



Job Details

Date: 16th September 2026
Project: Sustainable Design Assessment for a Childcare Centre
Client: [REDACTED]
Address: 7 Torquay Road, Belmont
Planning No: TBC
Assessor: [REDACTED]
Job No: 250558

Revision

A:	22 nd July 2025	Preliminary SDA Report
B:	29 th August 2025	SDA Report
C:	3 rd July 2026	Amendment per updated plan
D:	16 th September 2026	Final Report for Council Submission

This copied document is made available for the sole purpose of enabling its consideration and review as part of a planning process under the Planning and Environment Act 1987.
The document must not be used for any purpose which may breach copyright legislation

Sustainable Management Plan – 7 Torquay Road, Belmont

Introduction

The Subject site is located at 7 Torquay Road, Belmont. The plans prepared by studio BAM proposes a childcare centre. The site has a total area of 1375.2m².

The following report is to be read in conjunction with the following documents.

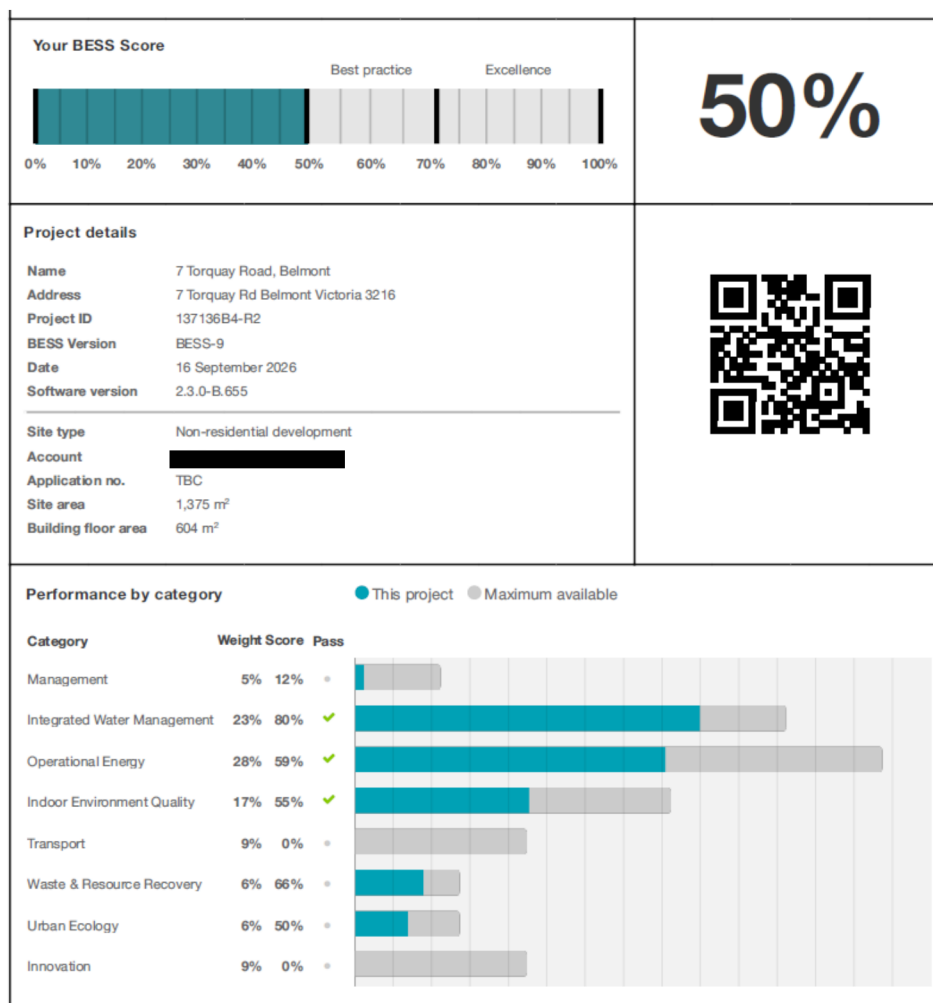
- BESS assessment
- NCC 2019 Façade Calculator (applicable to NCCC 2022 Section J4D6)
- STORM assessment

BESS Assessment (Project number 137136B4)

The BESS (Built Environment Sustainable Scorecard) V9 was used to assess

- Management
- Integrated Water Management
- Operational Energy
- Indoor Environment Quality (IEQ)
- Transport
- Waste
- Urban Ecology &
- Innovation

Following is a list of initiatives inputted into the scorecard to achieve a best practice score of 50%



Sustainable Management Plan – 7 Torquay Road, Belmont

Management**Objectives**

- To integrate sustainability from concept design through to the construction process.
- To give occupants the information they need to be able to run their buildings efficiently.

Initiatives

- Provide utility meters that allow monitoring of energy and water consumption.

Water requirements**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 (eg. Grey water)

Initiatives

- 16,000L water tank connect to a minimum 405m² of roof area.
- Rainwater tanks connected to all toilet flushing and irrigation area.
- Water efficient landscaping. A landscape plan prepared by a suitable landscape architect to nominate water efficient vegetation throughout the development.
- For outdoor water reductions, plants, shrubs and lawn which require low amounts of water (drought-resistance) should be chosen. Native plants will be selected as they use less water and are more resistant to local plant diseases. Plant slopes with plants that will retain water and help reduce runoff.
- Group plants according to their watering needs.
- Mulch will slow evaporation of moisture while discouraging weed growth. Adding 2 - 4 inches of organic material such as compost or bark mulch will increase the ability of the soil to retain moisture.
- Shower heads to be 4 Star WELS rating (>6.0L/min but ≤ 7.5L/min).
- Kitchen taps to be 6 Star WELS rating.
- Bathroom taps to be 6 Star WELS rating.
- Toilets to be 4 Star WELS rating.

Stormwater**Objectives**

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

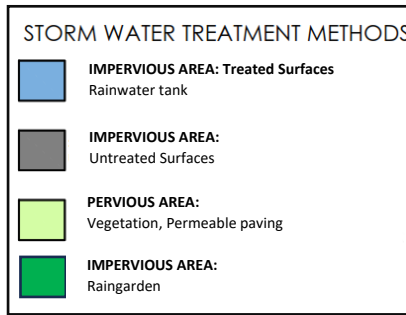
Initiatives

The BlueFactor stormwater treatment tool was used to demonstrate that the development achieves 110% of the required on-site stormwater flow management.

Hard Surface	Area	Nominated treatment type
Childcare roof	405m ² 200m ²	16,000L rainwater tank 4m ² raingarden (100mm)
Driveway	283.8m ²	No treatment
Rainwater tank note:	Water tanks to be connected to toilet flushing and irrigation area	

Sustainable Management Plan – 7 Torquay Road, Belmont

Indicative Stormwater Treatment Plan



A TOTAL OF 16,000L UNDERGROUND RAINWATER TANK CONNECTED TO UNIT ROOF AREA



A TOTAL OF 4m2 RAINGARDEN (300mm) CONNECTED TO UNIT ROOF AREA



Note:

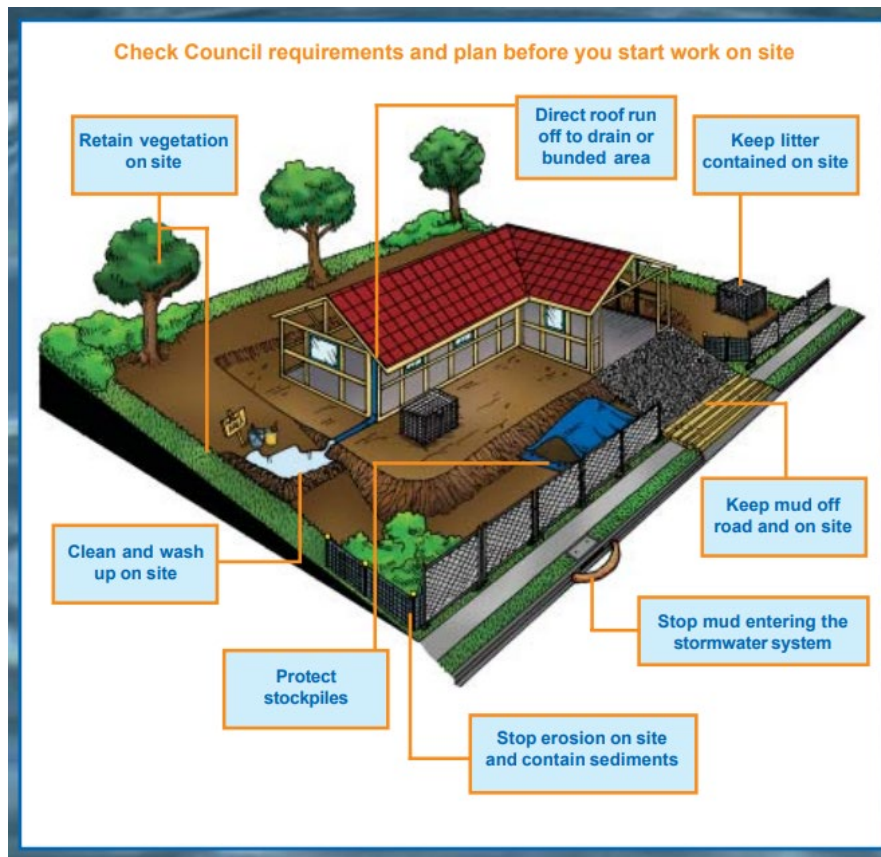
- Plan is indicative only and final locations of treatment systems and roof catchment area is subject to civil engineering.
- Residual stormwater flows not connected to a treatment type will be direct to LPOD.
- Please refer to civil engineering plans (once prepared) for detailed drainage designs.
- For the purpose of water consumption calculations within the STORM tool, the expected occupancy for the development has been determined using the InSite Water tool (Integrated Water Management and Stormwater Assessment Tool). Based on the building classification as Class 9b and

Sustainable Management Plan – 7 Torquay Road, Belmont

the total internal floor area, the occupancy has been calculated as 21.1. This figure has been rounded down to 21 occupants for input into the BlueFactor tool.

• The paved areas have been designed with graded falls directing runoff towards adjacent landscaped zones, enabling infiltration of stormwater into the garden areas.

Stormwater Site Management Initiatives



Sourced from: *Keeping our Stormwater Clean – A Builder's Guide*, Melbourne Water.

