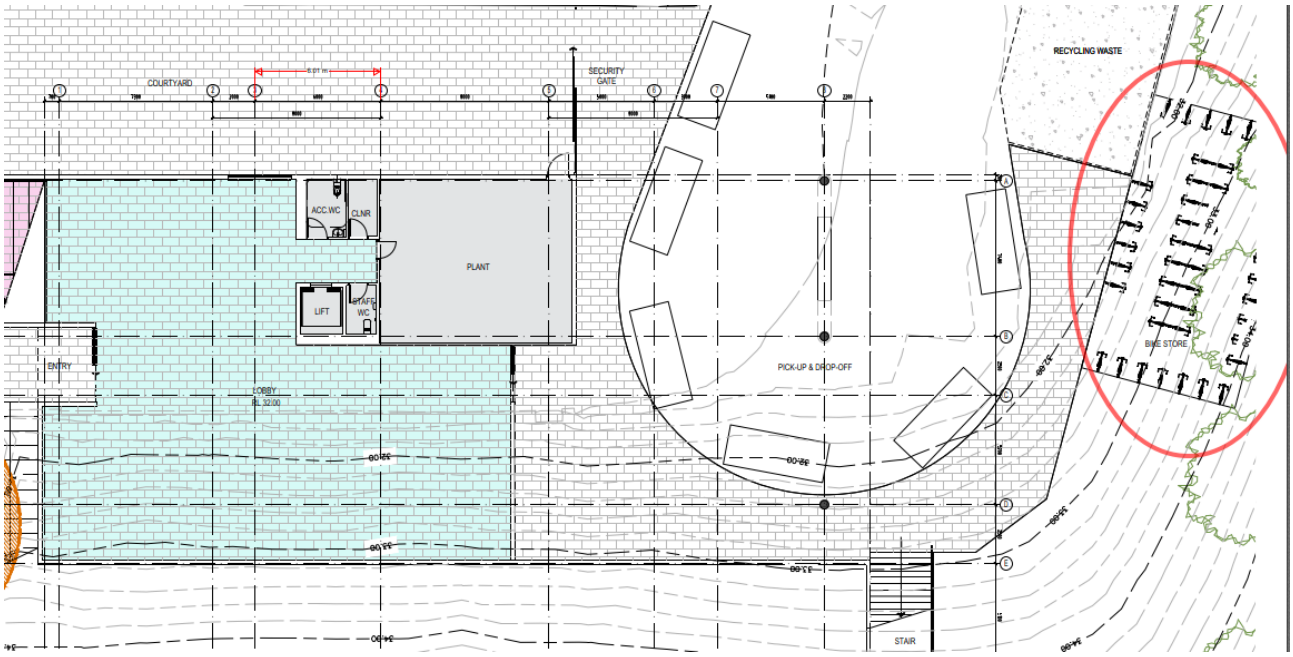


Figure 4: Bicycle parking spots for students and staff is located just north of the subject site on the ground floor.

2.5 Building Materials

Design Requirements	Responsibility & Implementation	Project Stage
Steel		
Wherever possible, steel for the development will be sourced from a Responsible Steel Maker[3]. Reinforcing steel for the project will be manufactured using energy reducing processes.	Builder / Structural Engineer	Construction Documentation
Concrete		
A minimum of 50% of the concrete mix will contain recycled water (rainwater or purchased recycled water) and at least 40% of coarse aggregate will be crushed slag or another alternative material.	Structural Engineer	Construction Documentation

[3] A Responsible Steel Maker must have facilities with a currently valid and certified ISO 14001 Environmental Management System (EMS) in place, and be a member of the World Steel Association's (WSA) Climate Action Program (CAP).

Design Requirements	Responsibility & Implementation	Project Stage
Alternatively, 25% of fine aggregate (sand) will be specified as recycled or manufactured sand (not virgin sand from a quarry). Concrete will also include a portion of supplementary cementitious materials (SCMs) to reduce the embodied energy of the project.		
Asphalt		
Any asphalt used within the development will contain at least 10% RAP (reclaimed asphalt pavement) or the maximum allowable RAP content for the application as prescribed by the City of Moonee Valley. The use of warm mix asphalt (rather than hot mix asphalt) will be specified. Recycled plastic content in asphalt will also be utilised to help strengthen and increase the life of the asphalt whilst making use of a waste product.	Civil Engineer	Construction Documentation
Timber		
All timber used in the development will be Forest Stewardship Council (FSC) or Program for the Endorsement of Forest Certification (PEFC) certified or recycled/reused.	Builder	Construction
PVC		
All standard uses of cables, pipes, flooring and blinds within the building will either not contain any PVC or will be sourced from a supplier who adheres to the Green Building Council of Australia's *Best Practice Guidelines for PVC in the Built Environment*.	Builder	Construction
Flooring		
Any carpet or vinyl flooring will be selected from products/materials certified under any of the following: • Carpet Institute of Australia Limited, Environmental Certification Scheme (ECS) v1.2; • Ecospecifier GreenTag GreenRate V3.2; and/or • Good Environmental Choice (GECA).	Architect	Construction Documentation
Recycled Content in Insulation		
Any bulk insulation installed within the development will have a minimum 20% recycled content.	Builder	Construction

Figure 5: Examples of approved environmental labels for products which may be incorporated for the development.

2.6 Construction, Waste and Building Management

Design Requirements	Responsibility & Implementation	Project Stage
Metering and Monitoring		
Metering will be provided on all substantive energy uses throughout the building. This will include metering for separate floors, and energy loads greater than 100kW, and for single items, 5% of total building energy use and 10% of total building water use.	Services Consultant	Construction Documentation
Operational Waste (Waste 2.2)		
The development will be provided with dedicated bins for the separation and collection of general waste, glass, and recyclables. Recycling facilities will be adjacent to each bin for general waste, with bin colouring and signage to ensure a clear distinction between the waste streams. (See also BESS Waste 2.1).	Architect/ Building Owner	Design Development
Construction Environmental Management Plan		
A Construction Environmental Management Plan (CEMP) will be prepared and implemented for the development. This will identify all environmental risks and include relevant management strategies.	Builder	Construction Documentation
Building User Guide (Management 4.1)		
A Building User's Guide (BUG) will be developed and made available to all building management and staff. It will comprehensively feature the manuals of the systems installed in the development and relevant suggestions for sustainable operation.	Architect/ ESD Consultant	Construction Documentation
Construction Waste Management		
A Construction Waste Management Plan will be prepared (either as an independent document or as an element of the Construction Environmental Management Plan) and presented to all on-site staff at a site orientation session to ensure that the waste generated on site is minimised and disposed of correctly. A minimum 80% of all construction waste (excluding any existing vegetation) generated on site will be reused or recycled.	Builder	Construction Documentation

2.7 Urban Ecology

Design Requirements	Responsibility & Implementation	Project Stage
Vegetation (BESS Urban Ecology 2.1)		
Approximately 60% of the site (as indicated on the ground floor site plan) will be covered by vegetation and/or landscaping. The vegetated surfaces will help treat stormwater runoff, reduce the urban heat island effect and increase the outdoor amenity of the development.	Architect/ Landscape Architect	Design Development
Refrigerant ODP		
All HVAC refrigerants used in the development will be selected to have an Ozone Depletion Potential (ODP) of zero.	Mechanical Engineer	Construction Documentation
Insulation Ozone Depleting Potential		
All thermal insulation used in the development will not contain any ozone-depleting substances and will not use any when being manufactured	Architect	Construction Documentation
Food and Garden Waste (BESS Waste 2.1)		
Ensure sufficient space is allocated for waste management needs, including composting and green waste facilities.	Architect/ Building Owner	Design Development

Design Requirements	Responsibility & Implementation	Project Stage
This will help lower the amount of waste going to landfill and the by-products of these facilities will be utilized in maintaining the landscaped areas of the development.		
Light Pollution		
No external luminaire on the project will have an Upward Light Output Ratio (ULOR) exceeding 5%, relative to its mounted orientation. Light spill into the night sky will be avoided.	Electrical Engineer	Construction Documentation

3. Conclusion and Implementation of Initiatives

The proposed development at St Bernard's College, Senior Learning Centre, Essendon West will meet the best practice requirements through a number of initiatives such as the inclusion of rainwater tanks for rainwater re-use, thermal performance of the building fabric with the use of efficient glazing, reduction in greenhouse gas emissions through efficient air conditioning, as well as reduced environmental impact during the construction stage through the specification of sustainable materials and a mindful construction team.

The initiatives that have been included within this SDA have a proven track record to serve their individual purpose and can be easily maintained with any failures generally being obvious to the occupants of the development. This helps to ensure the ongoing sustainability of the development as the systems installed in the beginning are maintained for purpose throughout the life of the development.

With appropriate implementation, management, monitoring and maintenance, the initiatives outlined within this SDA will serve to provide the occupants with lower running costs, as well as benefit the surrounding environment with an environmentally and economically sustainable development.

