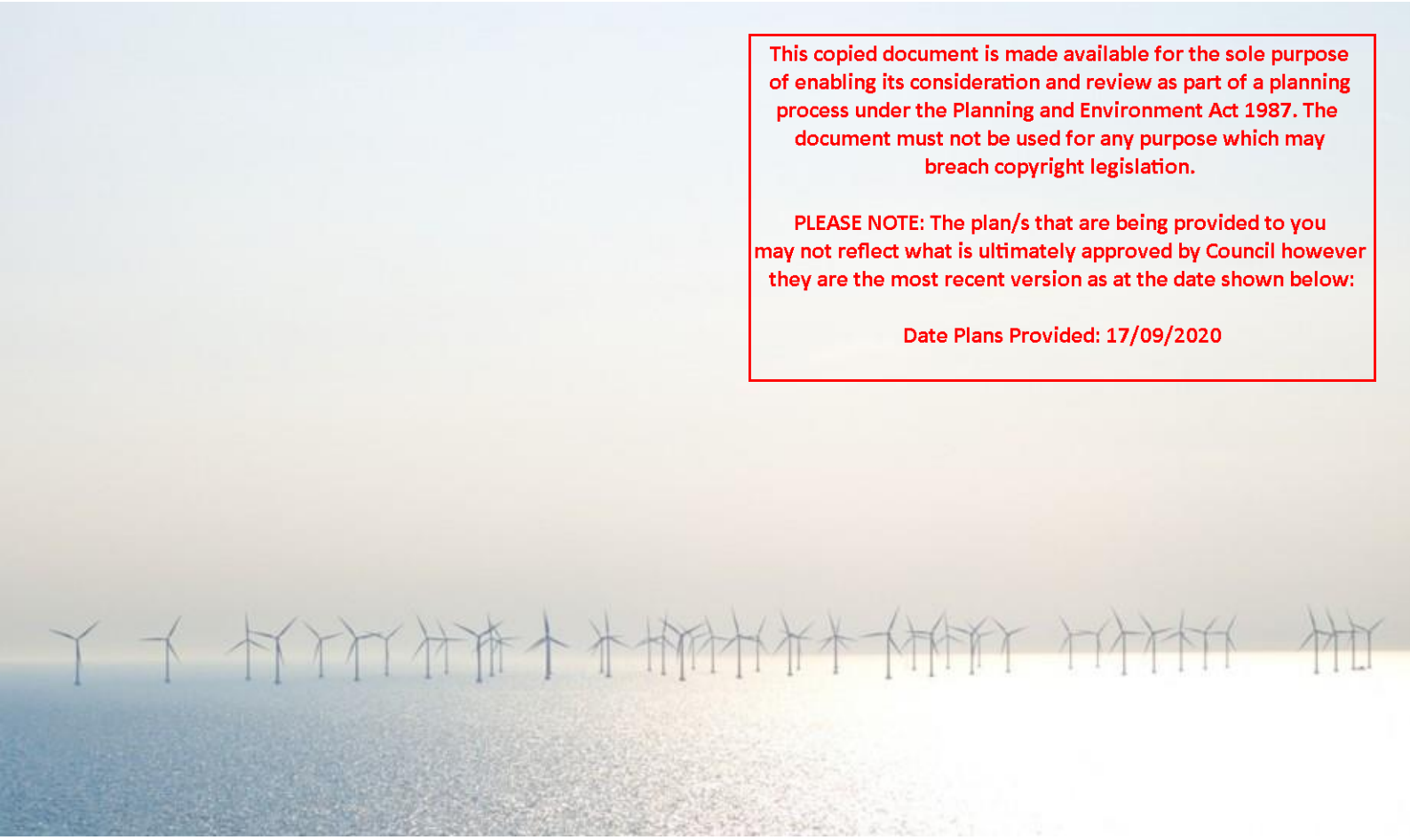

Sustainable Design Assessment

34 Wedge Street South, Werribee

Prepared for:

Dixon Building Group

C/o Draft Comps Services

24 August 2020

Prepared by:

EcoHarmony

Revision	Date	Prepared by	Reviewed	Status
A	19/08/2020	LF	-	Draft
B	24/08/2020	LF	-	TP

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Contents

1. Summary

This Sustainable Design Assessment (SDA) was completed for the residential development located at 34 Wedge Street South, Werribee, as a response to clauses 22.08 and 53.18 of Wyndham City planning policies. The SDA is to inform the planning authority on how sustainability will be addressed within the subject development.

The development consists of 3 dwellings witch are classified as class 1 under the Building Code of Australia. Town planning drawings used to complete this assessment were provided by Draft Comps Services on 18 August 2020 and dated 16 July 2020

The Built Environment Sustainability Scorecard (BESS) tool was used to assess the environmental outcome of the development which has achieved 53% score while also passing all mandatory categories