6 Site Rules To Keep The Stormwater Clean:

1. Check council requirements and plan before you start work on site.
2. Stop erosion onsite and contain sediments.
3. Protect stockpiles.
4. Keep mud off road and on site.
5. Keep litter contained on site.
6. Clean and wash up on site.

The methods and processes specified in “Keeping our Stormwater Clean – A Builder’s Guide, developed by Melbourne Water will be adhered to by the builder/developer for managing the construction site.

<https://www.clearwatervic.com.au/resource-library/guidelines-and-strategy/keeping-our-stormwater-clean-a-builders-guide.php>

Sustainable Management Plan – 7 Torquay Road, Belmont

Rain Garden Maintenance

- To operate successfully, the plants in a rain garden system need to be well-established and dense.
- The plants need to be grouped close together so any runoff water will flood or seep through, rather than establishing little flow channels (known as rills) which may erode the surface. Mulch should prevent erosion.
- Maintaining the health and density of vegetation is vital, particularly in the early stages. High density planting will also ensure a uniform root zone in rain garden systems.
- New planting will need to be maintained for at least 6 months. Tasks include regular watering, weeding, replacing dead plants, monitoring and controlling pests, and removing rubbish.
- Any scour at inlets needs to be monitored closely. Litter, debris and sediment can build up at inlet points. Litter and debris also need to be removed from surcharge pits.
- Check overflow pits for structural faults. Check the pits are functioning properly.
- If the filtration capacity is reduced significantly, the filter material should be replaced, along with new plants and mulch.

Source: EPA Victoria: Maintaining water sensitive urban design elements

Rain Garden Schedule

Component	Key activities	Typical frequency
Filter Media	– Remove leaf litter and gross pollutants	3 months & following storm events
	– Check for biofilms (algal biofilms may develop on the surface of the filter media leading to clogging issues)	
	– Monitor ponding of water following rainfall events	
	– Check for permanently boggy/pooled areas	
	– Remove sediment (or scarify filter media surface if required)	Annually
Erosion	– Check for erosion/scouring	3 months
	– Check for evidence of preferential flow paths	
	– Replace filter media in eroded areas	
	– Add rock protection around inlets (if required)	
Mulch	– Check depth and even distribution of mulch	3 months
	– Check mulch is not touching plant stems	
	– Check for sediment/silt accumulation in mulch layer	
	– Replace mulch (if required)	
	– Retain mulch using jute mats or nets (if required)	
Vegetation	– Inspect plant health and cover	3 months
	– Replace dead plants (maintain a consistent vegetation density of 6–10 plants per square metre across the raingarden filter media)	
	– Remove weeds (avoid use of herbicides)	
	– Prune plants (where applicable)	
	– Water plants (if required during establishment phase)	
Civil components	– Check infrastructure for damage and repair as required	3 months & following storm events
	– Ensure inlet and outlet points are clear of sediment, litter and debris	
	– Inspection opening for underdrain (slotted drainage pipe):	Annually
	– Check water level	
	– Check for sediment accumulation	
	– Flush the underdrain system (if required)	

For additional inspection and maintenance schedule for building managers, refer **Appendix C**

Sustainable Management Plan – 7 Torquay Road, Belmont

Energy**Objectives**

- To improve the efficient use of energy, by ensuring development demonstrates design potential for ESD initiatives.

Childcare (Conditioned Space) Initiatives

- The proposed development, as currently designed, is capable of meeting the building fabric requirements of the NCC 2022 BCA Volume One, Section J, using the Deemed-to-Satisfy provisions. The building elements will comply with the insulation and thermal performance requirements as outlined below:
 - Roof
 - The roof is required to achieve a minimum of R3.2
 - The proposed metal roof has a total system R-Value of 0.48.
 - **The minimum total added roof insulation must be 2.72.**
 - Floor
 - The roof is required to achieve a minimum of R2.0.
 - The proposed concrete slab floor has a total system R-Value of 2.0.
 - **No minimum total floor insulation required.**
 - The proposed exposed floor has a total system R-Value of 0.3.
 - **The minimum total added exposed floor insulation must be 1.70.**
 - Wall and Glazing
 - The wall component of a wall-glazing construction must achieve a minimum Total R-Value of R1.0.
 - As per the NCC 2019 Volume 1 Façade Calculator (still applicable under NCC 2022 Section J4D6):
 - Childcare space: Fibre cement wall cladding + **R1.5 insulation.**
 - Glazing: Average window performance
 - Ground Floor – **U-Value 3.90, SHGC 0.52.**

Note: This assessment is provided for information purposes to support the town planning application. It is not intended to demonstrate full compliance with Section J for building approval and a formal Section J report will be required at the building permit stage.

- Heating and cooling systems will be within one Star, or Coefficient of Performance(COP) & Energy Efficiency Ratios(EER) will be 85% or better than the most efficient equivalent capacity unit available.
- Water heating systems will be within one Star, or 85% or better than the most efficient equivalent capacity unit available.
- A minimum 90% of the floor area will achieve a maximum illumination power density will be at least 10% lower than required in accordance with the NCC 2022 BCA Volume 1, as calculated below:

Space	Maximum illumination power density (W/m ²)
Playrooms	4.5
Change/Toilets/Staff room	3
Kitchen	4
Laundry/Storage	1.5
Planning room/Office	4.5
Foyer/Reception	4.5

- For a 10% improvement the maximum illumination power density must not exceed:
 - Playrooms space: **4.05W/m²**

Sustainable Management Plan – 7 Torquay Road, Belmont

- Change/Toilets/Staff space: **2.70W/m²**
- Kitchen space: **3.60W/m²**
- Laundry/Storage space: **1.35W/m²**
- Planning/Office space: **4.05W/m²**
- Foyer/Reception space: **4.05W/m²**
- LED luminaires will be specified with best practice efficiency.
- External and communal area lighting will be fitted with energy-efficient LED fixtures and equipped with control systems such as motion sensors and timers to reduce energy consumption during off-peak hours (e.g., between 11:00 pm and 5:00 am).

Indoor Environment Quality (IEQ)

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 minimised need for mechanical heating, ventilation and cooling.
- To reduce indoor air pollutants by encouraging use of materials with low toxic chemicals.
- To reduce reliance on mechanical heating, ventilation, cooling and lighting systems.
- To minimise noise levels and noise transfer within and between buildings and associated external areas.

Initiatives

- Daylight Access:
 - 34.8% of the childcare space will have at least 2% daylight factor. Refer to Appendix A, Green Star Daylight Hand Calculation Assessment for further details.
 - Daylight penetration through windows/openings will be enhanced with the use of clear glazing and light internal colours, allowing for a better internal reflection of daylight.
- Ventilation
 - Operable windows will be specified to all childcare spaces, to facilitate natural ventilation.
 - The ventilation system for the childcare spaces is designed to achieve and monitor a CO₂ concentration level of 700 ppm.
 - Preliminary details of desired CO₂ concentration management monitoring system
 - CO₂ sensors will be installed in regularly occupied mechanically ventilated spaces to continuously monitor indoor air quality. The sensors will provide a visual indication of indoor CO₂ concentrations and automatically control the mechanical ventilation system to increase the outdoor air supply when CO₂ concentrations exceed the nominated setpoint. The system will be commissioned at practical completion to maintain indoor CO₂ concentrations at no more than 700 ppm
 - All bathrooms and kitchens will have their own exhaust fans or range hoods. These will be vented directly outside and will not recycle air back into the building.
- Air Quality
 - All carpets, internal paints and all finishes and flooring will be selected for their low VOC properties.
 - E1-E0 grade timber products will be specified.
- At least 50% of east, west and north facing glazing has appropriate external shading. Most windows on the ground floor are covered by verandah.

Sustainable Management Plan – 7 Torquay Road, Belmont

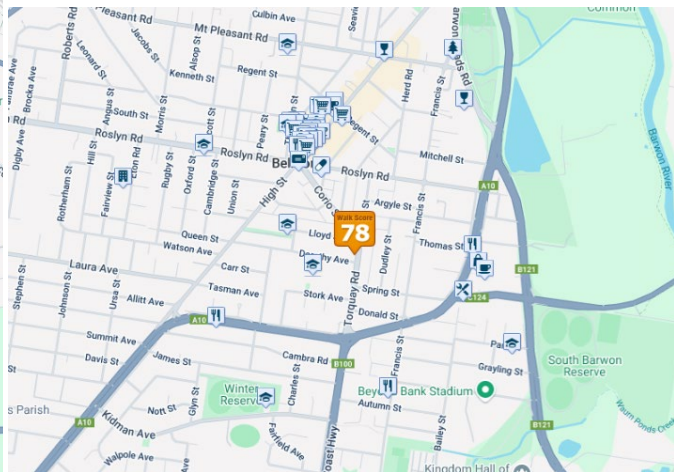
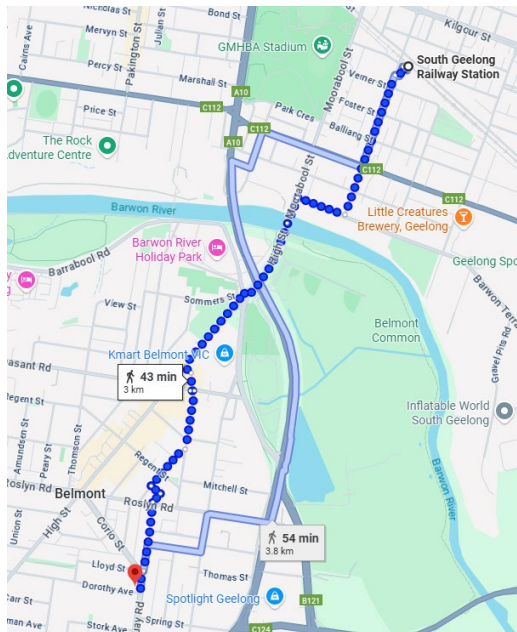
Transport

Objectives

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

Initiatives

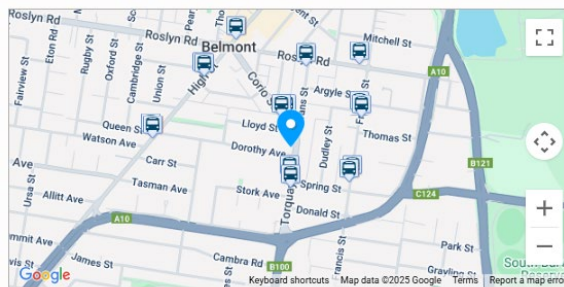
- 7 Torquay Road has a Walk Score of 78 out of 100. This location is Very Walkable so most errands can be accomplished on foot.
- This location is in the Belmont neighborhood in Geelong. Nearby parks include Library Square, Alsop Park and Cameron Park.
- The site is situated 3.0km to South Geelong train station.