Appendix 1: BESS Assessment

St Bernards, Essendon West 3040 Essendon West

Site area: 2150 m^2 ·
Site type: Non-residential development m^2 ·
Building Floor Area: 3340 m^2 ·
Date of Assessment: 09 Apr 2021 · Version: V5, 1.6.2-B.296 ·
Applicant: zain@sdconsultants.com.au

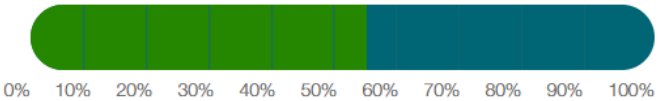
Project Identifier

7795FC86

Published
http://bess.net.au/projects/7795FC86-V2

Your BESS score is

+ 54%



50% + Best Practice

70% + Excellence

% of Total	Category	Score	Pass
1 %	Management	33 %	
6 %	Water	71 %	✔
18 %	Energy	67 %	✔
14 %	Stormwater	100 %	✔
5 %	IEQ	33 %	✘
0 %	Transport	0 %	
6 %	Waste	100 %	
3 %	Urban Ecology	62 %	
0 %	Innovation	0 %	

Appendix 2: STORM Assessment & WSUD Report

Objectives

The quality and quantity of stormwater leaving a site can have a significant impact on the surrounding infrastructure and waterways. Impervious surfaces move water quickly and efficiently out of built-up areas straight into stormwater infrastructure, which in turn quickly moves the untreated water into natural watercourses. This process does not treat the stormwater and as the water flows into natural water courses, it causes erosion and pollution of those waterways with the rubbish, sediments, pathogens, and other pollutants that run off the impervious surfaces into the stormwater drains.

New developments in the City of Moonee Valley must comply with *Clause 53.18* and the best practice performance targets for suspended solids, total phosphorous and total nitrogen, as set out in the Urban Stormwater Best Practice Environmental Management Guidelines, Victoria Stormwater Committee 1999. Currently, these water quality performance targets require:

- Suspended Solids - 80% retention of typical urban annual load.
- Total Nitrogen - 45% retention of typical urban annual load.
- Total Phosphorus - 45% retention of typical urban annual load.
- Litter - 70% reduction of typical urban annual load.

New developments must also incorporate treatment measures that improve the quality of water and reduce flow of water discharged into waterways (such as collection and use of rainwater/stormwater on site) and encourage the use of measures to prevent litter being carried off-site in stormwater flows. The proposed development has addressed these requirements by identifying the impervious surfaces within the site and implementing treatments to mitigate the impacts of stormwater leaving the site. To assess these initiatives, the STORM tool – which is an industry accepted tool – was used to determine the treatment effectiveness of these initiatives.

Site Characteristics

For the purposes of the stormwater assessment, the townhouses have been delineated into basic surface types listed below and highlighted in mark-up plans following:

- Total site area: 2,150m^2
- Roof / balcony / terrace as catchment area (blue): 1,500m^2
- Permeable surfaces (green): 360m^2
- Remaining impervious surfaces (grey): 290m^2

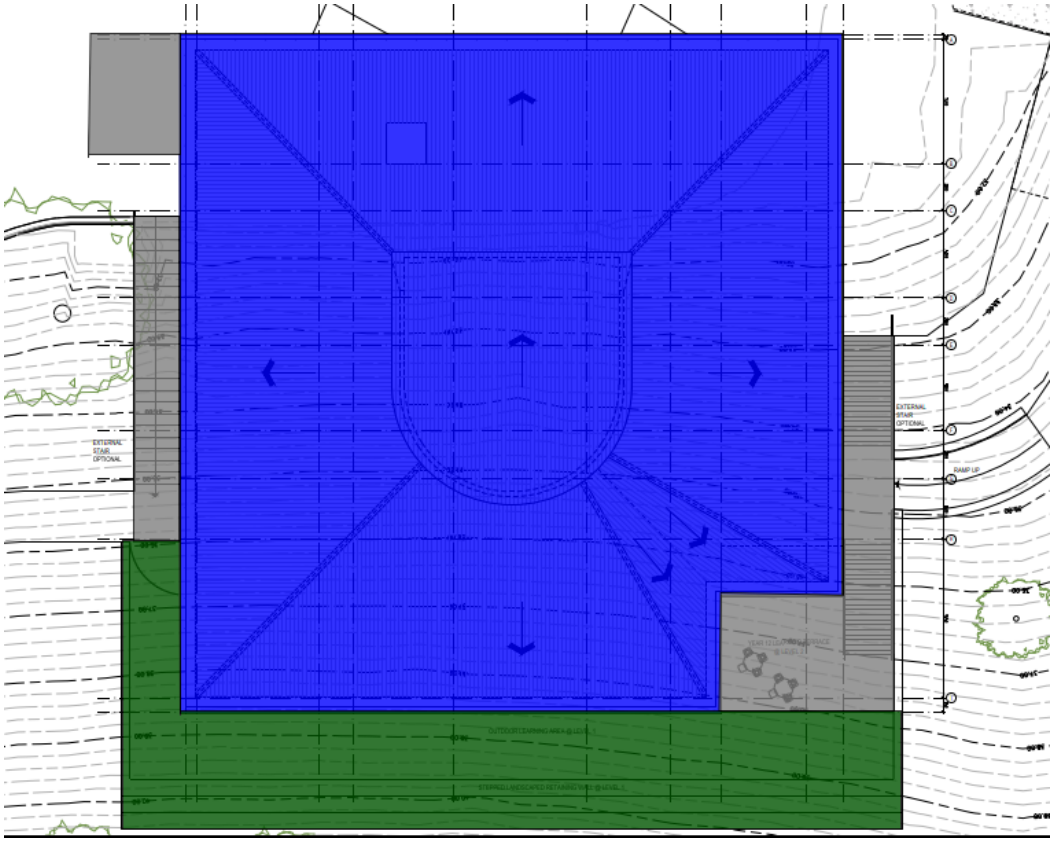


Figure 6: Site delineation.

Stormwater Management Initiatives

Stormwater treatment initiatives will need to be implemented. The following section presents the different surfaces that have been identified for treatment, and the required treatment. The initiatives to manage stormwater flows for the building area will underpin the overall performance of the building and its ability to meet stormwater management objectives.

Table 1: List of areas and their stormwater treatment measures.

Surfaces	Topographic Area (m^2)	Required Treatment
Effective Roof Catchment Area (shaded blue)	1,500m^2	Runoff from the total catchment area of 1,500m^2 will be diverted to rainwater tank(s) with a total effective storage capacity of 50,000L. The stored water will be used for toilet flushing and landscape irrigation. Overflow from the tank(s) will be diverted to the Legal Point of Discharge (LPD) on site.
Garden Area (shaded green)	360m^2	The landscaped area on the ground floor is assumed to be permeable, with no additional treatment required.
Remaining Impervious Area (shaded grey)	290m^2	All remaining impervious area runoff will be diverted directly to the LPD onsite.

The rainwater captured and stored in the 50,000L tank(s) will be used for all toilet flushing and landscape irrigation.

Please see Appendix 5 for Raingarden Specifications.

Rainwater Reuse

For water consumption calculations within the STORM tool, occupancy has been estimated based on the total number of students and staff (305 occupants), each responsible for 16.5L/day[4] water use resulting in a total daily demand of 5,032.5L. Additional water demand comes from irrigation requirements.

Rainfall Calculator - Based on 17 years (2000 to 2016) weather data for Melbourne

Building Type	School	Irrigation Area	1300	Students	305
Roof Area	1500	Irrigation Demand	455000 L/year	Laundry Use	7.0 L/day
Collection Efficiency	0.8	Toilet Use	16.5 L/day	Total Laundry Use	0.0 L/day
Loss per month	2.00 mm	Total Toilet Use	5032.5 L/day	Hot water demand	2135.0 L/day
Irrigation Requirement	350.00 mm				

Month	Average Rainfall	Runoff	Irrigation Demand	Laundry Demand	Toilet Demand	Total Demand	Overall Balance
January	32.66 mm	39,195 L	120,575 L	0 L	156,008 L	276,583 L	-237,388 L
February	46.31 mm	55,569 L	118,300 L	0 L	140,910 L	259,210 L	-203,641 L
March	39.76 mm	47,712 L	84,175 L	0 L	156,008 L	240,183 L	-192,471 L
April	47.49 mm	56,991 L	1,820 L	0 L	150,975 L	152,795 L	-95,804 L
May	37.37 mm	44,848 L	0 L	0 L	156,008 L	156,008 L	-111,160 L
June	44.72 mm	53,666 L	0 L	0 L	150,975 L	150,975 L	-97,309 L
July	47.31 mm	56,768 L	0 L	0 L	156,008 L	156,008 L	-99,240 L
August	47.41 mm	56,895 L	0 L	0 L	156,008 L	156,008 L	-99,113 L
September	47.11 mm	56,528 L	0 L	0 L	150,975 L	150,975 L	-94,447 L
October	50.85 mm	61,024 L	0 L	0 L	156,008 L	156,008 L	-94,984 L
November	61.04 mm	73,248 L	36,855 L	0 L	150,975 L	187,830 L	-114,582 L
December	51.25 mm	61,500 L	93,275 L	0 L	156,008 L	249,283 L	-187,783 L
Total	**553.29 mm**	**663,944 L**	**455,000 L**	**0 L**	**1,836,863 L**	**2,291,863 L**	**-1,627,919 L**
Average	**46.11 mm**	**55,329 L**	**37,917 L**	**0 L**	**153,072 L**	**190,989 L**	**-135,660 L**

Figure 7: Rainfall calculation

[4] This is compliant with the AS6400 standard of one full and four half flushes/person/day; toilets are assumed to use 4.5L per full flush and 3L per half flush.