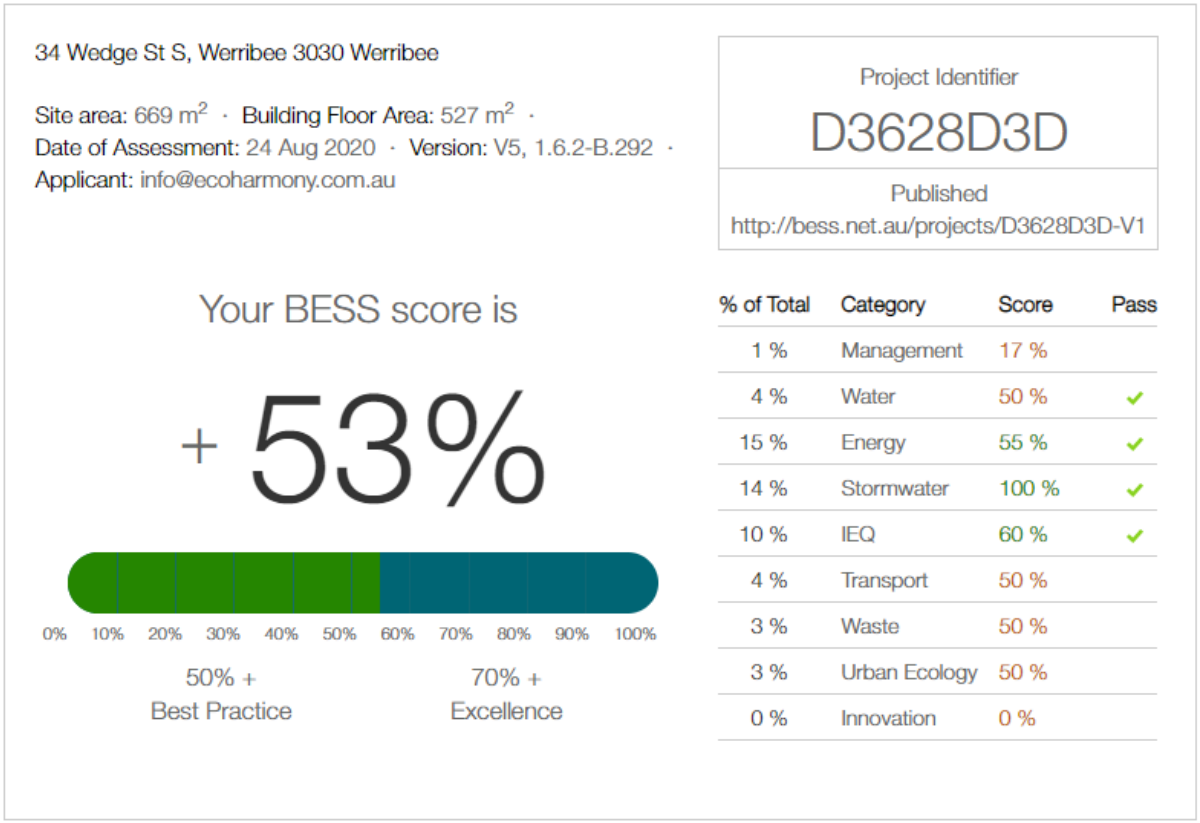

Figure 1: BESS results (source: Casbe)

The main Environmentally Sustainable Design (ESD) initiatives are as following:

- 6.5 Star average energy rating
- Double glazing for habitable rooms
- Energy efficient services
- 2000 L rainwater tank to each dwelling connected to toilets and irrigation
- Water efficient fixtures
- Central location

1.1. Framework

Sustainable Design Assessment in the Planning Process (SDAPP) program incorporated in clause 22.08 of the Wyndham City planning schemes, forms the basis of this Sustainable Design Assessment (SDA). The report details the environmental sustainability features of the development within the below 7 categories:

- Energy performance
- Water resources
- Indoor environment quality
- Stormwater management
- Transport
- Waste Management
- Urban Ecology

The Objectives as stated for each category in the report have been incorporated from the environmentally sustainable development local planning clause of the subject Council.

Moreover, the stormwater management plan also addresses the requirements of clause 55.03 by meeting best practice performance objectives for stormwater quality.

To assess the environmental outcome of the development, the below sustainability tools were used:

- BESS
- Melbourne Water STORM tool

The Green Building Council of Australia's (GBCA) Green Star tool guidelines have also been used as a reference for some of the sustainability initiatives.

1.2. Drawings Indications

The ESD initiatives stated in this report in agreement with project team and other stakeholders, should be clearly indicated and/or annotated on the architectural drawings. This includes but not limited to: water tank, windows operability, air-conditioners condensers, clotheslines, bicycle racks, external materials and other relevant readily shown items.

2. Internal Environment Quality

Objectives

- To achieve a healthy indoor environment quality for the wellbeing of building occupants, including the provision of fresh air intake, cross ventilation, and natural daylight.
- To achieve thermal comfort levels with minimized need for mechanical heating, ventilation and cooling.
- To reduce indoor air pollutants by encouraging use of materials with low toxic chemicals.

2.1. Thermal Comfort

In order to enhance the mean radiant temperature, double glazed windows will be installed for all living spaces and bedrooms as a minimum.

2.2. Ventilation

To encourage natural ventilation and reduce reliance on mechanical cooling, all operable windows will be fitted with insect screens while magnetic door latches will be provided for bedroom doors.

The dwellings are designed to have effective cross ventilation in all habitable rooms. Ventilation opening areas will exceed the minimum regulatory requirement.

2.3. Volatile Organic Compounds

Many construction materials used internally have high levels of volatile organic compounds (VOC) posing health risks to building occupants and workers. Risks will be mitigated by committing to the following:

- Engineered wood products including particleboard, plywood, MDF…will meet the Australian Standards for formaldehyde emission limits E0 or E1 as a maximum or equivalent.
- Carpets will have a total VOC emission limits as specified in Green Star guidelines section 13.1.2, i.e. not exceeding 0.5 mg/m^2 per hour.
- Paints, adhesives and sealants will meet the total VOC limits of Green Star as specified in the table below

Table 1: Maximum total VOC limits for paints, adhesives and sealants (Source: GBCA 2017)

Product category	Maximum VOC content (g/L)
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 membrane and sealant, fire retardant sealant and adhesives	250
Structural glazing adhesive, wood flooring and laminate adhesive and sealants	100

3. Energy Efficiency

Objectives

- To improve the efficient use of energy, by ensuring development demonstrates design potential for ESD initiatives at the planning stage.
- To reduce total operating greenhouse gas emissions.
- To reduce energy peak demand through particular design measures

3.1. Energy Ratings

The two dwellings will achieve 6.5 Star average energy rating at the building permit stage.

3.2. Heating and Cooling

Both heating and cooling will be provided by reverse cycle air conditioners. The air conditioner should be a multi-split inverter type or individual split systems allowing for single room conditioning while only consuming proportionate energy.

The reverse cycle air conditioner to be selected, will be within one star of the most efficient available of its size and type.

3.3. Hot Water

The hot water for the development will be provided by individual 6 star or more instantaneous natural gas fired hot water units.

3.4. Lighting

20% reduction in lighting power density for all internal artificial lighting will be achieved. This means that for a class 1 building, the maximum lighting power allowance will be reduced from 5 to 4 W/m2.

All external lightings, including lights on balconies will be controlled by daylight and motion detectors.

3.5. Appliances

The dishwasher will be minimum 5 star energy rated and no washing machines or dryer will be provided by the developer.

3.6. Clothes Drying

All townhouses will have an outdoor clothesline which would minimize or eliminate the need for an electric dryer.

4. Water Efficiency

Objectives

- To improve water efficiency.
- To reduce total operating potable water use.
- To encourage the collection and reuse of stormwater.
- To encourage the appropriate use of alternative water sources

4.1. Rainwater Harvesting

For each townhouse, rainwater runoff from the rear portion of the roof will be collected in a 2000L minimum capacity tank which will service all the toilets and irrigation.

4.2. Water Fixtures

The water fixtures in the development will have WELS rating as per the below table

Table 2: fixtures water efficiency

Water fixture & appliances	WELS rating	Flow
Kitchen taps	5 star	4.5-6 L/min
Basin taps	5 star	4.5-6 L/min
Showers	3 star	6-7.5 L/min
Toilets	4 star	3.5 L/flush (avg.)
Dishwasher	5 star	12 L/cycle (avg.)