Some Transit

[Add to your site](#)

7 Torquay Road has some transit which means a few nearby public transportation options.



- Restaurants:**
Kun Lon International Chinese5km
- Coffee:**
Bus Stop Cafe .5km
- Bars:**
Geelong RSL Branch .9km
- Groceries:**
Fruit Shack .5km
- Parks:**
Library Square .5km
- Schools:**
Oberon Primary School .2km
- Shopping:**
Belmont Drapery .6km
- Entertainment:**
The Clunes Bottle Museum 1.1km
- Errands:**
Pardeys Pharmacy Belmont .4km

Rail lines:

Melbourne - Warrnambool ... 2.3 km Geelong - Melbourne 2.3 km

Bus lines:

41 Deakin University - Geel... 0.1 km 40 Geelong Station - Deakin... 0.1 km

49 Kalkee Ret Village - Belm... 0.1 km 1 North Shore Station - Dea... 0.5 km

Warrnambool - Melbourne ... 0.5 km 101 Geelong - Apollo Bay Vi... 0.5 km

Geelong 2.3 km Melbourne - Geelong 2.3 km

Sustainable Management Plan – 7 Torquay Road, Belmont

Waste management**Objectives**

- To promote waste avoidance, reuse and recycling during the design construction and operation stages of the 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.

Initiatives

- The development is to recycle or reuse a minimum of 80% of construction demolition waste. To support this, the builder will prepare a Construction Waste Management Plan (CWMP) for the construction phase to ensure this target is met during civil works and building construction. The CWMP may form part of a broader Construction Environmental Management Plan (CEMP).
- Re-use of excavated material on-site and disposal of any excess to an approved site;
- Green waste mulched and re-used in landscaping either on-site or off-site;
- Bricks, tiles, concrete recycled off-site and plasterboard returned to supplier for recycling;
- Framing timber to be recycled elsewhere;
- Windows, doors, joinery, plumbing, fittings and metal elements recycled off-site;
- All asbestos, hazardous and/or intractable wastes are to be disposed of in accordance with Workcover Authority and EPA requirements;
- Locations of on-site storage facilities for material to be reused on-site, or separated for recycling off-site.
- Compost bins will be provided within the kitchen area to facilitate the separation and collection of organic food waste.

Materials**Objectives**

- To reduce the environmental impact of materials by recycling of existing material or use of environmentally friendly materials and materials with low embodied energy.

Initiatives

- The development will use sustainable timber, where it meets the Australian Forestry Standard(AFS) or Forest Stewardship Council(FSC) standard and will use E1 or E0-grade engineered wood products.
- The development will use 20-35% supplementary cementitious materials(SCM) as a partial cement alternative, subject to the structural engineer's approval.
- Consider materials that included recycled content such as polyester insulation, recycled paving or timber landscape elements.
- Using recyclable and long lifecycle materials, such as steel, concrete and bricks.
- Materials proposed are local and readily available reducing embodied energy from transportation.
- Industry accepted benchmarks and/or third party certified low VOC and non-toxic products will be used for the development.
- All steel to be sourced from a Responsible Steel Maker i.e. 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)
- All concrete to use recycled aggregate where appropriate and recycled water in its manufacture.

Sustainable Management Plan – 7 Torquay Road, Belmont

Urban ecology

Objectives

- To protect and enhance biodiversity with the municipality
- To provide environmentally sustainable landscapes and natural habitats, and minimise the urban heat island effect.
- To encourage the retention of significant trees and the planting of indigenous vegetation,
- To encourage the provision of space for productive gardens, particularly in larger residential developments.

Initiatives

- The development will include native/indigenous plants.
- Landscape architect to prepare water efficient landscape design.
- The vegetation percentage area to be at least 33%. (Vegetation area per the BESS calculations include plant and turf areas which may differ from the garden area calculated for town planning purposes.)

Sustainable Management Plan – 7 Torquay Road, Belmont

DAYLIGHT ASSESSMENT

This Green Star daylight hand calculation will focus on the childcare space, the assumptions are as follows:

Calculating the Zone of Compliance :

The zone of compliance is an area (in the horizontal plane) that is the width of the window by a depth which is twice the height of the window head above desktop/table top level (700mm). The percentage of daylight compliant areas will be calculated as following:

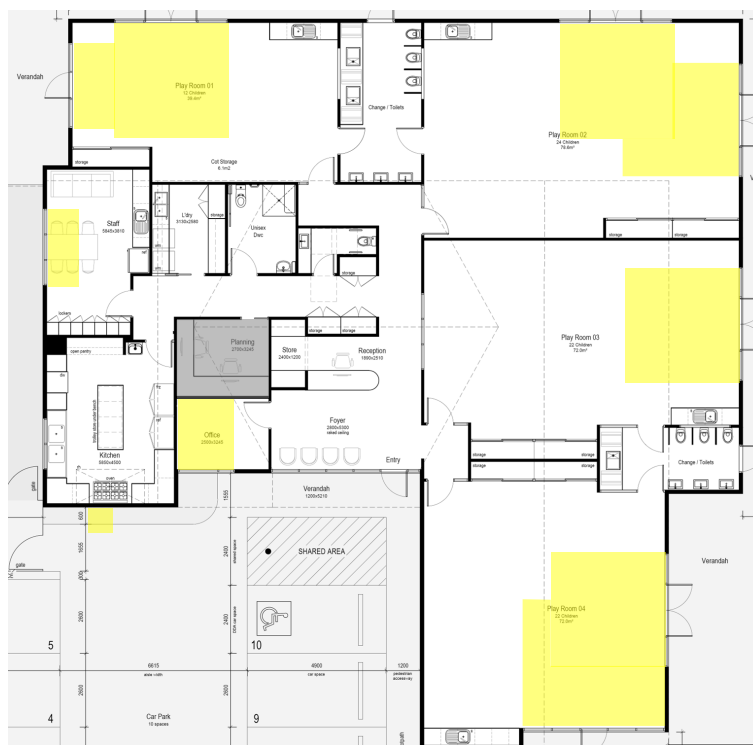
$$\text{Zone of Compliance} = h \times 2 \times w \text{ (m}^2\text{)}$$

$$\text{Nominated area} = A_{\text{Nominated}} \text{ (m}^2\text{)}$$

$$\text{Percentage of compliant area} = (\text{Zone of Compliance}) / (A_{\text{Nominated}}) \times 100 \text{ (\%)}$$

Childcare space:

Space Type	Floor Area (m2)	2% Daylight Factor Area (m2)	2% Daylight Factor Percentage (%)
Play Room 01	39.4	18.1	45.9
Play Room 02	78.6	27.2	34.6
Play Room 03	72	13.6	18.8
Play Room 04	72	36.6	50.8
Office	8.11	5	61.65
Staff	18.4	3.24	17.6
Planning	8.76	0	0
Total	297.27	103.74	34.8



The results show that the proposed additions daylight conditions are as follows:

- **34.8%** of the childcare spaces have a daylight factor of 2% or higher.

BESS Buildings Report

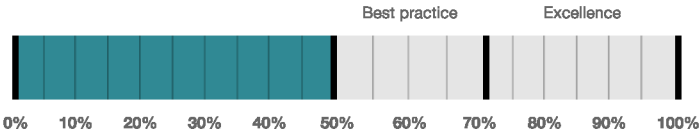
Built Environment Sustainability Scorecard



This BESS report outlines the sustainable design commitments of the proposed development at 7 Torquay Rd Belmont Victoria 3216. 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 Greater Geelong City Council.

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

Your BESS Score



50%

Project details

Name	7 Torquay Road, Belmont
Address	7 Torquay Rd Belmont Victoria 3216
Project ID	137136B4-R2
BESS Version	BESS-9
Date	16 September 2026
Software version	2.3.0-B.655



Site type	Non-residential development
Account	
Application no.	TBC
Site area	1,375 m²
Building floor area	604 m²

Performance by category

● This project ● Maximum available

Category	Weight	Score	Pass	Progress
Management	5%	12%	●	
Integrated Water Management	23%	80%	✓	
Operational Energy	28%	59%	✓	
Indoor Environment Quality	17%	55%	✓	
Transport	9%	0%	●	
Waste & Resource Recovery	6%	66%	●	
Urban Ecology	6%	50%	●	
Innovation	9%	0%	●	

Buildings

Name	Height	Footprint	% of total footprint
Building 1	1	604 m ²	100%

Dwellings & Non Res Spaces

Non-Res Spaces

Name	Quantity	Area	Building	% of total area
Public building				
Childcare Centre	1	604 m ²	Building 1	100%
Total	1	604 m²	100%	

Supporting Evidence

Shown on Floor Plans

Credit	Requirement	Response	Status
Integrated Water Management 2.1	Location of any stormwater management systems (rainwater tanks, raingardens, buffer strips)		-
Integrated Water Management 3.1	Annotation: Water efficient garden details		-
Waste & Resource Recovery 2.1	Location of food and garden waste facilities		-
Waste & Resource Recovery 2.2	Location of recycling facilities		-
Urban Ecology 2.1	Location and size of vegetated areas		-

Supporting Documentation

Credit	Requirement	Response	Status
Management 2.3a	Section J glazing assessment		-
Integrated Water Management 2.1	STORM report or MUSIC model		-
Operational Energy 1.1	Energy Report showing calculations of reference case and proposed buildings		-
Operational Energy 3.7	Average lighting power density and lighting type(s) to be used		-
Indoor Environment Quality 1.4	A short report detailing assumptions used and results achieved.		-

Credit summary

Management Overall contribution 4.5%

		12%
1.1 Pre-Application Meeting		0%
2.3 Thermal Performance Modelling - Non-Residential		50%
3.2 Metering - Non-Residential		0%
3.3 Metering - Common Areas		0%
4.1 Building Users Guide		0%

IWM Overall contribution 22.5%

		80%	✓ Pass
1.1 Potable Water Use		42%	✓ Achieved
2.1 Stormwater Treatment		100%	✓ Achieved
3.1 Water Efficient Landscaping		100%	
4.1 Building Systems Water Use		N/A	✚ Scoped Out
No chiller system proposed.			