Results:

The recommended treatments have been applied to the STORM tool and as a result, the proposed development has achieved score of 142%. With the proposed stormwater treatment measures incorporated into the development, the design will meet the minimum performance standards required by BESS.

Melbourne Water **STORM Rating Report**

TransactionID:	1127591
Municipality:	MOONEE VALLEY
Rainfall Station:	MOONEE VALLEY
Address:	41 Rosehill Road
	Essendon West
	VIC 3040
Assessor:	Zain Siddiqui
Development Type:	Other
Allotment Site (m2):	2,150.00
STORM Rating %:	142

Description	Impervious Area (m2)	Treatment Type	Treatment Area/Volume (m2 or L)	Occupants / Number Of Bedrooms	Treatment %	Tank Water Supply Reliability (%)
Roof Surface	500.00	Rainwater Tank	16,666.00	100	170.00	82.00
Roof Surface 1	500.00	Rainwater Tank	16,666.00	100	170.00	82.00
Roof Surface 2	500.00	Rainwater Tank	16,666.00	100	170.00	82.00
Impervious pathway	290.00	None	0.00	0	0.00	0.00

Figure 8: Stormwater calculator result.

With the addition of the rainwater tank(s) storage system, the overall flow from the site into the stormwater system during rainfall events has been reduced and the use of captured rainwater for irrigation and toilet flushing, will prevent pollutant loads in the captured water from entering the stormwater system. Overall, the development has managed the outflows and quality of stormwater runoff from the site by demonstrating an improvement with reduction in the typical annual load of total nitrogen, total phosphorus, gross pollutants and suspended solids.

Rainwater Tank Maintenance

Stormwater management measures or WSUD assets require undertaking regular scheduled maintenance to ensure that they perform to their optimal level and meet their intended objectives.

This section provides guidance on how to effectively maintain the Rainwater Tank proposed for the Danaher Drive, South Morang. The following management framework covers all the stages of a maintenance program for a WSUD asset, from its installation to its commissioning.

Regular Inspections

Inspections of roof areas and gutters leading to the tank(s) should take place every 3-6 months. Rainwater in the tank(s) should be checked every 6 months for mosquito infestation. The rainwater tank(s) should be examined every 2 years for sludge build up. The following key items should be regularly inspected:[5]

LEAF LITTER/DEBRIS IN GUTTERS
Inspect the gutters for presence of litter/debris.

BLOCKED DOWNPIPE
Check if water is spilling from the edge of the gutters and ensure that the downpipes are not blocked.

FIRST FLUSH DIVERTER CLOGGING
To ensure the diverters function properly, clean out by unscrewing the cap at the base of the diverters and remove the filter. Wash the filter with clean water as well as the flow restrictor inside the cap.

DEBRIS ON THE MESH COVER OVER INLETS/OUTLETS
Ensure that the mesh cover over inlets and outlets are clean of leaves and debris.

DIRT AND DEBRIS AROUND THE TANK BASE OR SIDE
Keep leaf build-up, sticks, and other items off the lid of the rainwater tanks and ensure there is no debris on the base, bottom lip and walls of the tanks.

SMELLY WATER OR MOSQUITOS
Ensure that the harvested rainwater does not smell. If mosquitoes are found to be present, refer to section 8.1 of this program for appropriate measures to remedy this.

PUMP
Ensure the pumps are operating regularly by monitoring the sound. Check that pumps are kept clear of surface water (flooding), vegetation, and have adequate ventilation.

MAINS BACKUP OR PUMP OPERATION
If the mains backup switching device fails, it may not be noticed for a long time. Consider a manual operating system to ensure continuous operation.

OVERFLOW
Check that the overflow is not blocked and that there is a clear path for water to safely spill from the tank through the overflow pipe when full. Check that a clean mesh screen is safely in place to prevent mosquitoes entering the tank.

SEDIMENT/DEBRIS BUILD-UP IN TANK
Inspect the sludge build-up in the bottom of the tank and ensure that it is no more than 20mm thick. When the sludge builds up to be more than 20mm, the rainwater tank can be emptied and washed with a high-pressure washer or hose.

BASE AREA
Tanks must be fully supported by a flat and level base. Check for any movement, cracks or damage to the slab or pavers. If damage is observed, empty the tank and have the fault corrected to prevent further damage.

MONITORING THE WATER LEVEL
Ensure the monitoring system (be it digital or a simple float system) is functioning properly by checking the water level in the rainwater tanks.

Clean Out Procedures

With the leaf blocking system installed, the roof and gutters onsite should be checked, maintained and cleaned annually to avoid blockages from occurring.

Water ponding in gutters should be avoided as this provides a breeding ground for mosquitos; tank(s) should also not become breeding grounds for mosquitoes. If mosquitoes are detected in the tank(s), remedial steps need to occur to prevent breeding.

[5] Sourced from the City of Port Phillip's '*Maintenance Manual – Rainwater Tanks*' from the City of Port Phillip website: www.portphillip.vic.gov.au/Maintenance_Manual_Rainwater_Tank.pdf

If mosquitoes or other insects are found in rainwater tanks, the point of entry should be located and repaired. As well as preventing further access, this will prevent the escape of emerging adults. Gutters should be inspected to ensure they do not contain ponded water and be cleaned if necessary.

There is no ideal treatment to kill mosquito larvae present in rainwater. The two commonly recognized treatments involve adding chemicals (medicinal or liquid paraffin, or kerosene) to tanks, which defeats one of the advantages of collecting rainwater. In addition, problems have been reported with both types of treatment.

Tanks can be treated by adding a small quantity of medicinal or liquid paraffin or kerosene. The recommended dose of kerosene is 35mL or two and a half tablespoon for a 15,000L tank. When using paraffin, the dose is double that required for kerosene.

Note: Commercial or industrial kerosene, for example power kerosene for tractors etc., **should not** be used in rainwater tanks.

Paraffin can be used in all types of tanks, but there have been reports of coagulation after a time and of deposits forming on the sides of tanks. Kerosene is not suitable for use in tanks coated with Aguaplate® and may not be suitable for use in tanks constructed of, or lined with, plastic. If in doubt, consult the manufacturer of the tank. Used carefully, kerosene will not result in risks to human health, but excess quantities can taint the water and very high doses can be poisonous to humans. Kerosene added to the surface will not mix through the body of rainwater in the tank and it will either evaporate or be washed out of the tank by overflow. Kerosene should not be added to tanks when water levels are low.

Internationally, it has been suggested that larvicides, such as temephos, s-methoprene and Bti (Bacillus thuringiensis), could be used in rainwater tanks (WHO 1997). However, only larvacide s-methoprene is registered for use in rainwater tanks by the Australian Pesticides and Veterinary Medicines Authority.

Note: Vegetable oils **should not** be used as they can become rancid after a while.[6]

Another option would be adding a very small amount of chlorine (approximately 4 parts per million) to kill off mosquitos and bacteria causing odours. The chlorine will disinfect the water and then evaporate. Chlorine tablets from a pool supplier can be used.

Rainwater tanks should be checked by a regular maintenance person every 3-6 months to ensure that connection to the building is maintained and there are no blockages. A simple way to ensure the tank is operating as intended would be through the installation of a smart monitoring device such as OneBox. These systems allow users to operate tanks remotely from internet or smartphone, monitor and control the tanks in real time, allow automatic release of stored water prior to storm events, alert users if there is any blockage and view tank history and usage patterns.

Alternatively, onsite tank gauges can help those familiar with the tank know if the tank is not working correctly.

Installation and Commissioning

The tank manufacture or material has not yet been nominated. However, the rainwater harvesting system will be installed with a mesh insect cover over the inlet pipe to ensure the tank does not become a breeding ground for pests. Mesh needs to be installed over overflow pipes. All inlets and outlets should be correctly sealed to prevent insects entering. Connection to the toilets in the dwelling should be tested (dye test or equivalent).

Installation and commissioning of the any filtration device should be in accordance with the manufacturer's instructions.