5. Stormwater management

Objectives

- To reduce the impact of stormwater run-off.
- To improve the water quality of stormwater run-off.
- To achieve best practice stormwater quality outcomes.
- To incorporate the use of water sensitive urban design, including stormwater re-use.

5.1. Water Sensitive Urban Design

The water sensitive urban design objectives will be met by the means of water harvesting, and ground infiltration as detailed in appendix A.

6. Building Materials

Objectives

- To minimize the environmental impacts of buildings by encouraging the use materials with a favorable lifecycle assessment

6.1. Timber

All the timber used in the construction for structural and non- structural purposes will be responsibly and sustainably sourced.

New timber will be certified by one of three forest management independent certification bodies:

- Forest Stewardship Council (FSC)
- Program for the Endorsement of Forest Certification (PEFC)
- Responsible Wood Certification Scheme

The use of recycled timber or bamboo for flooring is also a sustainable option.

Figure 2: Certification logos for sustainable timber (source: PentArch)

6.2. Supplementary Cementitious Materials

Slab concrete will have at least 30% cement substitutes.

The production of cement, which is the binding agent in concrete, is responsible for around 8% of global emissions (BZE 2017). Supplementary cementitious materials (SMC) can partially replace Portland cement, mainly coal fly ash and ground granulated blast-furnace slag (GGBS). These materials are abundant and would reduce emissions by 6% for every 10% replacement. Concrete with more than 60% replacement materials are commercially available such as Boral Envisia or equivalent.

6.3. Carpet underlay

Carpet underlay used for cushioning will be made from at least 90% recycled materials and shall be 100% recyclable at end of life.

7. Transport

Objectives

- To ensure that the built environment is designed to promote the use of walking, cycling and public transport, in that order.
- To minimize car dependency.
- To promote the use of low emissions vehicle technologies and supporting infrastructure.

7.1. Location

The development is also located within 500 meters from Werribee central with the advantage of reduced or zero need of private car transport mode. The location offers ample of amenities and is an excellent choice for medium and high density housing.

7.2. Cycling

The dwellings have private garages allowing for the parking of a bicycle at the front corner of the car without affecting the space required for doors operation, alternatively, the shed can be used as a bicycle parking

7.3. Public Transport

The development is situated within one km from Werribee train station which can be reached on foot or bus. The bus stop is 100m from the development

Figure 3: Public transport local area map (source: PTV)

8. Waste Management

Objectives

- To promote waste avoidance, reuse and recycling during the design, construction and operation stages of development.
- To ensure durability and long term reusability of building materials.
- To ensure sufficient space is allocated for future change in waste management needs, including (where possible) composting and green waste facilities.

8.1. Construction and Demolition Waste

As a minimum, 70% of all demolition and construction waste by mass will be recycled or reused on site.

Materials to be separated and recycled are to be identified by the builder/contractor and confirmed by writing before construction activities start. Most of the construction materials are recyclable provided a proper separation on site occurs. Amongst the recyclable materials; steel, aluminum, glass, plaster, concrete, timber, bricks, plastics…

8.2. Food and Garden Waste

A Food organics and garden organics (FOGO) bin will be available to each townhouse to encourage organic waste diversion from landfill.

When sent to landfill, organic waste produces methane as a byproduct during decomposition, methane is a gas with global warming potential more than 20 time that of CO_2.

9. Building Management

Objectives

- To Encourage a holistic and integrated design and construction process and ongoing high performance

9.1. Building User Guide

A building user guide will be developed and made available to future building occupants.

The guide should inform the occupants of the sustainability features of the building and how to minimize environmental impacts through proper use of the services provided. This may include information on the following:

- Rainwater harvesting and reuse
- Waste reduction, proper recycling and composting
- How to make use of natural ventilation
- Efficient use of appliances
- Green transport options
- Contact details of key personnel

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Appendix A: Stormwater Management

Victoria best practice stormwater performance targets as set out in the Urban Stormwater Best practice Environmental Management Guidelines (BPEMG), require that stormwater leaving the site have the following reductions:

- 80% of suspended solids
- 45% of total nitrogen
- 45% of total phosphorus
- 70% of litter

WSUD requirements will be met by rainwater harvesting and reuse and demonstrated by achieving a STORM score of 100% or greater.

The following will be done to meet the above objectives:

- Water runoff from all the roofed areas of each townhouse will be collected in a minimum 2000L capacity rainwater tank located in the POS.
- The tank will service all the toilets and irrigation needs
- Rainwater collection, storage and distribution will be designed and installed in accordance with plumbing regulations and relevant Australian Standards including AS/NZS 3500 series and HB230-2008
- The driveways will be directly connected to LPOD

Moreover, during construction, the builder will implement best practice stormwater protection by following Melbourne Water guidelines for keeping stormwater clean, which can be downloaded via:

https://www.melbournewater.com.au/sites/default/files/Keeping-our-stormwater-clean-builders-guidelines.pdf