Operational Energy Overall contribution 27.5%

		Minimum required 50%	59%	✓ Pass
1.1 Thermal Performance Rating - Non-Residential		37%		
2.1 Greenhouse Gas Emissions		100%		
2.2 Peak Demand		100%		
2.6 Electrification		0%	⊘ Disabled	
Credit is available when the energy supply is set to all-electric (no gas or wood).				
2.7 Energy consumption		100%		
3.1 Carpark Ventilation		N/A	✚ Scoped Out	
Carparking is not enclosed				
3.2 Hot Water - Non-Residential		100%		
3.7 Internal Lighting - Non-Residential		100%		
4.1 Combined Heat and Power (cogeneration / trigeneration)		N/A	✚ Scoped Out	
No cogeneration or trigeneration system in use.				
4.2 Renewable Energy Systems - Solar		0%	⊘ Disabled	
No solar PV renewable energy is in use.				
4.4 Renewable Energy Systems - Other		N/A	✚ Scoped Out	
No other (non-solar PV) renewable energy is in use.				

IEQ Overall contribution 16.5%

	Minimum required 50%	55%	✓ Pass
1.4 Daylight Access - Non-Residential	34%	✓ Achieved	
2.3 Ventilation - Non-Residential	72%	✓ Achieved	
3.4 Thermal comfort - Shading - Non-Residential	66%		
3.5 Thermal Comfort - Ceiling Fans - Non-Residential	0%		
4.1 Air Quality - Non-Residential	100%		

Transport Overall contribution 9.0%

	0%
1.4 Bicycle Parking - Non-Residential	0%
1.5 Bicycle Parking - Non-Residential Visitor	0%
1.6 End of Trip Facilities - Non-Residential	0% Disabled
Credit 1.4 must be complete first.	
2.1 Electric Vehicle Infrastructure	0%
2.2 Car Share Scheme	0%
2.3 Motorbikes / Mopeds	0%

Waste & Resource Recovery Overall contribution 5.5%

	66%
1.1 Construction Waste - Building Re-Use	0%
2.1 Operational Waste - Food & Garden Waste	100%
2.2 Operational Waste - Convenience of Recycling	100%

Urban Ecology Overall contribution 5.5%

	50%
1.1 Communal Spaces	0%
2.1 Vegetation	100%
2.2 Green Roofs	0%
2.3 Green Walls and Facades	0%
3.2 Food Production - Non-Residential	0%

Innovation Overall contribution 9.0%

	0%
1.1 Innovation	0%

Credit breakdown

Management Overall contribution 4.5%

	12%
--	-----

1.1 Pre-Application Meeting	0%
Score Contribution	This credit contributes 37.5% towards the category score.
Criteria	Has an ESD professional been engaged to provide sustainability advice from schematic design to construction? AND Has the ESD professional been involved in a pre-application meeting with Council?
Question	Criteria Achieved ?
Project	No
2.3 Thermal Performance Modelling - Non-Residential	50%
Score Contribution	This credit contributes 25% towards the category score.
Criteria	Has a preliminary facade assessment been undertaken in accordance with NCC2022 Section J4D6?
Question	Criteria Achieved ?
Public building	Yes
Criteria	Has preliminary modelling been undertaken in accordance with either NCC2022 Section J (Energy Efficiency), NABERS or Green Star?
Question	Criteria Achieved ?
Public building	No
3.2 Metering - Non-Residential	0%
Score Contribution	This credit contributes 12.5% towards the category score.
Criteria	Have utility meters been provided for all individual commercial tenants?
Question	Criteria Achieved ?
Public building	No
3.3 Metering - Common Areas	0%
Score Contribution	This credit contributes 12.5% towards the category score.
Criteria	Have all major common area services been separately submetered?
Question	Criteria Achieved ?
Public building	No
4.1 Building Users Guide	0%
Score Contribution	This credit contributes 12.5% towards the category score.
Criteria	Will a building users guide be produced and issued to occupants?
Question	Criteria Achieved ?
Project	No

IWM Overall contribution 22.5%

80% ✔ Pass

Do you have a reticulated third pipe or an on-site water recycling system?:	No
Are you installing a swimming pool?:	No
Stormwater profile	
Which stormwater modelling software are you using?:	Melbourne Water STORM tool
STORM score achieved:	110
Flow:	-
Total Suspended Solids:	-
Total Phosphorus:	-
Total Nitrogen:	-
Rainwater tank profile	
What is the total roof area connected to the rainwater tank?:	
Rainwater Tank 1	405 m ²
	-
Tank Size:	
Rainwater Tank 1	16,000 Litres
	-
Irrigation area connected to tank:	
Rainwater Tank 1	0.0 m ²
	-
Is connected irrigation area a water efficient garden?:	
Rainwater Tank 1	No
	-
Other external water demand connected to tank?:	
Rainwater Tank 1	0.0 Litres/Day
	-
Fixtures, fittings & connections profile	
Building:	Building 1
Showerhead:	4 Star WELS (≥ 6.0 but ≤ 7.5)
Bath:	Scope out
Kitchen Taps:	≥ 6 Star WELS rating
Bathroom Taps:	≥ 6 Star WELS rating
Dishwashers:	Default or unrated
WC:	≥ 4 Star WELS rating
Urinals:	Scope out
Washing Machine Water Efficiency:	Occupant to Install
Which non-potable water source is the dwelling/space connected to?:	Rainwater Tank 1
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
1.1 Potable Water Use		42%  Achieved
Score Contribution	This credit contributes 33.3% towards the category score.	
Criteria	What is the reduction in total potable water use due to efficient fixtures, appliances, rainwater use and recycled water use? To achieve points in this credit there must be >25% potable water reduction.	
Output	Reference	
Project	2704 kL	
Output	Proposed (excluding rainwater and recycled water use)	
Project	2170 kL	
Output	Proposed (including rainwater and recycled water use)	
Project	1972 kL	
Output	% Reduction in Potable Water Consumption	
Project	27 %	
Output	% of connected demand met by rainwater	
Project	54 %	
Output	How often does the tank overflow?	
Project	Never / Rarely	
Output	Opportunity for additional rainwater connection	
Project	1170 kL	
2.1 Stormwater Treatment		100%  Achieved
Score Contribution	This credit contributes 60% towards the category score.	
Criteria	Has best practice stormwater management been demonstrated?	
Output	Min STORM Score	
Project	100	
Output	STORM Score	
Project	110	
3.1 Water Efficient Landscaping		100%
Score Contribution	This credit contributes 6.7% towards the category score.	
Criteria	Will water efficient landscaping be installed?	
Question	Criteria Achieved ?	
Project	Yes	
4.1 Building Systems Water Use		N/A  Scoped Out
		No chiller system proposed.
This credit was scoped out	No chiller system proposed.	

Operational Energy Overall contribution 27.5%

Minimum required 50%

59%

✔ Pass

Project profile

Use the BESS Deem to Satisfy (DtS) method for Non-residential spaces?:

Are you installing any renewable energy system(s) (other than solar photovoltaic)?:

No

Energy Supply:

Electricity & Natural Gas

Are you installing a cogeneration or trigeneration system?:

-

Non-residential Deemed-to-Satisfy profile

Do all exposed floors and ceilings (forming part of the envelope) demonstrate meeting the required NCC2022 insulation levels (total R-value upwards and downwards)?:

Does all wall and glazing demonstrate meeting the required NCC2022 facade calculator (or better than the total allowance)?:

Yes

Are heating and cooling systems within one Star of the most efficient equivalent capacity unit available, or Coefficient of Performance (CoP) & Energy Efficiency Ratios (EER) not less than 85% of the CoP & EER of the most efficient equivalent capacity unit available?:

Yes

Are water heating systems within one star of the best available, or 85% or better than the most efficient equivalent capacity unit?:

Yes

1.1 Thermal Performance Rating - Non-Residential

37%

Score Contribution

This credit contributes 36.4% towards the category score.

Criteria

What is the % reduction in heating and cooling energy consumption against the reference case (NCC2022 Section J)?

2.1 Greenhouse Gas Emissions

100%

Score Contribution

This credit contributes 9.1% towards the category score.

Criteria

What is the % reduction in annual greenhouse gas emissions against the benchmark?

2.2 Peak Demand

100%

Score Contribution

This credit contributes 4.5% towards the category score.

Criteria

What is the % reduction in the instantaneous (peak-hour) demand against the benchmark?

2.6 Electrification

0%

⊗ Disabled

Credit is available when the energy supply is set to all-electric (no gas or wood).

This credit is disabled

Credit is available when the energy supply is set to all-electric (no gas or wood).

2.7 Energy consumption

100%

Score Contribution

This credit contributes 18.2% towards the category score.

Criteria

What is the % reduction in annual energy consumption against the benchmark?

3.1 Carpark Ventilation		N/A	✦ Scoped Out
		Carparking is not enclosed	
This credit was scoped out		Carparking is not enclosed	
3.2 Hot Water - Non-Residential		100%	
Score Contribution	This credit contributes 4.5% towards the category score.		
Criteria	What is the % reduction in annual energy consumption (gas and electricity) of the hot water system against the benchmark?		
3.7 Internal Lighting - Non-Residential		100%	
Score Contribution	This credit contributes 9.1% towards the category score.		
Criteria	Does the maximum illumination power density (W/m2) in at least 90% of the area of the relevant building class meet the requirements in Table J7D3a of the NCC 2022 Vol 1?		
Question	Criteria Achieved ?		
Public building	Yes		
4.1 Combined Heat and Power (cogeneration / trigeneration)		N/A	✦ Scoped Out
		No cogeneration or trigeneration system in use.	
This credit was scoped out		No cogeneration or trigeneration system in use.	
4.2 Renewable Energy Systems - Solar		0%	⊘ Disabled
		No solar PV renewable energy is in use.	
This credit is disabled		No solar PV renewable energy is in use.	
4.4 Renewable Energy Systems - Other		N/A	✦ Scoped Out
		No other (non-solar PV) renewable energy is in use.	
This credit was scoped out		No other (non-solar PV) renewable energy is in use.	