[6] From the Australian Department of Health: www.health.gov.au/internet/publications/publishing.nsf/Content/ohp-enhealth-raintank-cnt-l~ohp-enhealth-raintank-cnt-l-5~ohp-enhealth-raintank-cnt-l-5.5

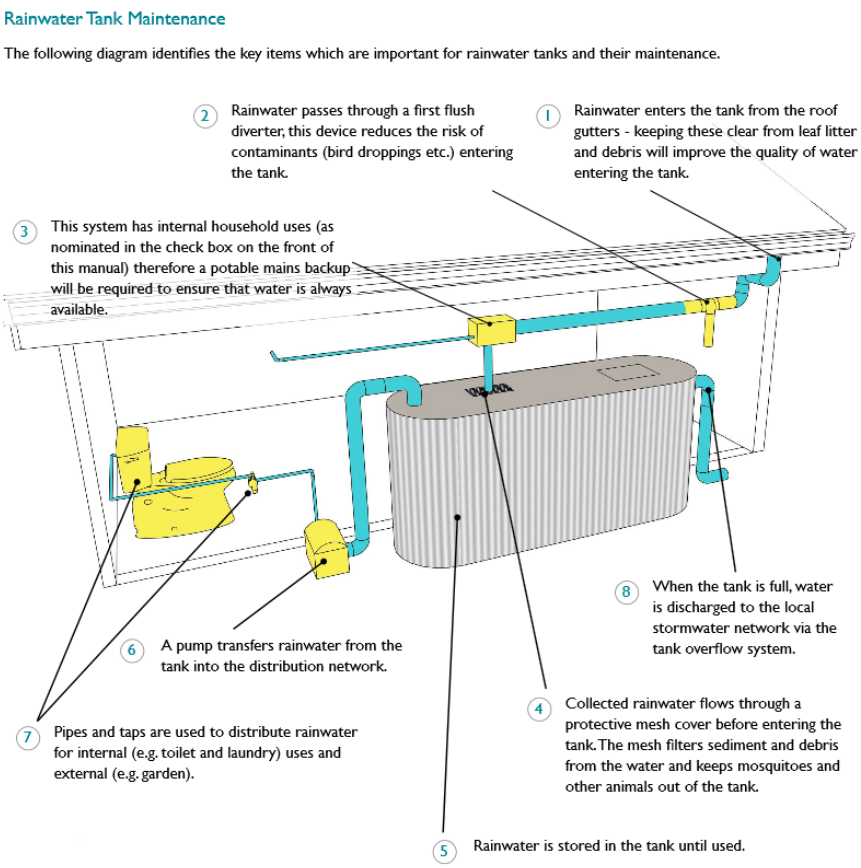


Figure 9: Diagram identifying the key items for rainwater tanks and their operation and maintenance (Source: City of Port Phillip Maintenance Manual-Rainwater Tanks)

Please note that the above image is not representative of the type of rainwater tank(s) for this project, however the maintenance aspects are to be very similar. This should be used as a guide along with the As Built drawings for the site which will be provided in the development's Operations and Maintenance manual.

Stormwater Runoff Treatment during the Construction Stage

Treatment – Various

Stormwater management in the construction stage will include measures which will be put in place to minimise the likelihood of contaminating stormwater discharge from the site as well as reduce the velocity of the flows generated from the building as it is being constructed. This will mean ensuring buffer strips are in place, and the site will be kept clean from any loose rubbish. More information is available from "*Keeping Our Stormwater Clean – A Builder's Guide*" by Melbourne Water[7]. The diagram below is an illustration of the various objectives which assist in minimising the impacts of stormwater runoff typical during the construction phase. Typical pollutants that are generated from a construction site during a rainfall event include:

- Dust
- Silt
- Mud
- Gravel
- Stockpiled materials
- Spills/oils
- Debris/litter

[7] For copies please contact Melbourne Water on 131 722.

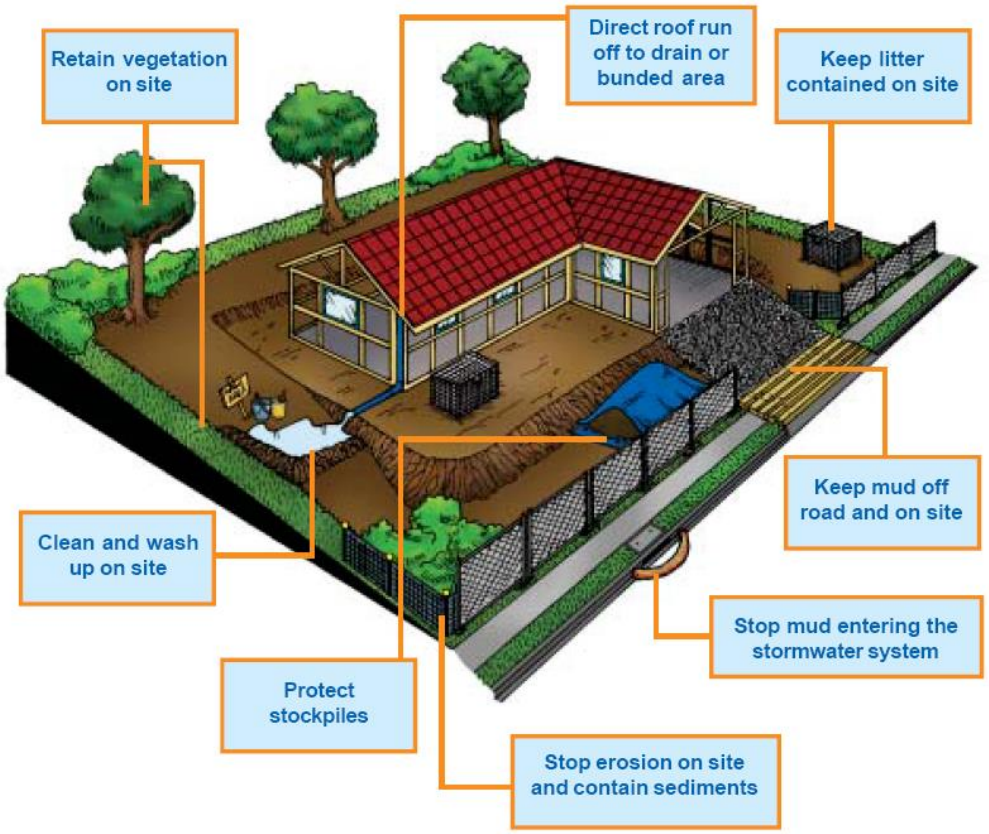
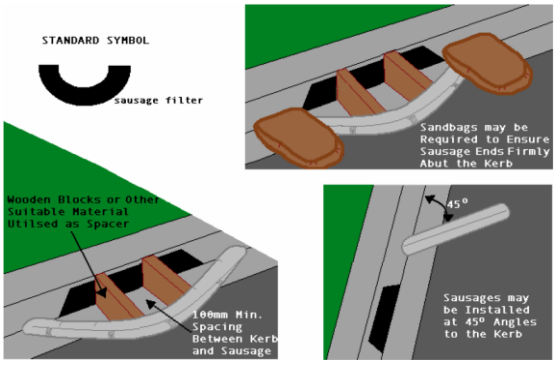


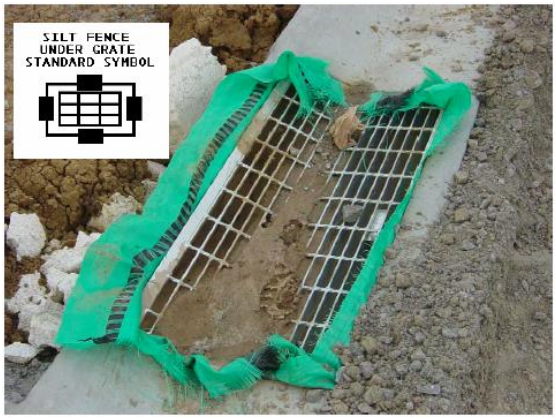
Figure 10: Stormwater will be effectively managed during construction phase according to the requirements listed in "Keeping Our Stormwater Clean – A Builder's Guide"

To reduce the impacts and minimise the generation of these pollutants the following measures are proposed. The symbols embedded within each image are typically used for Construction Environmental Management Plans.

Gravel Sausage filters – to be placed at the entrance of pits/side stormwater inlets. These permeable sacks will filter the suspended soils and sediments and any other litter carried by the stormwater to prevent the pollutants entering the system.



Silt Fences Under Grates - Silt fence material may be placed under the grate of surface-entry inlets to prevent sediment from entering the stormwater system.



Temporary Rumble Grids – these are designed to open the tread on tires and vibrate mud and dirt off the vehicle (in particular the chassis). This will heavily minimise the amount of soil/dirt deposited on local roads where it can be washed (by rainfall or other means) into the stormwater drains.