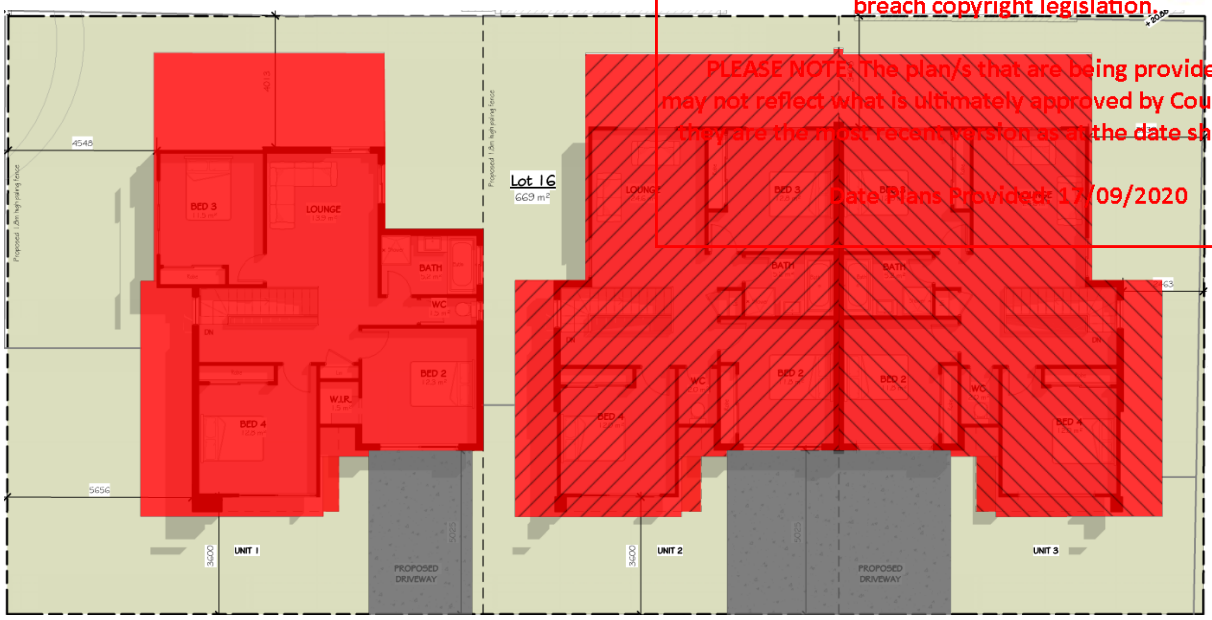
Melbourne Water STORM Rating Report

TransactionID:	1011353
Municipality:	WYNDHAM (South West of Skeleton Creek)
Rainfall Station:	WYNDHAM (South West of Skeleton Creek)
Address:	34 Wedge Street South
	Werribee
	VIC
Assessor:	EcoHarmony
Development Type:	Residential - Multiunit
Allotment Site (m2):	669.00
STORM Rating %:	113

Description	Impervious Area (m2)	Treatment Type	Treatment Area/Volume (m2 or L)	Occupants / Number Of Bedrooms	Treatment %	Tank Water Supply Reliability (%)
U1 roofed area_to tank	121.00	Rainwater Tank	2,000.00	4	126.00	79.00
U2 roofed area_to tank	117.00	Rainwater Tank	2,000.00	4	130.20	77.20
U3 roofed area_to tank	117.00	Rainwater Tank	2,000.00	4	130.20	77.20
Impervious_no treatment	50.00	None	0.00	0	0.00	0.00

Date Generated: 19-Aug-2020 Program Version: 1.0.0

Figure 4: Melbourne Water STORM calculator results



WSUD Legend		
	Description	*Area*
	Impervious area - no treatment	50
	Permeable area	264
	U1 Roofed area_Treated to tank	121
	U2 Roofed area_Treated to tank	117
	U3 Roofed area_Treated to tank	117

Figure 5: stormwater catchment plan

Appendix B: Rainwater Harvesting and Reuse

Rainwater in this report is limited to low risk usage including: toilet flushing, washing machine connection, garden watering, outdoor uses…should the water be used in higher risk areas, further consultation and risk assessment would be required. Rainwater collection, storage and distribution must be designed and installed in accordance with plumbing regulations and relevant Australian Standards including AS/NZS 3500 series and HB230-2008.

Rainwater collected from roof areas is considered a valuable resource, collection and reuse is key for sustainable developments. Incorporating rainwater tanks does not only help in reducing stormwater runoffs, but also reducing potable water usage and meeting regulatory requirements for Class 1 dwellings.

There are two methods of rainwater tank connection; wet and dry

A wet system uses underground pipes to connect all downpipes and then up again to feed to tank, it is also known as charged system. This configuration allows for long runs while maintaining aesthetics. Care should be taken to avoid mosquito breeding in the charged pipe as detailed in the succeeding sections. Charged pipe drain should also be considered especially for areas with prolonged dry season.

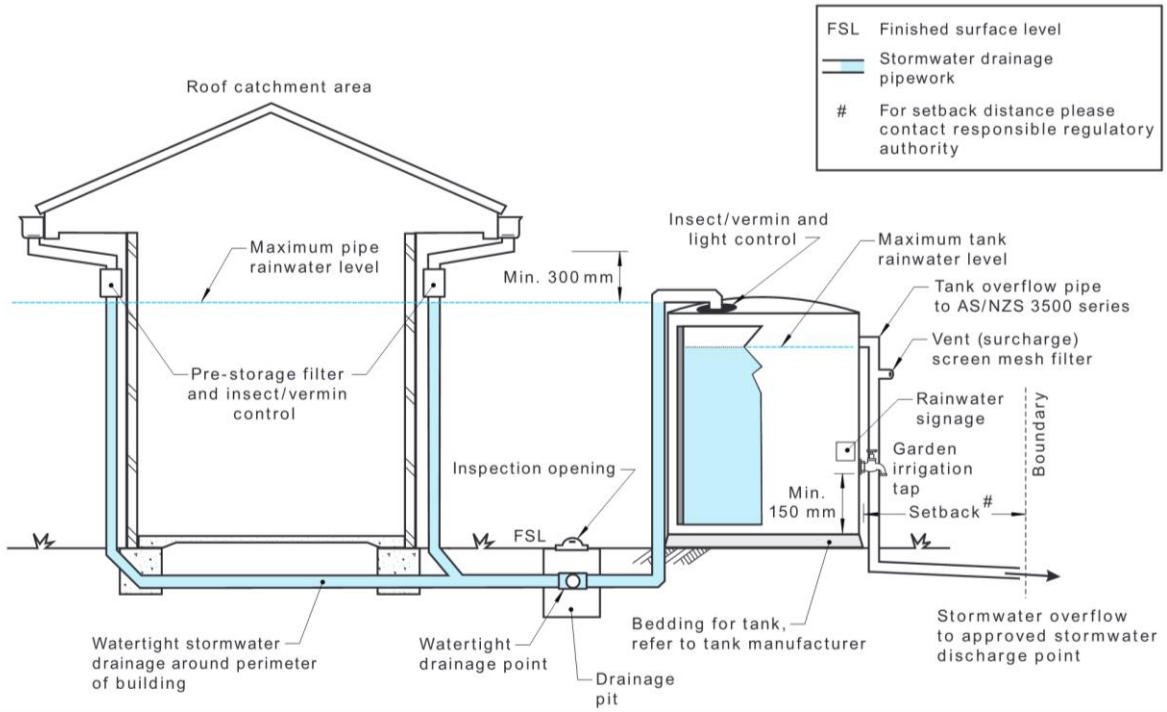


Figure 6: Charged (wet) above ground installation (source: Australian Standards 2008)

A dry system is more suitable for shorter runs or when roof sections are connected to separate tanks. Where underground connection lead to a lower installed underground tank, or when above ground tanks are placed on the lower end of a sloping site, these would also be considered as dry.