IEQ Overall contribution 16.5%

		Minimum required 50%	55%	✓ Pass
--	--	----------------------	-----	--------

1.4 Daylight Access - Non-Residential			34%	✓ Achieved
Score Contribution	This credit contributes 35.3% towards the category score.			
Criteria	What % of the nominated floor area has at least 2% daylight factor?			
Question	Percentage Achieved?			
Public building	34 %			
2.3 Ventilation - Non-Residential			72%	✓ Achieved
Score Contribution	This credit contributes 35.3% towards the category score.			
Criteria	What % of the regular use areas are effectively naturally ventilated?			
Question	Percentage Achieved?			
Public building	60 %			
Criteria	What increase in outdoor air is available to regular use areas compared to the minimum required by AS 1668.2:2012?			
Question	Percentage Achieved?			
Public building	0 %			
Criteria	What CO2 concentrations are the ventilation systems designed to achieve, to monitor and to maintain?			
Question	Value			
Public building	700 ppm			
3.4 Thermal comfort - Shading - Non-Residential			66%	
Score Contribution	This credit contributes 17.6% towards the category score.			
Criteria	What percentage of east, north and west glazing to regular use areas is effectively shaded?			
Question	Percentage Achieved?			
Public building	50 %			
3.5 Thermal Comfort - Ceiling Fans - Non-Residential			0%	
Score Contribution	This credit contributes 5.9% towards the category score.			
Criteria	What percentage of regular use areas in tenancies have ceiling fans?			
Question	Percentage Achieved?			
Public building	0 %			
4.1 Air Quality - Non-Residential			100%	
Score Contribution	This credit contributes 5.9% towards the category score.			

Criteria	Do all paints, sealants and adhesives meet the maximum total indoor pollutant emission limits?
Question	Criteria Achieved ?
Public building	Yes
Criteria	Does all carpet meet the maximum total indoor pollutant emission limits?
Question	Criteria Achieved ?
Public building	Yes
Criteria	Does all engineered wood meet the maximum total indoor pollutant emission limits?
Question	Criteria Achieved ?
Public building	Yes

Transport Overall contribution 9.0%

		0%
1.4 Bicycle Parking - Non-Residential		0%
Score Contribution	This credit contributes 22.2% towards the category score.	
Criteria	Have the planning scheme requirements for employee bicycle parking been exceeded by at least 50% (or a minimum of 2 where there is no planning scheme requirement)?	
Question	Criteria Achieved ?	
Public building	No	
Question	Bicycle Spaces Provided ?	
Public building	0	
1.5 Bicycle Parking - Non-Residential Visitor		0%
Score Contribution	This credit contributes 11.1% towards the category score.	
Criteria	Have the planning scheme requirements for visitor bicycle parking been exceeded by at least 50% (or a minimum of 1 where there is no planning scheme requirement)?	
Question	Criteria Achieved ?	
Public building	No	
Question	Bicycle Spaces Provided ?	
Public building	0	
1.6 End of Trip Facilities - Non-Residential		0% ☒ Disabled
Credit 1.4 must be complete first.		
This credit is disabled	Credit 1.4 must be complete first.	
2.1 Electric Vehicle Infrastructure		0%
Score Contribution	This credit contributes 22.2% towards the category score.	
Criteria	Are facilities provided for the charging of electric vehicles?	
Question	Criteria Achieved ?	
Project	No	
2.2 Car Share Scheme		0%
Score Contribution	This credit contributes 11.1% towards the category score.	
Criteria	Has a formal car sharing scheme been integrated into the development?	
Question	Criteria Achieved ?	
Project	No	
2.3 Motorbikes / Mopeds		0%
Score Contribution	This credit contributes 22.2% towards the category score.	
Criteria	Are a minimum of 5% of vehicle parking spaces designed and labelled for motorbikes (must be at least 5 motorbike spaces)?	
Question	Criteria Achieved ?	
Project	No	

Waste & Resource Recovery Overall contribution 5.5%

		66%
--	--	-----

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

Urban Ecology Overall contribution 5.5%

		50%
--	--	-----

1.1 Communal Spaces		0%
Score Contribution	This credit contributes 12.5% towards the category score.	
Criteria	Is there at least the following amount of common space measured in square meters : * 1m ² for each of the first 50 occupants * Additional 0.5m ² for each occupant between 51 and 250 * Additional 0.25m ² for each occupant above 251?	
Question	Common space provided	
Public building	0.0 m ²	
Output	Minimum Common Space Required	
Public building	55 m ²	
2.1 Vegetation		100%
Score Contribution	This credit contributes 50% towards the category score.	
Criteria	How much of the site is covered with vegetation, expressed as a percentage of the total site area?	
Question	Percentage Achieved ?	
Project	33 %	
2.2 Green Roofs		0%
Score Contribution	This credit contributes 12.5% towards the category score.	
Criteria	Does the development incorporate a green roof?	
Question	Criteria Achieved ?	
Project	No	
2.3 Green Walls and Facades		0%
Score Contribution	This credit contributes 12.5% towards the category score.	
Criteria	Does the development incorporate a green wall or green façade?	
Question	Criteria Achieved ?	
Project	No	
3.2 Food Production - Non-Residential		0%
Score Contribution	This credit contributes 12.5% towards the category score.	
Criteria	What area of space per occupant is dedicated to food production?	
Question	Food Production Area	
Public building	0.0 m ²	
Output	Min Food Production Area	
Public building	16 m ²	

Innovation Overall contribution 9.0%

	0%
--	----

1.1 Innovation	0%
Score Contribution	This credit contributes 100% towards the category score.
Criteria	What percentage of the Innovation points have been claimed (10 points maximum)?

Disclaimer

The Built Environment Sustainability Scorecard (BESS) has been provided for the purpose of information and communication. While we make every effort to ensure that material is accurate and up to date (except where denoted as 'archival'), this material does in no way constitute the provision of professional or specific advice. You should seek appropriate, independent, professional advice before acting on any of the areas covered by BESS.

The Municipal Association of Victoria (MAV) and CASBE (Council Alliance for a Sustainable Built Environment) member councils do not guarantee, and accept no legal liability whatsoever arising from or connected to, the accuracy, reliability, currency or completeness of BESS, any material contained on this website or any linked sites

Project # 93D80303
7 Torquay Road, Belmont
[REDACTED]
7 Torquay Rd, Belmont VIC 3216, Australia
03 July 2026 4:35 p.m.



7 Torquay Road, Belmont

Nitrogen reduction target has been met, and a small low-risk project is deemed to comply. Higher risk projects need to meet all targets.



Project details

Name	7 Torquay Road, Belmont
Project ID	93D80303
Street address	7 Torquay Rd, Belmont VIC 3216, Australia
Municipality	Greater Geelong
Site area	1375.2 m ²
Planning Number	

Results

Item	Result	Target
Mean annual runoff volume harvested or evapotranspired (%)	31%	>32%
Mean annual runoff volume infiltrated or filtered (%)	48%	>3%
Total suspended solids (%)	61%	>80%
Total phosphorus (%)	51%	>45%
Total nitrogen (%)	49%	>45%
Total gross pollutants (%)	66%	>70%

For small low-risk sites, Total Nitrogen has been used as a proxy for other pollutants indicating compliance has been adequately met for many years. This has meant that if the Blue Factor score meets 100% based on Nitrogen, the Responsible Authority has the discretion to accept stormwater management design responses that do not meet all the individual pollutant load reduction targets on small low-risk sites.

Larger, high-risk projects, with roads, car parks or activities that may yield higher than typical pollutant loads, must meet all water quality targets fully. All projects should manage flow volume reductions through harvesting and evapotranspiration as well as infiltration to a level that is reasonably practicable.

Additional considerations

Flow and other pollutant load reductions should also be considered. The EPA Urban stormwater management guidelines (EPA - Publication [1739.1](#)) are referenced in the VPPs as a policy document and support compliance with the General Environmental Duty.

You can use the guidelines to help minimise risks from urban stormwater so far as reasonably practicable ([epa.vic.gov.au/about-epa/laws-ew-laws/what-is-reasonablypracticable](#)). Doing what is reasonably practicable means putting in proportionate controls to minimise the risk of harm to human health and the environment relative to the values being protected and risks presented by the site.

A completed small-scale low risk site with no public roads or external user parking areas will usually generate very little sediment, referred to as total suspended solids (TSS). It is common that the 80% TSS target will not easily be achieved for this type of site.

Other sites may generate significant total suspended solids (TSS) as well as litter, referred to as gross pollutants and should meet all targets.

The generation of sediment and litter during the construction phase is a significant problem and must be addressed effectively for all developments.

You should demonstrate what appropriate controls will be used to ensure the generation of litter and sediment is prevented and controlled during construction to minimise risk of harm.

Blue Factor is designed to support a range of developments of less than 10,000 square metres including small scale residential, apartment developments, small scale commercial and small public use developments which must meet planning requirements including stormwater management quality objectives in the EPA Urban stormwater management guidelines (EPA - Publication 1739.1) It is recommended that MUSIC is used for larger and more complex projects to demonstrate compliance.

Configuration 1



Childcare Centre Roof Catchment 405m2



Rainwater Tank 1
Rainwater tank retention volume in kilolitres: 16



Building 1 Non-Residential Mixed Use, 21 employee(s)

Configuration 2



Childcare Centre - Raingarden Roof, 200m2



Raingarden 1 Area: 4 m²,
Extended detention depth: 0.1 m,
Submerged zone depth: 0.3 m, Site soil type: Clay

Catchments



Childcare Centre Roof Catchment 405m2



Driveway Paved, 283.8m2 Untreated



Garden and Lawn Pervious (garden and lawn), 486.4m2



Childcare Centre - Raingarden Roof, 200m2



Rainwater Tank 1

Rainwater tank retention volume in kilolitres: 16

161%



Raingarden 1 Area: 4 m²,
Extended detention depth: 0.1 m,
Submerged zone depth: 0.3 m, Site soil type: Clay

164%

**Building 1** Non-Residential Mixed Use, 21 employee(s)

Water sources	I want to calculate my water use based on fixtures and fittings
Basin taps - Primary water source	Mains water
Basin taps - Efficiency	6 star WELS rating
Showers - Primary water source	Mains water
Showers - Efficiency	3 star WELS rating (> 6 but < 7.5 litres per minute)
Clothes Washer - Primary water source	Mains water
Clothes Washer - Efficiency	Scope out
Urinal - Primary water source	Mains water
Urinal - Efficiency	No urinals
Toilets connected to mains water	8
Toilets connected to rainwater	8
Toilets connected to recycled water	0
Toilets efficiency	4 star WELS rating
Garden water use	Garden water demands are in use
Garden primary water source	Rainwater
Irrigated garden area supplied by:	
• Mains	0 m ²
• Rainwater Tank	100 m ²
• Recycled Water	0 m ²
Garden water use efficiency	Medium

INSTRUCTION SHEET

Building a planter box raingarden (lined)

What is a planter box raingarden?