Appendix 3: VOC and Formaldehyde Emissions Limits

Table 2: Maximum Volatile Organic Compound Levels for construction materials (Source: Green Building Council Australia – Green Star Design and As Built v1.3 2019 Manual)

Product Type/Subcategory	Max TVOC Content (g/L of ready-to-use-product)
Paints, Adhesives and Sealants	
General purpose adhesives and sealants	50
Interior wall and ceiling paint, all sheen levels	16
Trim, varnishes and wood stains	75
Primers, sealers and prep coats	65
One and two pack performance coatings for floors	140
Acoustic sealants, architectural sealant, waterproofing membranes and sealant, fire retardant sealants and adhesives	250
Structural glazing adhesive, wood flooring and laminate adhesives and sealants	100
Carpets	
Total VOC limit	0.5 mg/m^2 per hour
4-PC (4-Phenylcyclohexene)	0.05mg/m^2 per hour
ISO 16000 / EN 13419 - TVOC at three days	0.5 mg/m^2 per hour
ISO 10580 / ISO/TC 219 (Document N238) - TVOC at 24 hours	0.5 mg/m^2 per hour

Table 3: Maximum Formaldehyde levels for processed wood products. (Source: Green Building Council Australia – Green Star Design and As Built v1.3 2019 Manual)

Formaldehyde emission limit values for different testing methods	
Test Method	**Emission Limit/ Unit of Measurement**
AS/NZS 2269:2004, testing procedure AS/NZS 2098.11:2005 method 10 for Plywood	≤1mg/ 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	≤1mg/ L
AS/NZS 4357.4 - Laminated Veneer Lumber (LVL)	≤1mg/ L
Japanese Agricultural Standard MAFF Notification No.701 Appendix Clause 3 (11) - LVL	≤1mg/ L
JIS A 5908:2003- Particle Board and Plywood, with use of testing procedure JIS A 1460	≤1mg/ L
JIS A 5905:2003 - MDF, with use of testing procedure JIS A 1460	≤1mg/ L
JIS A1901 (not applicable to Plywood, applicable to high pressure laminates and compact laminates)	≤0.1 mg/m^{2}hr
ASTM D5116 (applicable to high pressure laminates and compact laminates)	≤0.1 mg/m^{2}hr
ISO 16000 part 9, 10 and 11 (also known as EN 13419), applicable to high pressure laminates and compact laminates	≤0.1 mg/m^{2}hr (at 3 days)
ASTM D6007	≤0.12mg/m^3
ASTM E1333	≤0.12mg/m^3
EN 717-1 (also known as DIN EN 717-1)	≤0.12mg/m^3
EN 717-2 (also known as DIN EN 717-2)	≤3.5mg/m^{2}hr

Appendix 4: Green Star Daylight Hand Calculation Mark-up

The predicted daylight levels within the proposed development were calculated using the Green Star Daylight Hand Calculation methodology.

Areas marked in yellow in the figures below represent the nominated area, and areas marked in orange represent the portion of nominated area that effectively achieves a daylight factor of at least 2%.

Classrooms
Nominated area = 1,325m^2
Zone of compliance = 360m^2

Atrium Amphitheatre
Nominated area = 166m^2
Zone of compliance = 166m^2

Overall

Total % of nominated area that achieve at least 2% daylight factor: 527m^2/1,491m^2 = 35.3%
Note that meeting rooms, plant rooms, co-ord rooms and bathrooms have been excluded as they are assumed to be secondary/ transitory areas.

The development design is predicted to provide a high level of internal daylight amenity through the proposed windows which fulfills the minimum requirements of Moonee Valley Council's SDAPP Fact Sheet on Indoor Environment Quality.

This will not only help to improve the indoor environment quality, but also help to reduce the demand for artificial lighting during daylight hours.

Table 4: Summary of daylight assessment results for the development

Area	Nominated area (m^2)	Zone of compliance (m^2)	Area achieving 2% DF
Classrooms	1,325	360	27.1%
Atrium Amphitheatre	166	166	100%
Total	1,491	527	35.3%

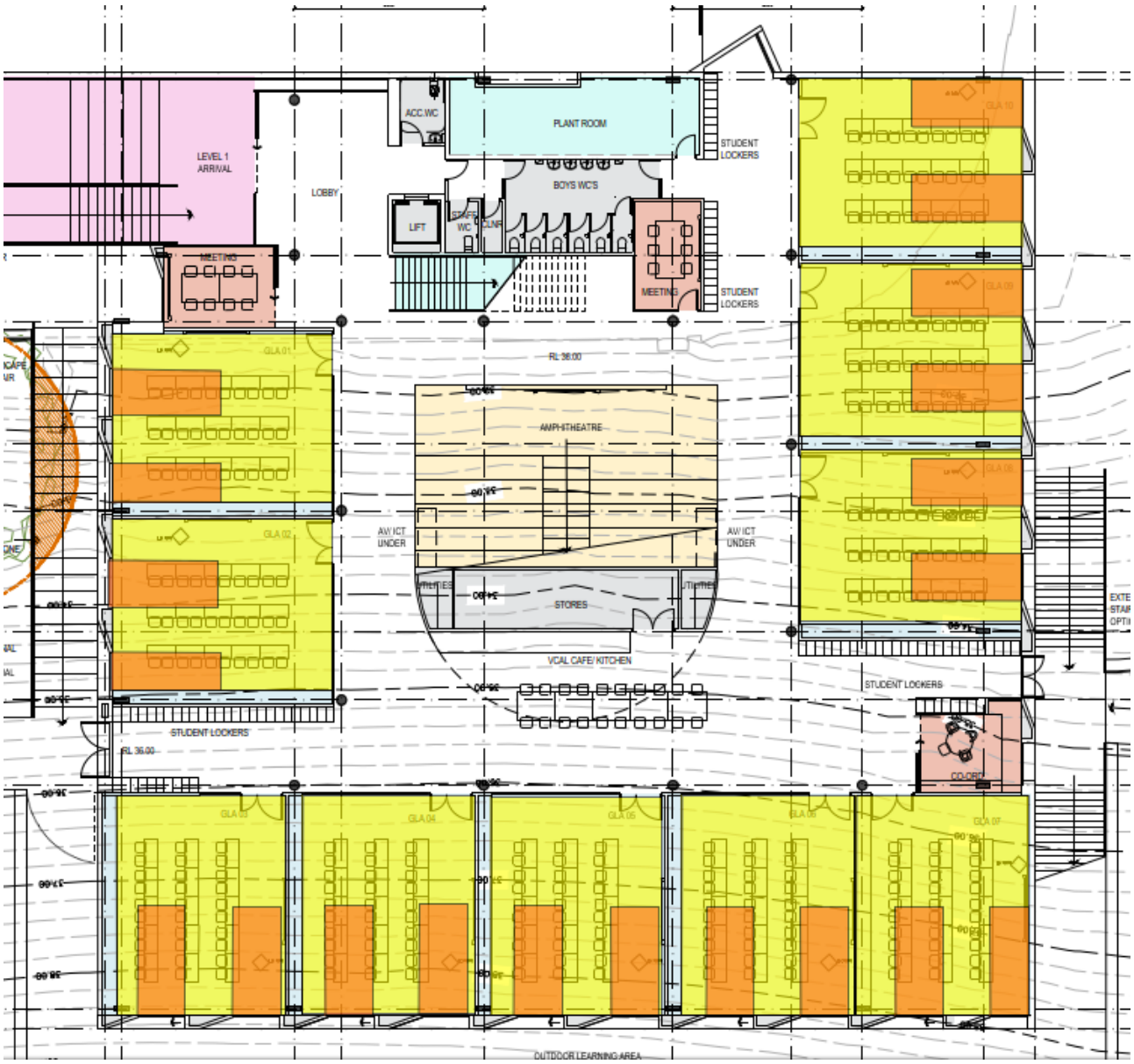


Figure 11: Daylight zone of compliance of all the level 1 classrooms of the development.