System Components

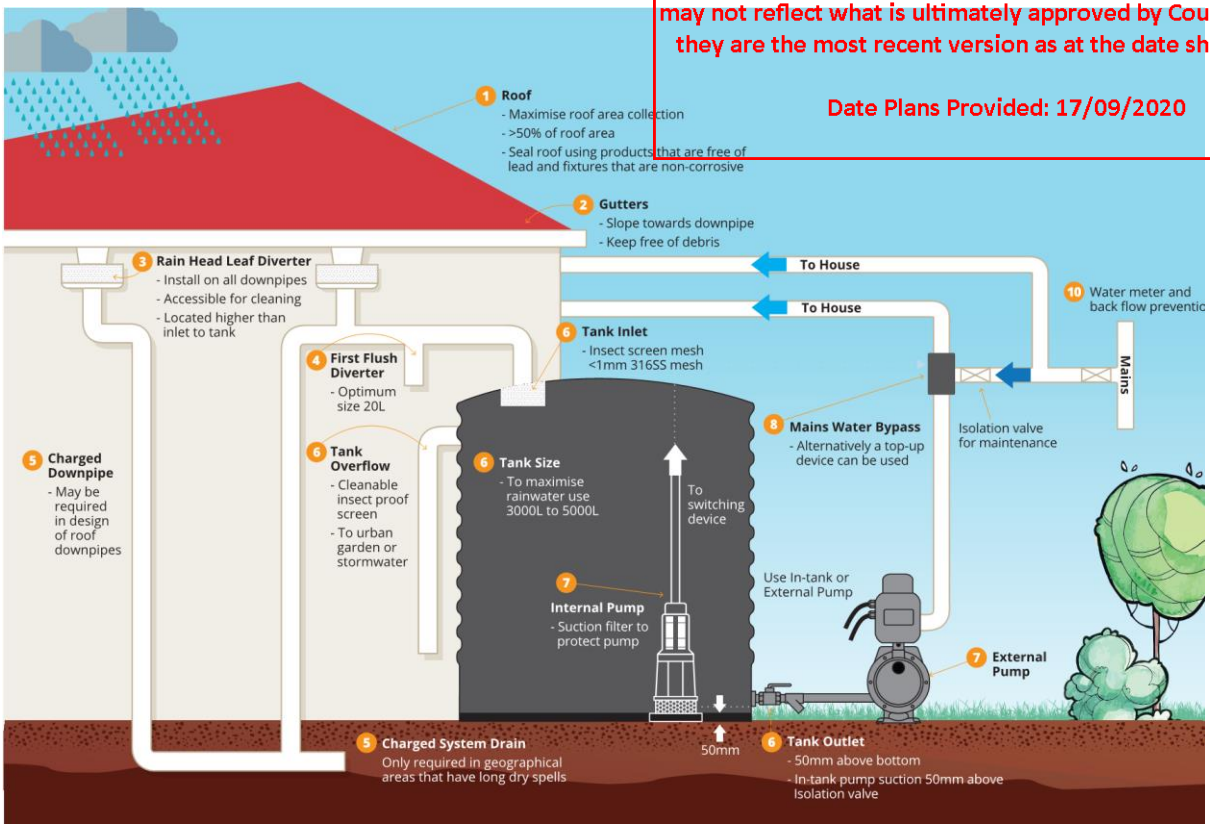


Figure 7: Different components of an above ground rainwater tank (source: RHAA & UWCS)

Roof

According to the department of health (2013), for low risk of ingestion, the below guidelines for roof catchment can be followed

- Prune overhanging vegetation or use gutter guard
- In order to prevent water stagnation, gutters should be installed with a slope of 1:100. Stationary water allows debris catchment, algae growth and mosquito breeding
- Discharge from roof mounted appliances, such as coolers and hot water, should be directed outside the catchment area
- Avoid the use of chemicals for roof cleaning or choose carefully
- Exclude sections affected by emissions from industrial processes

Moreover, the following are good practice but most important where risk of ingestion is higher

- Seal or avoid collection from roof areas containing hazardous chemicals such as lead, bitumen and treated timber.
- Restrict roof access and remove or relocate any structure where birds can perch.
- Slow combustion heaters flues should be installed in accordance with relevant Australian Standards

Rain head leaf diverters

Known also as Leaf Eaters, should be installed at each downpipe at an elevation higher than the inlet of the tank but low enough to provide easy maintenance access.

The mesh should be less than 1mm to prevent mosquito breeding access and preferably made from stainless steel for longevity.

First flush diverters

First flush normally contains more contaminants, the diverter insures that it doesn't reach the tank. First flush diverters can be wall mounted or in-ground allowing for complex installations.

Sizing is based on 20L per 100 m^2 of roof catchment

Tanks

- All tank access points should be sealed and an inlet strainer should be installed. A 1mm hole diameter mesh with should also be installed at the inlet and overflow pipes in order to prevent mosquitoes and other vermin accessing the tank.
- Tanks should be light proof in order to avoid algae growth.
- In-ground tanks need to be sealed against surface run-off and should not be installed in contaminated ground or near septic tanks.
- Outlet should be at least 150mm from tank bottom, while calmed inlets insure sediments are not disrupted.

Pumps

Pump can either be submerged or external, in both cases, correct quality sourcing, sizing and installation, is key to uninterrupted supply.

- Being the weakest link in the rainwater system, investing in good quality pump is preferable.
- A variable speed pump is a more efficient and environmentally friendly option than fixed speed.
- Pumps should be installed and maintained to manufacturers' specifications.

Mains water bypass

When rainwater is not available (empty tank), a mains water bypass, known also as switching device or diverter, insures uninterrupted supply to fixtures and appliances.

- Unless integrated within the water bypass, Australian Standard compliant backflow prevention devices, which is check valve allowing one directional flow, should be installed between pump and mains, so that rainwater does not infiltrate into potable water pipes. These devices can either be mechanically or electronically activated.
- Stop valves before and after equipment allow for easy maintenance or replacement