Building a raingarden is a simple way to help the environment and the health of our local waterways while providing a self-watering garden for your backyard.

A raingarden is a specially prepared garden designed to receive and filter rain run-off from roofs or hard surfaces such as driveways or paving. You can even create a raingarden in a planter box, positioning it to collect water from a diverted downpipe or rainwater tank overflow.

Featuring layers of soil for filtration, gravel for drainage, and plants that can tolerate periods without rain, a raingarden helps to protect our streams and rivers from stormwater pollutants.

With a slotted pipe beneath the soil to take away the filtered rainwater and an overflow pipe on the surface to prevent flooding, raingardens are designed to collect water from a diverted downpipe, rainwater tank overflow or pavement runoff.

Please note: A certified plumber must be used for stormwater connections and modifications.

Did you know that a raingarden is only wet during and immediately after rain, leaving it dry most of the time? This is due to the drainage and filtration properties of the soil combination used in the raingarden.



Building your raingarden

Step 1 – getting started

Location

Build your planter box as close as possible to the water source whether it be a downpipe or rainwater tank overflow. This will help minimise the additional plumbing needed to bring water to the raingarden. Your raingarden needs to sit at least 300mm away from your house.

Having decided on a location, it is important to determine the proximity of the existing stormwater pipe to make sure your raingarden is connected properly. Your local plumber can help with this and also how and when to divert your downpipe so that the area doesn't flood during construction.

Stormwater reconnection

All connections or modifications to existing stormwater pipes need to be done by a licensed plumber. The plumber should ensure that pipes are reconnected into the property's stormwater and not another services such as the sewer.

Underground services

Be aware of any underground services (gas, electricity, water) that run near your house as this may determine where you can build your raingarden. Raingardens should not be built over or in close proximity to a septic system.

Materials

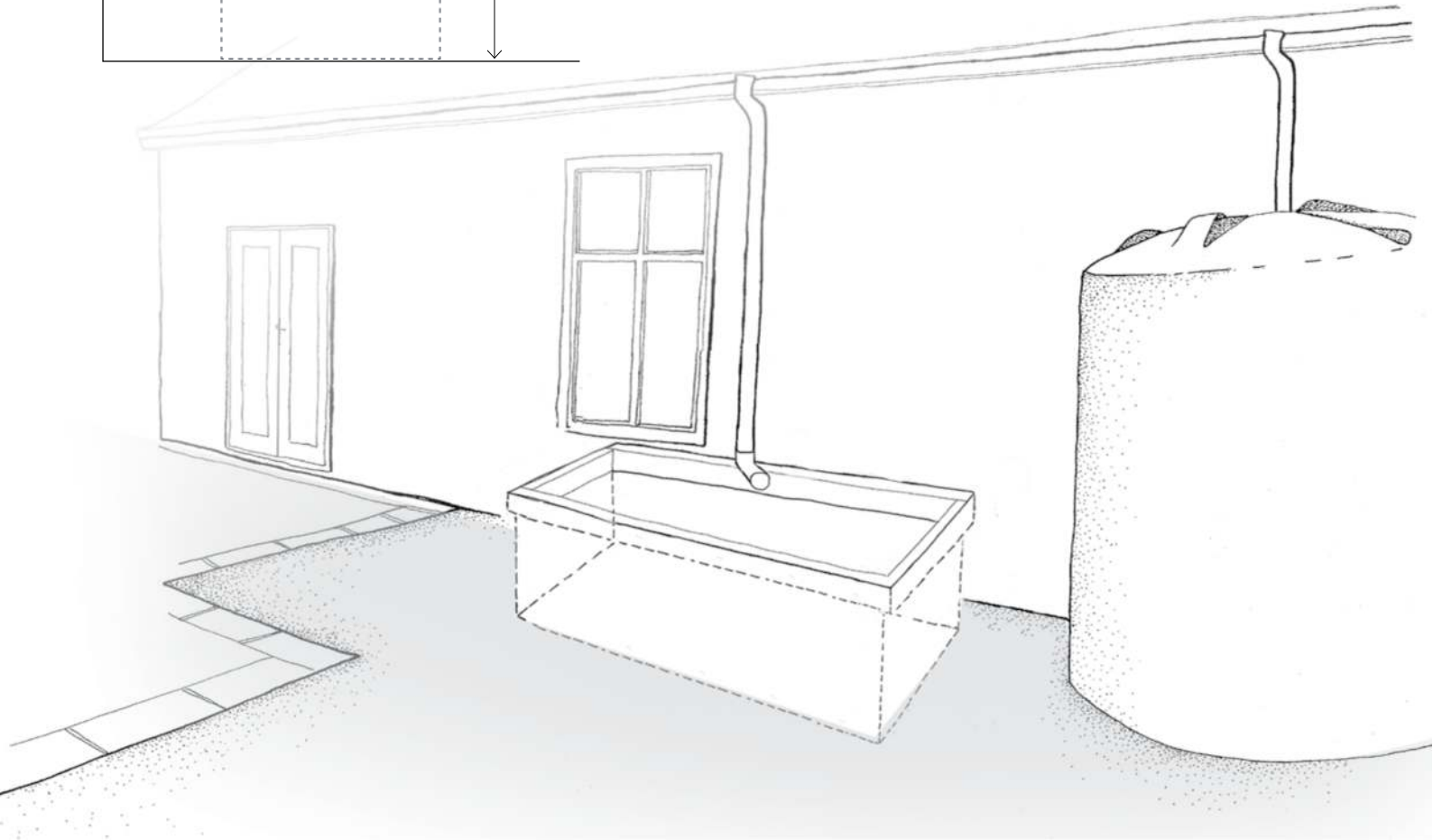
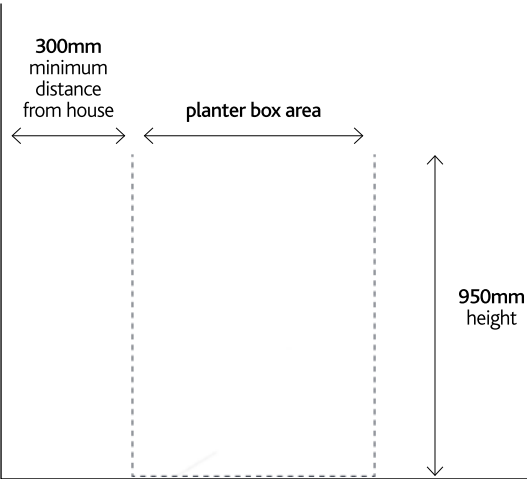
See *Materials List* for information about what you need to build a raingarden.

Size

You need to make sure that your raingarden is large enough to manage the amount of stormwater it will receive. If your raingarden is going to capture run-off from the roof via a downpipe, measure the area of roof that drains to that downpipe. Generally, the size of the raingarden should be approximately 2% of the run-off area. Table 1 will help you work out the correct size.

Table 1 – Raingarden sizing chart

AREA OF RUN-OFF (m²)	RAINGARDEN SIZE (m²)
50	1
100	2
150	3
200	4
250	5
300	6
350	7
400	8
450	9



Step 2 - planter box and pipe infrastructure

Preparing your planter box

You can create a planter box out of any material as long as it is strong enough to hold soil. This could be a corrugated iron 'tank', an old wine barrel, or you could build your own planter box using plantation hardwood or similar.

Line your planter box (sides and base) with a PVC liner. Overlap the sheets by 200mm and seal the joins with PVC tape.

Place the 7mm screenings (gravel) to a depth of 50mm. This will form a base for the slotted drainage pipe. Make sure the screenings are washed and cleaned of excess dirt as this can create blockages in the raingardens drainage.

Use the screenings to create a gentle slope towards the stormwater outlet (where the water will exit your planter box).

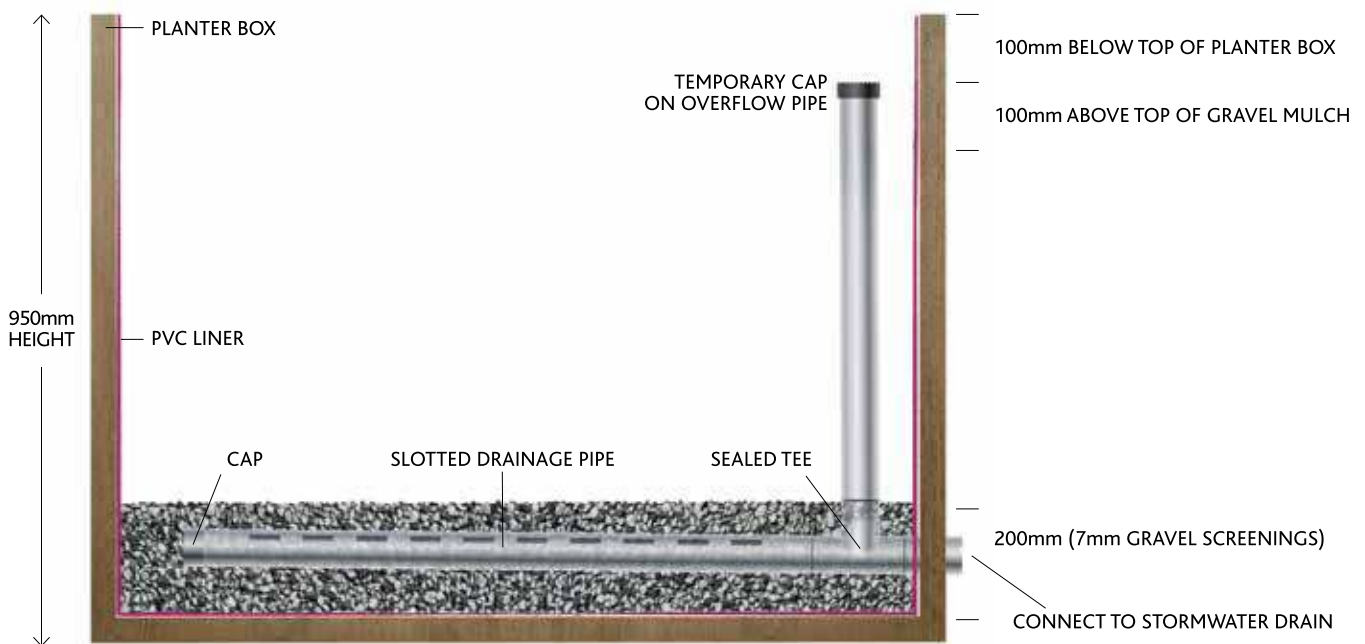
Pipe infrastructure

Lay a 90mm diameter slotted drainage pipe horizontally along the centre of the planter box base and cap one end of the slotted drainage pipe. Call your plumber to connect the drainage pipe back into the property's existing stormwater.