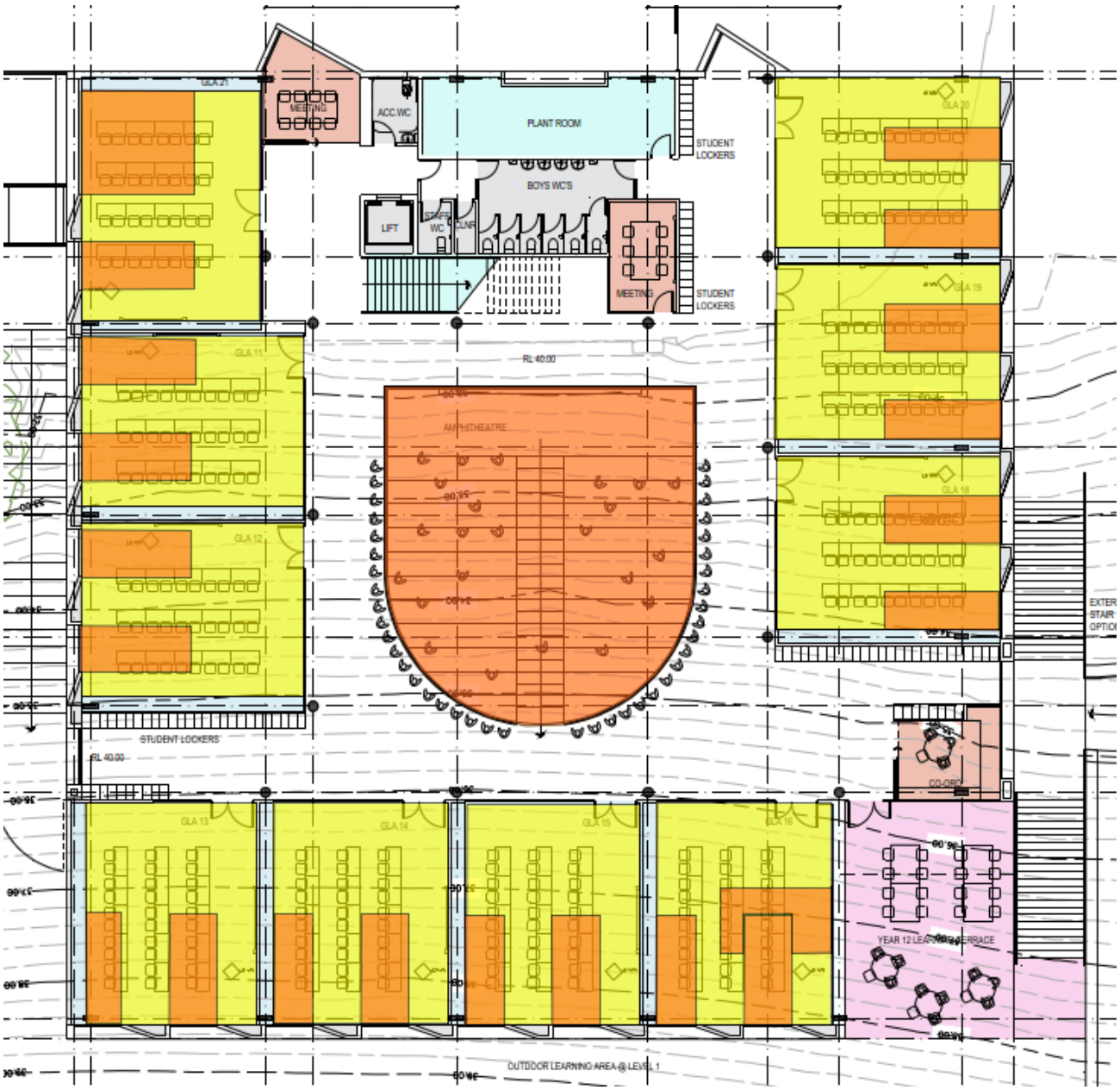


Figure 12: Daylight zone of compliance of all the level 2 classrooms of the development.

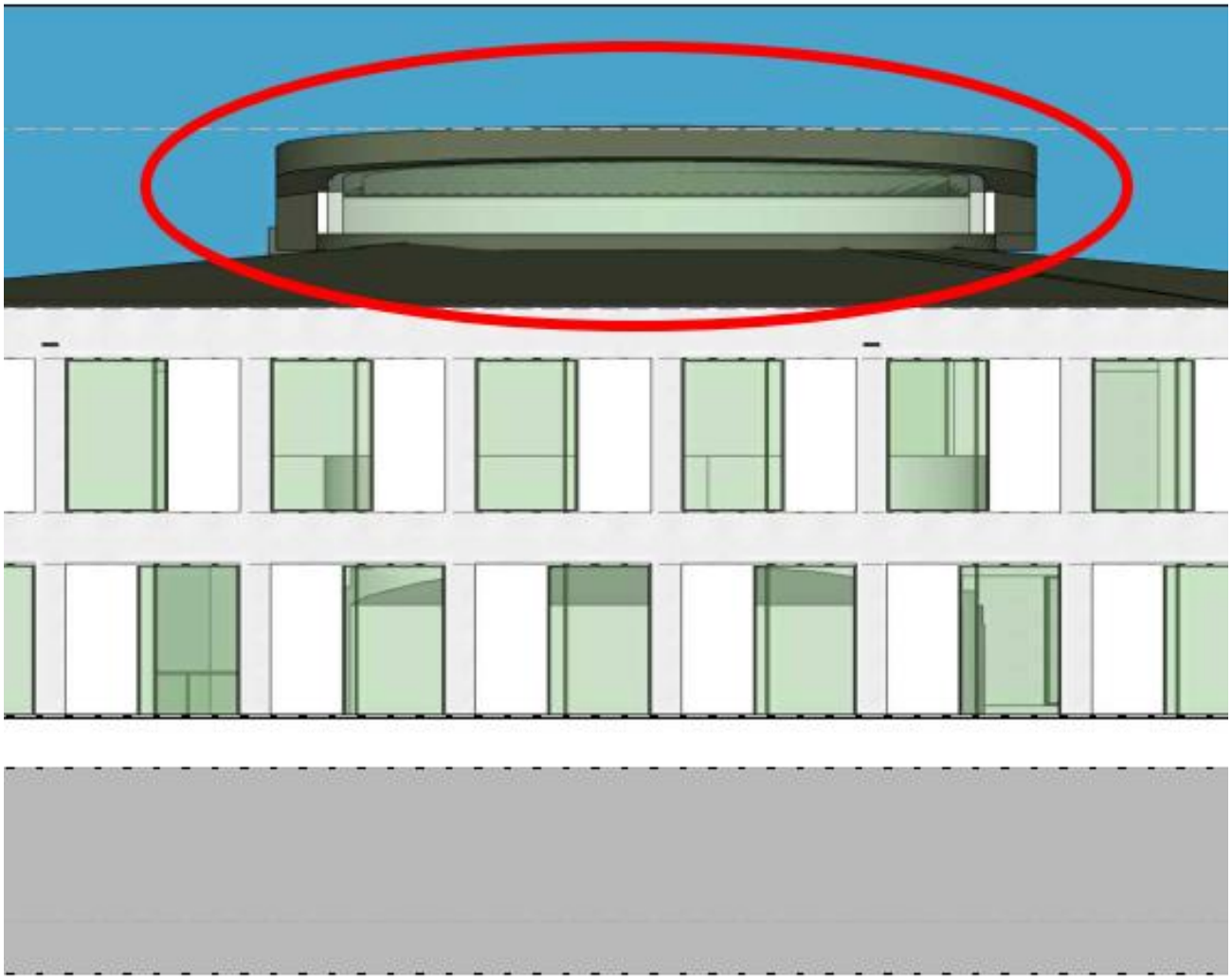


Figure 13: Three-sided windows that provide light to the Atrium Amphitheatre on the Level 2 of the development.

Appendix 5: Raingarden Specifications

In this development, 60m^2 of raingardens have been proposed to stop stormwater run-off from the driveway impervious area polluting the waterways with nutrients, rubbish and sediment. The section below provides information about how a raingarden works (sourced from Melbourne Water website[8]).

Step 1 – Rainwater collects and settles on the garden surface

Step 2 – Rainwater soaks through the plants and filter media, trapping rubbish and sediment on the surface

Step 3 – Plants use the nutrients in the stormwater, and toxins stick to the soil

Step 4 – The soil and plant roots work together to naturally filter the water and remove pollutants

Step 4 – The filtered water will then be collected at the bottom of the raingarden and being drained to the next treatment device or being diverted directly to the legal point of discharge.

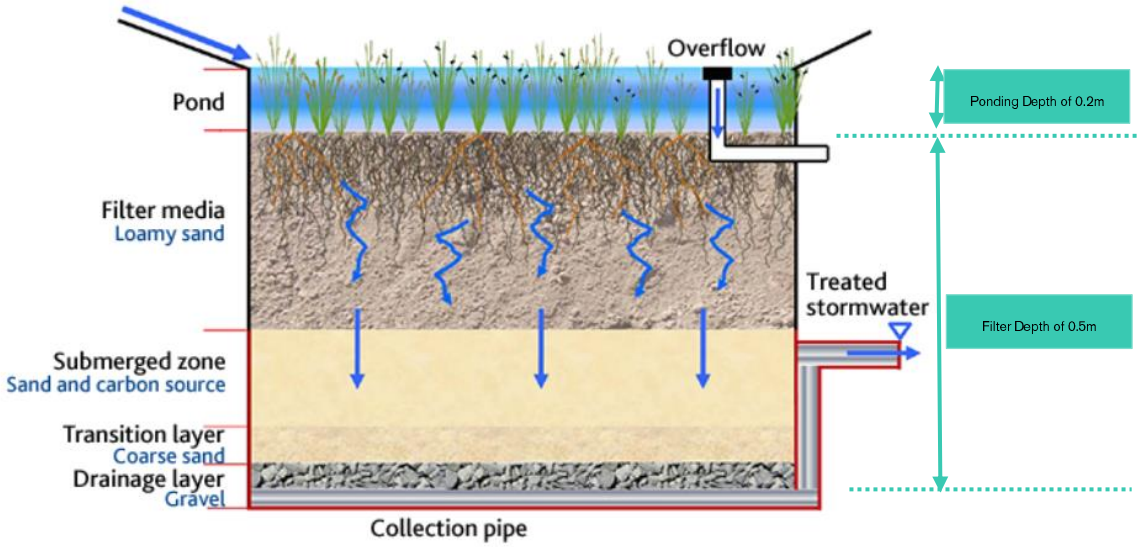


Figure 14: Cross-section of a raingarden with SDC's mark-up showing the proposed ponding depth and filter depth (image sourced from Melbourne Water website)

[8] Melbourne Water Website: https://www.melbournewater.com.au/planning-and-building/stormwater-management/options-treating-stormwater/raingardens

Print Report (/projects/7795FC86-V2/report-print)

This BESS report outlines the sustainable design commitments of the proposed development at St Bernards Essendon West VIC 3040. 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 Moonee Valley 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.