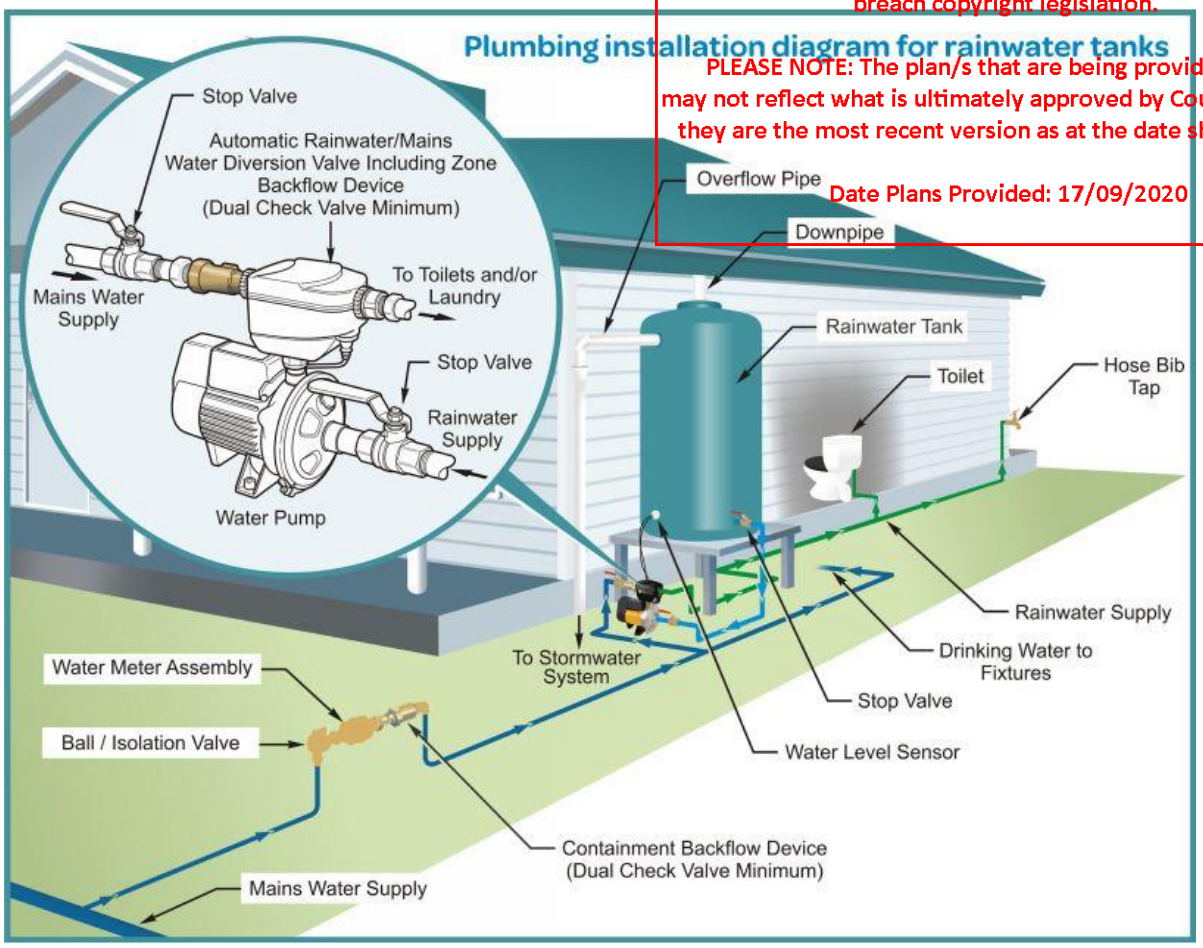


Figure 8: Mains water bypass (source: Southeast Water)

Treatment

- Rainwater quality is a function of a whole system approach, correct design, installation and maintenance. When collected from restricted access roofs and used solely for low risk uses including irrigation, toilet flushing and washing machine, rainwater should not require additional downstream filtration
- Water discoloration is mainly due to settling and decomposing leafs which should be managed before reaching the tank or by an activated carbon post filter which also removes odors
- Suspended solids are removed via sediment filtration averaging 20 microns while finer filters down to 0.01 microns are also available for the removal of finer contaminants
- Chlorine an UV treatment is the final stage, usually only used for installations with high risk of ingestion
- Correct sizing and cartridges change are essential to prevent supply pressure drop

Maintenance

Maintaining the rainwater harvesting system is the most important part to ensure acceptable water quality for the designated usage. The below inspection and maintenance checklist is provided by Australian Standard AS HB 230-2008.

Indicative frequency	Inspection and criteria	Maintenance activities (where required)
Annual	Check whether any tree branches overhang the roof or are likely to grow to overhang the roof	Install a barrier where permitted or by pruning back any overhanging branches
	Check that access covers to storage tanks are closed	Secure any open access covers to prevent risk of entry
	Check that screens on inlets, overflows and other openings do not have holes and are securely fastened	Repair any defective screens to keep out mosquitoes
	Inspect tank water for presence of rats, birds, frogs, lizards or other vermin or insects	Remove any infestations, identify point of entry and close vermin and insect-proof mesh
	Inspect tank water for presence of mosquito larvae (inspect more frequently in sub-tropical and tropical northern Australia, based on local requirements)	Identify point of entry and close with insect-proof mesh with holes no greater than 1.6 mm in diameter
	Inspect gutters for leaf accumulation and ponding	Clean leaves from gutters—remove more regularly if required. If water is ponding, repair gutter to ensure water flows to downpipe
	Check signage at external roofwater taps and that any removable handle taps are being properly used	Replace or repair the missing or damaged signage and fittings
	Check for cross-connections and inappropriate tapings by checking visible plumbing fittings and alternately turning off supplies	Remove any cross-connections and inappropriate tapings identified
	Check plumbing and pump connections are watertight/without leakage	Repair any leaks as necessary
	Check suction strainers, in-line strainers and pump location for debris	Clean suction strainers, in-line strainers or debris from pump location
	Check pump installation is adequate for reliable ongoing operation	Modify and repair as required
	Check first flush diverter, if present	Clean first flush diverter, repair and replace if necessary
	Check health of irrigation area and irrigated grass or plants	Investigate any adverse impacts observed that might be due to irrigation
	Check condition of roof and coatings	Investigate and resolve any apparent changes to roof condition, such as loss of material coatings
Triennial	Drain, clean out and check the condition of the tank walls and roof to ensure no holes have arisen due to tank deterioration	Repair any tank defects
	Check sediment levels in the tank	Organise a suitable contractor to remove accumulated sediment if levels are approaching those that may block tank outlets
	Undertake a systematic review of operational control of risks to the system	Identify the reason for any problems during inspections and take actions to prevent failures occurring in future
After 20 years and then every 5 years	Monitor the effectiveness of the irrigation equipment to assess for any clogging due to algal growth	Clean or replace clogged equipment
Ongoing	Inspect and follow up on any complaints or concerns raised that could indicate problems with the system	Repair or replace any problems that are notified

Figure 9: Rainwater harvesting inspection and maintenance activities (source: AS/NZS 3500.1:2018)

Appendix C: BESS Report

BESS Report

This BESS report outlines the sustainable design commitments of the proposed development at 34 Wedge St S Werribee VIC 3030. 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 Wyndham 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.