Handy Hint – If your raingarden is greater than 4m wide, you will need to install two slotted drainage pipes and two overflow pipes. These need to be evenly spaced across the planter box base to provide adequate drainage.

Connect the vertical 90mm diameter overflow pipe into the slotted drainage pipe using a 90 degree elbow pipe. When the raingarden is finished, the top of the overflow pipe should sit 100mm above the gravel mulch and 100mm below the top edge of the planter box.

Install a temporary cap on top of the overflow pipe to prevent materials dropping into it during construction. Some plastic taped across the top of the pipe will work fine.



Building your raingarden

Step 3 - soil layers

Screenings layer

Add 7mm screenings (gravel) to a depth of 150mm over the slotted drainage pipe in the base of your raingarden. This brings to total depth of screenings (gravel) to 200mm. Be careful when not to dislodge or damage the slotted drainage pipe when adding the additional screenings.

Sand layer

Place white washed sand to a depth of 100mm over the screenings (gravel) layer.

Sand/soil mix layer

Mix 4 parts white washed sand with 1 part topsoil. Add this mix to the raingarden to a depth of 400mm.

Handy Hint - Ensure you firmly pat down each layer of soil when building your raingarden to help reduce the layers from sinking.

Step 4 -pipe adjustments, plants and mulch

Pipe adjustments

Redirect your downpipe into the raingarden using pipe bends where required. If possible, use two 45 degree bends connected together as this will provide a much gentler and more even flow of water, reducing the risk of erosion and prevent blockages within the downpipe. A 90 degree elbow pipe will do as an alternative.

Plants

In general, plants that grow well in a raingarden:

- › like dry conditions but can tolerate temporary wet periods
- › are perennial rather than annual
- › have an extensive fibrous root system.

A wide range of plants are suitable for raingardens and your local nursery will be able to guide you on what is right for your area.

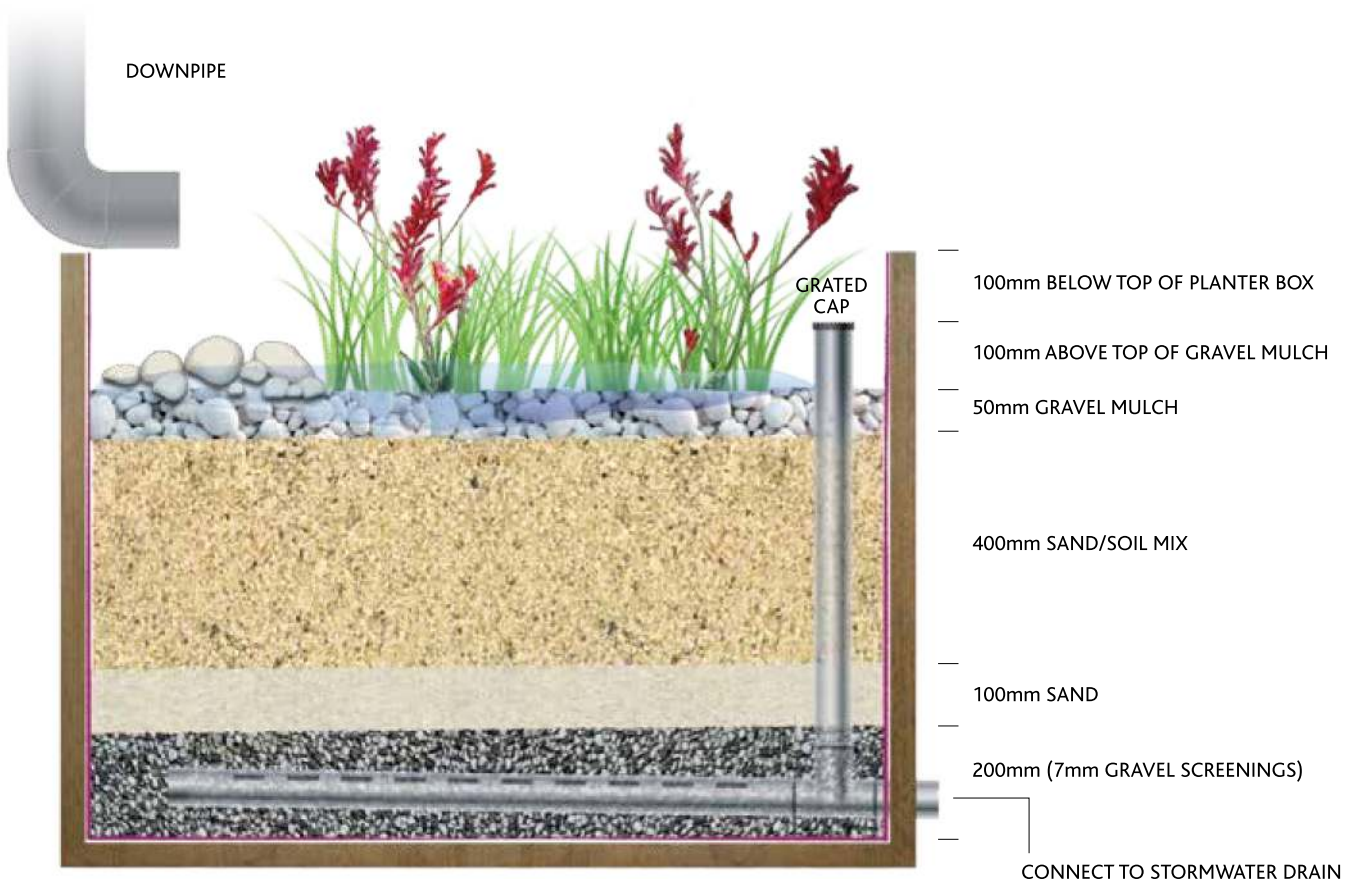
There are also particular plants that are really good at removing pollutants from stormwater. These include:

- › *Carex appressa*
- › *Lomandra longifolia*
- › *Juncus flavidus*
- › *Melaleuca ericifolia*
- › *Goodenia ovate*.

50% of your raingarden should be planted with these species, the other 50% can be made up of plants that like a dry environment with intermittent wet periods. It is important that the plants you select are suitable for the amount of sun and shade on your raingarden. See the *Plant List* for a suggested list of suitable raingarden plants.

Regardless of the type of plants you select, it is important to plant densely to cover the raingarden. Set your plants out at roughly 6 plants per m². So for a 2m² raingarden, you will need to buy 12 plants. Now start planting.

(continued on next page)



Looking after your raingarden

Mulch

To allow the spread of water gently over the raingarden, place some large flat rocks where water flows from the downpipe. Place smaller rocks in between the large rocks to fill the gaps and help prevent erosion. Alternatively a flow spreading device can be fitted to the downpipe.

Spread gravel mulch to a depth of 50mm around the plants.

Remove the temporary end cap from overflow pipe and replace with a 90mm PVC finishing collar and domed pipe grate.

Water the plants in – complying with your local water restrictions.

Once established, raingardens are low maintenance especially when planted with native plant species. They don't need to be watered, mowed or fertilised. However, a few simple tips can help your raingarden mature and function well.

- › Gravel mulch will help retain moisture in your raingarden and prevent weeds from growing.
- › Ensure that the overflow is never blocked.
- › Remove any sediment or build up from the downpipe.
- › Some weeding may need to take place until plants have matured.
- › Evenly distribute water flow into your garden to limit erosion from heavy rainfall. Strategically placed rocks may help with this.

- › Inspect your garden regularly – replace plants and repair erosion when necessary.

Note – If necessary, water your raingarden until your plants have established in compliance with your local water restrictions.

Need help?

If you have questions about building a raingarden, your landscape gardener or local plumber may be able to help. For more information visit melbournewater.com.au/raingardens



Materials List – what you need to build your raingarden

Table 2 details the materials required to create a 2m² raingarden. While item prices may vary depending on the materials you select, building a 2m² raingarden is likely to cost between \$400 and \$500 (plus the cost of a planter box and plumber).

QUANTITY	MATERIAL
2 l/m	90mm diameter slotted drainage pipe (Ag Pipe)
2 l/m	90mm diameter uPVC pipe*
0.4m ³	7mm screenings
0.85m ³	Sand (white washed)
0.15m ³	Topsoil
12	Plants (150mm pots)
0.1m ³	Gravel mulch
1	90mm diameter uPVC 90 degree bend or 2x 45 degree bends
1	PVC grate 90mm finishing collar
1	PVC 90mm diameter domed pipe grate
1	PVC 90mm tee
1	PVC 90mm cap
10m ²	PVC liner
	PVC tape

**Costs per square meter will depend on the length of connections back to the existing stormwater drain.*

l/m = lineal metres m² = square metres m³ = cubic metres mm = millimetres



Plant List – the best plants for your raingarden

The following plants grow well in raingardens.