St Bernards, Essendon West 3040 Essendon West

Site area: 2150 m^2 ·
Site type: Non-residential development m^2 ·
Building Floor Area: 3340 m^2 ·
Date of Assessment: 09 Apr 2021 ·
Version: V5, 1.6.2-B.296 ·
Applicant: zain@sdconsultants.com.au

Project Identifier
7795FC86

Published
http://bess.net.au/projects/7795FC86-V2

Your BESS score is

+ 54%

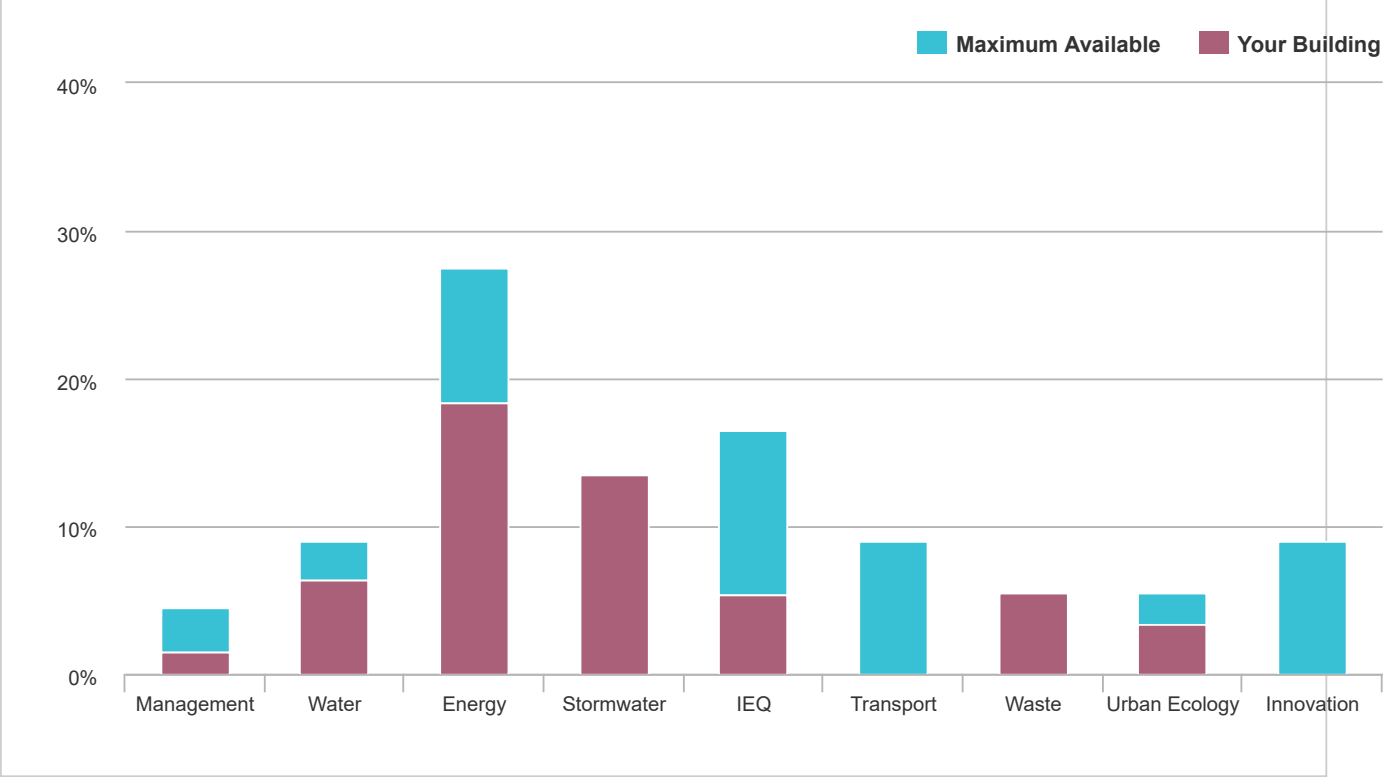
0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%

50% + Best Practice

70% + Excellence

% of Total	Category	Score	Pass
1 %	Management	33 %	
6 %	Water	71 %	✓
18 %	Energy	67 %	✓
14 %	Stormwater	100 %	✓
5 %	IEQ	33 %	✗
0 %	Transport	0 %	
6 %	Waste	100 %	
3 %	Urban Ecology	62 %	
0 %	Innovation	0 %	

How did this Development Perform in each Environmental Category?



Sustainable design commitments by category

The sustainable design commitments for this project are listed below. These are to be incorporated into the design documentation and subsequently implemented.

Management

33% - contributing 1% to overall score

Credit	Disabled	Scoped out	Score
Management 3.2 Metering			100 %
Management 3.3 Metering			100 %
Management 4.1 Building Users Guide			100 %

Management 3.2 Metering

100%

Score Contribution	This credit contributes 11.1% towards this section's score.
Aim	To provide building users with information that allows monitoring of energy and water consumption

Questions

Have utility meters been provided for all individual commercial tenants? *

Yes

Management 3.3 Metering 100%

Score Contribution	This credit contributes 11.1% towards this section's score.
Aim	To provide building users with information that allows monitoring of energy and water consumption

Questions

Have all major common area services been separately submetered? *

Yes

Management 4.1 Building Users Guide 100%

Score Contribution	This credit contributes 11.1% towards this section's score.
Aim	To encourage and recognise initiatives that will help building users to use the building efficiently

Questions

Will a building users guide be produced and issued to occupants? *

Yes

Water 71% - contributing 6% to overall score

Credit	Disabled	Scoped out	Score
Water 1.1 Potable water use reduction			60 %
Water 3.1 Water Efficient Landscaping			100 %
Water 4.1 Building Systems Water Use Reduction			100 %

Water Approachs

What approach do you want to use Water?	Use the built in calculation tools
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

	Year 12 Building
Showerhead	Scope out
Bath	Scope out
Kitchen Taps	>= 5 Star WELS rating
Bathroom Taps	>= 5 Star WELS rating
Dishwashers	Scope out
WC	>= 4 Star WELS rating
Urinals	Scope out
Washing Machine Water Efficiency	Scope out
Which non-potable water source is the dwelling/space connected to?	Rainwater Tank(s)
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 Tanks

	Rainwater Tank(s)
Name	Rainwater Tank(s)
What is the total roof area connected to the rainwater tank? Square Metres	1500.0
Tank Size Litres	50000.0
Irrigation area connected to tank Square Metres	1300.0
Is connected irrigation area a water efficient garden?	Yes

Water 1.1 Potable water use reduction 60%

Score Contribution	This credit contributes 71.4% towards this section's score.
Aim	Water 1.1 Potable water use reduction (interior uses) What is the reduction in total water use due to efficient fixtures, appliances, and rainwater use? To achieve points in this credit there must be >25% potable water reduction. You are using the built in calculation tools. This credit is calculated from information you have entered above.
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.

Calculations

Reference (kL) *

3438

Proposed (excluding rainwater and recycled water use) (kL) *

2677

Rainwater or recycled water supplied (Internal + External) (kL) *

752

Proposed (including rainwater and recycled water use) (kL) *

1924

% Reduction in Potable Water Consumption * Percentage %

44 %

Water 3.1 Water Efficient Landscaping 100%

Score Contribution	This credit contributes 14.3% towards this section's score.
Aim	Are water efficiency principles used for landscaped areas? This includes low water use plant selection (e.g. xeriscaping). Note: food producing landscape areas and irrigation areas connected to rainwater or an alternative water source are excluded from this section.

Questions

Will water efficient landscaping be installed? *

Yes

Water 4.1 Building Systems Water Use Reduction 100%

Score Contribution	This credit contributes 14.3% towards this section's score.
Aim	Will the project minimise water use for building systems such as evaporative cooling and fire testing systems?