34 Wedge St S, Werribee 3030 Werribee

Site area: 669 m² · Building Floor Area: 527 m² ·
Date of Assessment: 24 Aug 2020 ·
Version: V5, 1.6.2-B.292 ·
Applicant: info@ecoharmony.com.au

Project Identifier
D3628D3D
Published
http://bess.net.au/projects/D3628D3D-V1

Your BESS score is

+53%

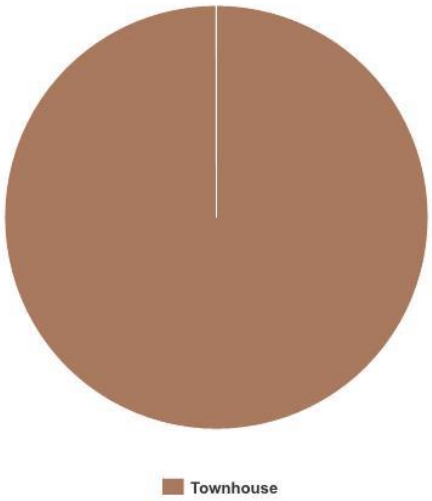
0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%

50% + Best Practice

70% + Excellence

% of Total	Category	Score	Pass
1 %	Management	17 %	
4 %	Water	50 %	✓
15 %	Energy	55 %	✓
14 %	Stormwater	100 %	✓
10 %	IEQ	60 %	✓
4 %	Transport	50 %	
3 %	Waste	50 %	
3 %	Urban Ecology	50 %	
0 %	Innovation	0 %	

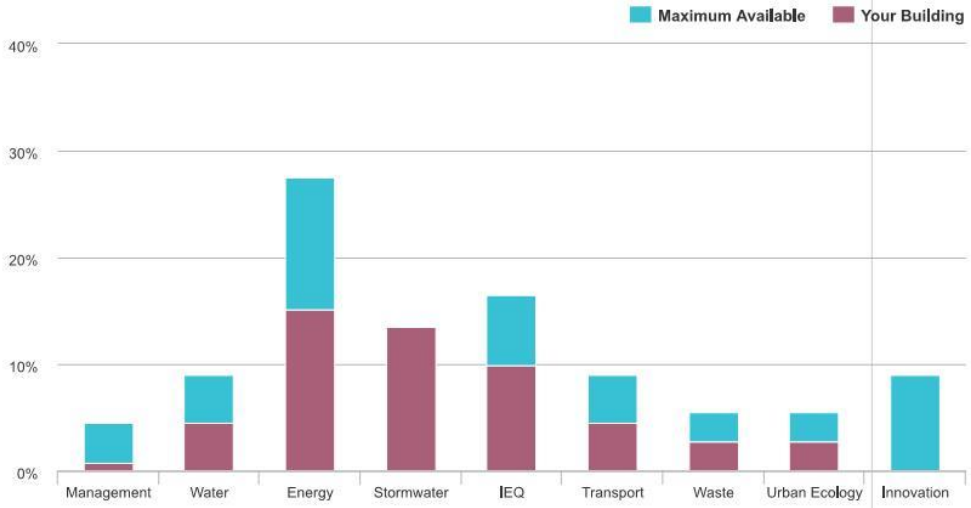
Building Composition



Dwellings

Type	Name	Quantity	Area
Townhouse	Unit 1	1	177 m²
Townhouse	Unit 2	1	175 m²
Townhouse	Unit 3	1	175 m²

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

17% - contributing 1% to overall score

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

Management 4.1 Building Users Guide

100%

Score Contribution	This credit contributes 16.7% 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

50% - contributing 4% to overall score

Credit	Disabled	Scoped out	Score
Water 1.1 Potable water use reduction			40 %
Water 3.1 Water Efficient Landscaping			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

	Unit 1	Unit 2	Unit 3
Showerhead	3 Star WELS (>= 6.0 but <= 7.5)	3 Star WELS (>= 6.0 but <= 7.5)	3 Star WELS (>= 6.0 but <= 7.5)

	Unit 1	Unit 2	Unit 3
Bath	Medium Sized Contemporary Bath	Medium Sized Contemporary Bath	Medium Sized Contemporary Bath
Kitchen Taps	>= 5 Star WELS rating	>= 5 Star WELS rating	>= 5 Star WELS rating
Bathroom Taps	>= 5 Star WELS rating	>= 5 Star WELS rating	>= 5 Star WELS rating
Dishwashers	>= 5 Star WELS rating	>= 5 Star WELS rating	>= 5 Star WELS rating
WC	>= 4 Star WELS rating	>= 4 Star WELS rating	>= 4 Star WELS rating
Urinals	Scope out	Scope out	Scope out
Washing Machine Water Efficiency	Default or unrated	Default or unrated	Default or unrated
Which non-potable water source is the dwelling/space connected to?	RWT 1	RWT 2	RWT 3
Non-potable water source connected to Toilets	Yes	Yes	Yes
Non-potable water source connected to Laundry (washing machine)	No	No	No
Non-potable water source connected to Hot Water System	No	No	No

Rainwater Tanks

	RWT 1	RWT 2	RWT 3
Name	RWT 1	RWT 2	RWT 3
What is the total roof area connected to the rainwater tank? Square Metres	121.0	117.0	117.0
Tank Size Litres	2000.0	2000.0	2000.0
Irrigation area connected to tank Square Metres	98.0	43.0	44.0
Is connected irrigation area a water efficient garden?	Yes	Yes	Yes

Water 1.1 Potable water use reduction 40%

Score Contribution	This credit contributes 83.3% 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) *

740

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

624

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

114

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

509

% Reduction in Potable Water Consumption * Percentage %

31 %

Water 3.1 Water Efficient Landscaping 100%

Score Contribution	This credit contributes 16.7% 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

Energy 55% - contributing 15% to overall score

Credit	Disabled	Scoped out	Score
Energy 1.2 Thermal Performance Rating - Residential			17 %
Energy 2.1 Greenhouse Gas Emissions			100 %
Energy 2.3 Electricity Consumption			100 %
Energy 2.4 Gas Consumption			100 %
Energy 2.5 Wood Consumption			N/A
Energy 3.2 Hot Water			100 %
Energy 3.3 External Lighting			100 %
Energy 3.4 Clothes Drying			100 %

Energy 3.5 Internal Lighting - Residential Single Dwelling 100 %

Dwellings Energy Approachs

What approach do you want to use for Energy?	Use the built in calculation tools
Are you installing a solar photovoltaic (PV) system?	No
Are you installing any other renewable energy system(s)?	No
Gas supplied into building	Natural Gas

Dwelling Energy Profiles

	Unit 1	Unit 2	Unit 3
Below the floor is	Ground or Carpark	Ground or Carpark	Ground or Carpark
Above the ceiling is	Outside	Outside	Outside
Exposed sides	4	4	4
NatHERS Annual Energy Loads - Heat MJ/sqm	94.4	94.4	94.4
NatHERS Annual Energy Loads - Cool MJ/sqm	23.6	23.6	23.6
NatHERS star rating	6.5	6.5	6.5
Type of Heating System	D Reverse cycle space	D Reverse cycle space	D Reverse cycle space
Heating System Efficiency	4 Star	4 Star	4 Star
Type of Cooling System	Refrigerative space	Refrigerative space	Refrigerative space
Cooling System Efficiency	4 Stars	4 Stars	4 Stars
Type of Hot Water System	J Gas Instantaneous 6 star	J Gas Instantaneous 6 star	J Gas Instantaneous 6 star
Central Hot Water System	No	No	No
Clothes Line	D Private outdoor clothesline	D Private outdoor clothesline	D Private outdoor clothesline
Clothes Dryer	A No clothes dryer	A No clothes dryer	A No clothes dryer

Energy 1.2 Thermal Performance Rating - Residential 17%

Score Contribution	This credit contributes 30.0% 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 average NatHERS rating?