Questions

Where applicable, have measures been taken to reduce potable water consumption by >80% in the buildings air-conditioning chillers and when testing fire safety systems? *

Yes

Energy 67% - contributing 18% to overall score

Credit	Disabled	Scoped out	Score
Energy 1.1 Thermal Performance Rating - Non-Residential			38 %
Energy 2.1 Greenhouse Gas Emissions			100 %
Energy 2.2 Peak Demand			100 %
Energy 2.3 Electricity Consumption			100 %
Energy 2.4 Gas Consumption			N/A
Energy 3.1 Carpark Ventilation			N/A
Energy 3.2 Hot Water			100 %
Energy 3.7 Internal Lighting - Non-Residential			100 %
Energy 4.1 Combined Heat and Power (cogeneration / trigeneration)			N/A
Energy 4.2 Renewable Energy Systems - Solar			100 %

Use the BESS Deem to Satisfy (DtS) method for Energy?	Yes
Do all exposed floors and ceilings (forming part of the envelope) demonstrate a minimum 10% improvement in required NCC2019 insulation levels (total R-value upwards and downwards)?	Yes
Does all wall and glazing demonstrate meeting the required NCC2019 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 Spaces Energy Profiles

	Year 12 Building

Solar Photovoltaic systems

		Solar
Name		Solar
System Size (lesser of inverter and panel capacity)	kW peak	20.0
Orientation (which way is the system facing)?		North
Inclination (angle from horizontal)	Angle (degrees)	2.5

Energy 1.1 Thermal Performance Rating - Non-Residential 38%

Score Contribution	This credit contributes 44.4% towards this section's score.

Aim	Reduce reliance on mechanical systems to achieve thermal comfort in summer and winter - improving comfort, reducing greenhouse gas emissions, energy consumption, and maintenance costs.
Criteria	What is the % reduction in heating and cooling energy consumption against the reference case (NCC 2019 Section J)?

Energy 2.1 Greenhouse Gas Emissions 100%

Score Contribution	This credit contributes 11.1% towards this section's score.
Aim	Reduce the building's greenhouse gas emissions
Criteria	What is the % reduction in annual greenhouse gas emissions against the benchmark?

Energy 2.2 Peak Demand 100%

Score Contribution	This credit contributes 5.6% towards this section's score.
Aim	Reduce demand on electrical infrastructure during peak cooling periods
Criteria	What is the % reduction in the instantaneous (peak-hour) demand against the benchmark?

Energy 2.3 Electricity Consumption 100%

Score Contribution	This credit contributes 11.1% towards this section's score.
Aim	Reduce consumption of electricity
Criteria	What is the % reduction in annual electricity consumption against the benchmark?

Energy 2.4 Gas Consumption N/A

This credit was scoped out: No gas connection in use

This credit was disabled: No gas connection in use

Aim	Reduce consumption of gas
Criteria	What is the % reduction in annual gas consumption against the benchmark?

Energy 3.1 Carpark Ventilation N/A

This credit was scoped out: The building does not have any enclosed car parking.

Energy 3.2 Hot Water 100%

Score Contribution	This credit contributes 5.6% towards this section's score.
Criteria	What is the % reduction in annual hot water system energy use (gas and electricity) against the benchmark?

Energy 3.7 Internal Lighting - Non-Residential 100%

Score Contribution	This credit contributes 11.1% towards this section's score.
Aim	Reduce energy consumption associated with internal lighting

Questions

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 J6.2a of the NCC 2019 Vol 1? *

Yes

Energy 4.1 Combined Heat and Power (cogeneration / trigeneration) N/A

This credit was scoped out: No cogeneration or trigeneration system in use.

This credit was disabled: No cogeneration or trigeneration system in use.

Aim	Reduce energy consumption
Criteria	Does the CHP system reduce the class of buildings GHG emissions by more than 25%?

Energy 4.2 Renewable Energy Systems - Solar 100%

Score Contribution	This credit contributes 5.6% towards this section's score.
Aim	To encourage the installation of on-site renewable energy generation
Criteria	Does the solar power system provide 5% of the estimated energy consumption of the building class it supplies?

Calculations

Solar Power - Energy Generation per year * kWh

22868.5

% of Building's Energy * Percentage %

24 %

Stormwater

100% - contributing 14% to overall score

Credit	Disabled	Scoped out	Score
Stormwater 1.1 Stormwater Treatment			100 %

Which stormwater modelling are you using?	Melbourne Water STORM tool

Stormwater 1.1 Stormwater Treatment

100%

Score Contribution	This credit contributes 100.0% towards this section's score.
Aim	To achieve best practice stormwater quality objectives through reduction of pollutant load (suspended solids, nitrogen and phosphorus)
Criteria	Has best practice stormwater management been demonstrated?

Questions

STORM score achieved *

142

Calculations

Min STORM Score *

100

IEQ

33% - contributing 5% to overall score

Credit	Disabled	Scoped out	Score

IEQ 1.4 Daylight Access - Non-Residential	33 %

IEQ 1.4 Daylight Access - Non-Residential 33%

Score Contribution	This credit contributes 100.0% towards this section's score.
Aim	To provide a high level of amenity and energy efficiency through design for natural light.
Criteria	What % of the nominated floor area has at least 2% daylight factor?

Questions

% Achieved ? *

35 %

Transport 0% - contributing 0% to overall score

Waste 100% - contributing 6% to overall score

Credit	Disabled	Scoped out	Score
Waste 1.1 - Construction Waste - Building Re-Use			N/A
Waste 2.1 - Operational Waste - Food & Garden Waste			100 %
Waste 2.2 - Operational Waste - Convenience of Recycling			100 %

Waste 1.1 - Construction Waste - Building Re-Use N/A

This credit was scoped out: The site was not previously developed.

Aim	To recognise developments that re-use materials on-site

Waste 2.1 - Operational Waste - Food & Garden Waste 100%

Score Contribution	This credit contributes 50.0% towards this section's score.

Aim	To minimise organic waste going to landfill

Questions

Are facilities provided for on-site management of food and garden waste? *

Yes

Waste 2.2 - Operational Waste - Convenience of Recycling 100%

Score Contribution	This credit contributes 50.0% towards this section's score.
Aim	To minimise recyclable material going to landfill

Questions

Are the recycling facilities at least as convenient for occupants as facilities for general waste? *

Yes

Urban Ecology 62% - contributing 3% to overall score

Credit	Disabled	Scoped out	Score
Urban Ecology 1.1 Communal Spaces			100 %
Urban Ecology 2.1 Vegetation			100 %

Urban Ecology 1.1 Communal Spaces 100%

Score Contribution	This credit contributes 12.5% towards this section's score.
Aim	To encourage and recognise initiatives that facilitate interaction between building occupants
Criteria	Is there at least the following amount of common space measured in square meters : * 1m² for each of the first 50 occupants * Additional 0.5m² for each occupant between 51 and 250 * Additional 0.25m² for each occupant above 251?

Questions

Common space provided * Square Metres

131.0

Calculations

Minimum Common Space Required * Square Metres

108

Urban Ecology 2.1 Vegetation 100%

Score Contribution	This credit contributes 50.0% towards this section's score.
Aim	To encourage and recognise the use of vegetation and landscaping within and around developments
Criteria	How much of the site is covered with vegetation, expressed as a percentage of the total site area?

Questions

Percentage Achieved ? * Percentage %

60 %

Innovation 0% - contributing 0% to overall score

Items to be marked on floorplans

Do not upload your floorplans and elevations into the BESS tool. Instead, please ensure the items below are marked on the plans and provide a document / page reference number in the comments field.
0 / 9 floorplans & elevation notes complete.

Management 3.2: Individual utility meters annotated	Incomplete
Management 3.3: Common area submeters annotated	Incomplete
Water 3.1: Water efficient garden annotated	Incomplete

Energy 4.2: Floor plans showing location of photovoltaic panels as described.	Incomplete
Stormwater 1.1: Location of any stormwater management systems used in STORM or MUSIC modelling (e.g. Rainwater tanks, raingarden, buffer strips)	Incomplete
Waste 2.1: Location of food and garden waste facilities	Incomplete
Waste 2.2: Location of recycling facilities	Incomplete
Urban Ecology 1.1: Size and location of communal spaces	Incomplete
Urban Ecology 2.1: Vegetated areas	Incomplete

Documents and evidence

Based on the information you have entered, the following supporting evidence is required. You can choose to upload supporting documents directly to BESS, or submit a printed version as an appendix to your BESS report. Use the comments field to provide a reference (e.g. page number) if relevant.

0 / 5 supporting evidence documentation complete.

Energy 1.1: Energy Report showing calculations of reference case and proposed buildings	Incomplete
Energy 3.7: Provide a written description of the average lighting power density to be installed in the development and specify the lighting type(s) to be used.	Incomplete
Energy 4.2: Specifications of the solar photovoltaic system(s).	Incomplete
Stormwater 1.1: STORM report or MUSIC model	Incomplete
IEQ 1.4: A short report detailing assumptions used and results achieved.	Incomplete

Other Supporting Documents

Please upload any other documents here that may help to support your application.

Management Section

Add Supporting Document

Water Section

Add Supporting Document

Energy Section

Add Supporting Document

Stormwater Section

Add Supporting Document

IEQ Section

Add Supporting Document

Transport Section

Add Supporting Document

Waste Section

Add Supporting Document

Urban Ecology Section

Add Supporting Document

Innovation Section

Add Supporting Document