Calculations

Average NATHERS Rating (Weighted) * Stars

6.5

Energy 2.1 Greenhouse Gas Emissions 100%

Score Contribution	This credit contributes 10.0% 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?

Calculations

Reference Building with Reference Services (BCA only) * kg CO2

28206.9

Proposed Building with Proposed Services (Actual Building) * kg CO2

8707.6

% Reduction in GHG Emissions * Percentage %

69 %

Energy 2.3 Electricity Consumption 100%

Score Contribution	This credit contributes 10.0% towards this section's score.
Aim	Reduce consumption of electricity
Criteria	What is the % reduction in annual electricity consumption against the benchmark?

Calculations

Reference * kWh

24740.3

Proposed * kWh

6373.1

Improvement * Percentage %

74 %

Energy 2.4 Gas Consumption 100%

Score Contribution	This credit contributes 10.0% towards this section's score.

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

Calculations

Reference * MJ

57816.4

Proposed * MJ

42938.9

Improvement * Percentage %

25 %

Energy 2.5 Wood Consumption N/A

This credit was scoped out: No wood heating system present

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

Energy 3.2 Hot Water 100%

Score Contribution	This credit contributes 5.0% towards this section's score.
Criteria	What is the % reduction in annual hot water system energy use (gas and electricity) against the benchmark?

Calculations

Reference * kWh

16060.1

Proposed * kWh

12070.5

Improvement * Percentage %

24 %

Energy 3.3 External Lighting 100%

Score Contribution	This credit contributes 5.0% towards this section's score.

Questions

Is the external lighting controlled by a motion detector? *

Yes

Energy 3.4 Clothes Drying 100%

Score Contribution	This credit contributes 5.0% towards this section's score.
Criteria	Does the combination of clothes lines and efficient dryers reduce energy (gas+electricity) consumption by more than 10%?

Calculations

Reference * kWh

2158.6

Proposed * kWh

431.7

Improvement * Percentage %

80 %

Energy 3.5 Internal Lighting - Residential Single Dwelling 100%

Score Contribution	This credit contributes 5.0% towards this section's score.
Aim	Reduce energy consumption associated with internal lighting

Questions

Does the development achieve a maximum illumination power density of 4W/sqm or less? *

Yes

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 *

113

Calculations

Min STORM Score *

100

IEQ 60% - contributing 10% to overall score

Credit	Disabled	Scoped out	Score
IEQ 2.2 Cross Flow Ventilation			100 %
IEQ 3.1 Thermal comfort - Double Glazing			100 %

IEQ 2.2 Cross Flow Ventilation 100%

Score Contribution	This credit contributes 20.0% towards this section's score.
Aim	To provide fresh air and passive cooling opportunities.

Questions

Are all habitable rooms designed to achieve natural cross flow ventilation? *

Yes

IEQ 3.1 Thermal comfort - Double Glazing 100%

Score Contribution	This credit contributes 40.0% towards this section's score.
Aim	To provide comfortable indoor spaces and reduce energy needed for heating and cooling

Questions

Is double glazing (or better) used to all habitable areas? *

Yes

Transport

50% - contributing 4% to overall score

Credit	Disabled	Scoped out Score
Transport 1.1 Bicycle Parking - Residential		100 %
Transport 1.2 Bicycle Parking - Residential Visitor		N/A

Transport 1.1 Bicycle Parking - Residential

100%

Score Contribution	This credit contributes 50.0% towards this section's score.
Aim	To encourage and recognise initiatives that facilitate cycling
Criteria	Is there at least one secure bicycle space per dwelling?
Notes	each dwelling has a private garage which can accommodate a bicycle next the parked car or in the storage shed

Questions

Bicycle Spaces Provided ? *

3

Calculations

Min Bicycle Spaces Required *

3

Transport 1.2 Bicycle Parking - Residential Visitor

N/A

This credit was scoped out: Not enough dwellings.

This credit was disabled: Not enough dwellings.

Aim	To encourage and recognise initiatives that facilitate cycling
Criteria	Is there at least one visitor bicycle space per 5 dwellings?

Waste

50% - contributing 3% to overall score

Credit	Disabled	Scoped out	Score
Waste 2.1 - Operational Waste - Food & Garden Waste			100 %

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

Urban Ecology

50% - contributing 3% to overall score

Credit	Disabled	Scoped out	Score
Urban Ecology 2.1 Vegetation			75 %
Urban Ecology 2.4 Private Open Space - Balcony / Courtyard Ecology			100 %

Urban Ecology 2.1 Vegetation 75%

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 %

27 %

Urban Ecology 2.4 Private Open Space - Balcony / Courtyard Ecology 100%

Score Contribution	This credit contributes 12.5% towards this section's score.
Aim	Encourage plants to be grown on balconies and courtyards

Questions

Is there a tap and floor waste on every balcony / in every courtyard? *

Yes

Innovation

0% - contributing 0% to overall score

Items to be marked on floorplans

0 / 10 floorplans & elevation notes complete.

Water 3.1: Water efficient garden annotated	Incomplete
Energy 3.3: External lighting sensors annotated	Incomplete
Energy 3.4: Clothes line annotated (if proposed)	Incomplete
Stormwater 1.1: Location of any stormwater management systems used in STORM or MUSIC modelling (e.g. Rainwater tanks, raingarden, buffer strips)	Incomplete
IEQ 2.2: Dwellings meeting the requirements for having 'natural cross flow ventilation'	Incomplete
IEQ 3.1: Glazing specification to be annotated	Incomplete
Transport 1.1: All nominated residential bicycle parking spaces	Incomplete
Waste 2.1: Location of food and garden waste facilities	Incomplete
Urban Ecology 2.1: Vegetated areas	Incomplete
Urban Ecology 2.4: Taps and floor waste on balconies / courtyards	Incomplete

Documents and evidence

0 / 4 supporting evidence documentation complete.

Energy 3.5: 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
Stormwater 1.1: STORM report or MUSIC model	Incomplete