BOTANICAL NAME	COMMON NAME	CONDITIONS	SIZE (H x W) (cm)
<i>Anigozanthos sp.</i>	Kangaroo paw	Full sun	30-90 x 100-120
<i>Blechnum nudum</i>	Fishbone Water-fern	Full sun to partial shade	50-100 x 40-80
<i>Calocephalus lacteus</i>	Milky Beauty-heads	Full sun to partial shade	15-30 x 10-30
<i>Carex Appressa</i>	Tall Sedge	Full sun to partial shade	80-100 x 120
<i>Carpobrotus modestus</i>	Pigface	Full sun	20cm high and spreading
<i>Chrysocephalum apiculatum</i>	Common Everlasting	Full sun	30-90 x 10-30
<i>Derwentia perfoliata</i>	Digger's Speedwell	Full sun to partial shade	20-40 x 30-60
<i>Dianella species</i>		Full sun to partial shade	60-120 x 40-150
<i>Ficinia nodosa</i>	Knobby Club-rush	Full sun	50-150 x 60-200
<i>Juncas amabilis</i>	Hollow Rush	Full sun to partial shade	20-120 x 20-50
<i>Juncas flavidus</i>	Yellow Rush	Full sun to partial shade	40-120 x 20-100
<i>Leucaphyta brownii</i>	Cushion Bush	Full sun, salt tolerant	100 x 200
<i>Lomandra species</i>		Full sun to partial shade	60-120 x 50-100
<i>Melaleuca ericifolia</i>	Swamp paperback	Full sun to partial shade	4m high x 3m wide
<i>Myoporum parvifolium</i>	Creeping Boobialla	Full sun	20-30 x 300
<i>Patersonia occidentalis</i>	Native iris	Sun to partial shade	20-40 x 30-60
<i>Pratia perdunculata</i>	Matter Pratia	Partial shade	50-150 x 1.8-5
<i>Wahlenbergia communis</i>	Tufted Bluebell	Full sun	15-50 x 15



Melbourne Water

990 La Trobe Street
Docklands VIC 3008

PO Box 4342

Melbourne Victoria 3001

Telephone 131 722

melbournewater.com.au/raingardens

ISBN 978-1-921603-51-8 (print)

ISBN 978-1-921603-52-5 (web)

© Copyright 2009

Version 7, December 2013

Melbourne Water Corporation.
All rights reserved.

No part of the document may be reproduced, stored in a retrieval system, photocopied or otherwise dealt with without prior written permission of Melbourne Water Corporation.

Disclaimer: This publication may be of assistance to you but Melbourne Water and its employees do not guarantee that the publication is without flaw of any kind or is wholly appropriate for your particular purposes and therefore disclaims all liability for any error, loss or other consequence which may arise from you relying on any information in this publication.



Certified by the
Carbon Reduction Institute
www.cri.org



2.4 INSPECTION AND MAINTENANCE SCHEDULE

This is an example schedule to guide the timing of your inspection and maintenance activities. This schedule outlines the average service the assets require, but you can adjust these timings

to suit your assets. This schedule and the "Inspection and Maintenance form" (see over page) have been designed to be copied and used on site.

Responsibility of assets

Example:

Regular inspections should be carried out every 3 months. The inspection and maintenance of the raingarden including all civil and landscape components is the responsibility of Council/contractor.

The operation and maintenance of adjacent stormwater infrastructure, parklands, garden beds, recreational assets, pathways and road surfaces is the responsibility of Council.

Item	What to check for	Action	Frequency
Civil components – Raingarden			
Inlet	No evidence of erosion, blockage, damage or standing water.	Clear inlet of accumulated sediment or debris.	Storm events
		Eroded areas should be locally re-profiled or reinforced, and re-planted if necessary.	3 months
		Refer to Water by Design (2012) <i>Rectifying Vegetated Stormwater Treatment Assets</i> if the erosion is either recurring or severe.	
Outlet	No evidence of erosion, blockage, damage or standing water Outlet freely draining.	Clear outlet of accumulated sediment or debris.	Storm events
		Refer to Water by Design (2012) <i>Rectifying Vegetated Stormwater Treatment Assets</i> if standing (backwatering into the raingarden) is present.	3 months
Other structures	No evidence of erosion and damage to other structures, e.g. pits, pipes, access ramps, walls and rock protection.	Repair minor damage to structures. Eroded areas should be repaired (reinforced). This may involve minor re-profiling or re-planting works. For severe damage, i.e. where flows have scoured down the side of a structure refer to Water by Design (2012) <i>Rectifying Vegetated Stormwater Treatment Assets</i> .	3 months
Batters and bunds	No evidence of erosion.	Eroded areas should be locally re-profiled or reinforced, and re-planted if necessary.	Annually
Hydraulic conductivity	Filter media is draining freely. No water ponded on the surface of the raingarden for more than 12 hours after rainfall.	If water is ponded on the surface of the raingarden for more than 12 hours after rainfall, refer to Water by Design (2012) <i>Rectifying Vegetated Stormwater Treatment Assets</i> . Note: the disposal of raingarden filter material must comply with EPA Victoria guidelines for the disposal of contaminated soil (Appendix C).	Storm events
Sediment accumulation	Sediment forebay less than 75% full.	Clean out accumulated sediment from the sediment forebay.	Annually
	No major sediment accumulation on surface of the raingarden.	Accumulated sediment to be removed from the surface of the raingarden and the system replanted as required.	
Filter media surface	No surface scour, depressions.	Filter surface to be repaired. This may involve evening out the surface, importing additional filter media and replanting.	3 months
Fine sediment surface crust	No impermeable or clayey surface on the filter media.	Repair surface layer by scarify filter media surface, re-profiling and re-establishing vegetation, if required.	3 months
	No major surface crusting (<3mm depth across less than 10% of the filter area is permissible).	If the problem persists refer to Water by Design (2012) <i>Rectifying Vegetated Stormwater Treatment Assets</i> .	
Mulch layer	Even depth and distribution of the mulch layer.	Re-distribute or replace mulch that has been washed out or displaced. This may involve retaining mulch using jute mats or nets.	3 months
	Surface of the mulch layer is at least 100 mm below the top of the outflow pit. Mulch is not touching the plant stems	Remove mulch that is touching plant stems.	
Algal or moss growth	No major algal growth (less than 10% of raingarden area is permissible). No moss growth.	If significant patches of algal growth or moss persist across the surface of the raingarden (i.e. greater than 10% of the surface) then refer to Water by Design (2012) <i>Rectifying Vegetated Stormwater Treatment Assets</i> .	3 months
Inspection opening	Water level is below filter media layer.	Refer to Water by Design (2012) <i>Rectifying Vegetated Stormwater Treatment Assets</i> if standing water is present in the filter media layer.	Annually
	No sediment accumulation in underdrain system.	Flush the underdrain system using low pressure water jet to remove accumulated sediment.	

Item	What to check for	Action	Frequency
Landscape components – Raingarden			
Vegetation cover – filter media	Greater than 90% vegetation cover.	Remove any dead or diseased vegetation.	3 months
	Plants healthy, free from disease and vigorously growing.	Replant individual bare patches (greater than 5% of the area) using either new plants or by dividing and translocating existing plants.	Annually
Vegetation cover – batters	Continuous vegetation cover along the lower batter.	If bare areas represent greater than 30% of the raingarden area, refer to Water by Design (2012) <i>Rectifying Vegetated Stormwater Treatment Assets</i> .	Annually
	Greater than 90% vegetation cover. Plants healthy, free from disease and vigorously growing.		
Weeds – filter media – batters	Less than 10% of the filter media surface area and batters covered in weeds.	Physically remove weeds from filter media surface and batters.	3 months
		Do not use herbicides as these may harm the desirable raingarden vegetation and contaminate the filter media. Refer to Water by Design (2012) <i>Rectifying Vegetated Stormwater Treatment Assets</i> if weed ingress is a persistent problem (i.e. weed coverage is persistently greater than 30%).	
Litter	Filter media surface and batters free of litter (i.e. less than 1 piece litter per 4m ²).	Remove all litter and excessive debris	3 months
Pests	No damage by pest animals and insects.	Seek specialist advice if persistent insect damage is observed.	3 months
		Refer to Water by Design (2012) <i>Rectifying Vegetated Stormwater Treatment Assets</i> if there is evidence of pest animal damage.	

Rainwater Tanks

Stormwater Sensitive Homes

How does a rainwater tank help protect our local streams?

Most people install a rainwater tank primarily to harvest stormwater from their roof and conserve their mains water use. In addition to conserving water, a rainwater tank also helps treat stormwater and protect local streams from high storm flows by reducing the volume of stormwater and quantity of pollutants coming from a house block that would otherwise be delivered to the local stream.

What do I use my tank water for?

Garden irrigation, laundry and toilet flushing consume much of our home water use. In most cases these uses do not require the water to be of drinking quality standard that is provided by mains water. By plumbing your rainwater tank to your toilet or laundry and substituting these mains water needs with the rainwater harvested from your roof, you can conserve mains water whilst reducing the amount of stormwater that enters our streams.





Why can't I use my rainwater tank for my garden alone?

So that your tank is not too full to collect rainwater when it rains, you need to be consistently using your tank water all year round.

If tank water is used for your garden alone, your tank will remain full and unused during the winter months when your garden does not require watering. With a full tank, your capacity to capture and store the regular winter rainfall and thus benefit the local waterway is significantly reduced.

By plumbing your rainwater tank to your toilet or laundry, your tank water is used consistently all year round allowing rainfall to refill the tank more often especially in winter. This ultimately reduces the volume of stormwater that is delivered to the stream and the quantity of pollutants that are washed with it.

The Victorian Government has recognised the importance of plumbing your tank to your toilet and offers a cash rebate for the installation of connected rainwater tanks (www.dse.vic.gov.au). In addition, a 5 star energy standard has been introduced that requires a connected 2000Lt rainwater tank or solar hot water service to be installed in all new houses and apartments (class 1 and 2 buildings). (www.buildingcommission.com.au).

How do I choose a rainwater tank?

The most important thing to consider when choosing a rainwater tank is to first identify what you want from your rainwater tank. The size and type of rainwater tank you choose will vary depending on your homes water needs and the reliability you seek from your rainwater tank supply. There are a number of factors that may influence this and the following questions should be considered when planning your tank installation:

- what is the water demand of your home?
- how many people are living in your home?
- what is your intended use of rainwater?
- what reliability do you want from your tank?
- what is the total area of roof draining into your tank?
- what is average rainfall of your area?
- do you need extras like a pressure pump, the ability to top up your tank with drinking water, a backflow prevention device or a first flush device?
- are the materials used on your roof suitable to collect rainwater?
- are there physical constraints of your property that may influence the type of rainwater tank you need?

Once you know how much water you can collect and how much water you are going to use then a tank size can be selected to provide the reliability of water supply that you need.

Types of rainwater tanks

Rainwater tanks come in a variety of materials, shapes and sizes and can be incorporated into building design so they don't impact on the aesthetics of the development. They can be located above ground, underground, under the house or can even be incorporated into fences or walls.

There are three main tank systems to consider and a variety of materials to choose from. Features of these are outlined below and in the pictures above:

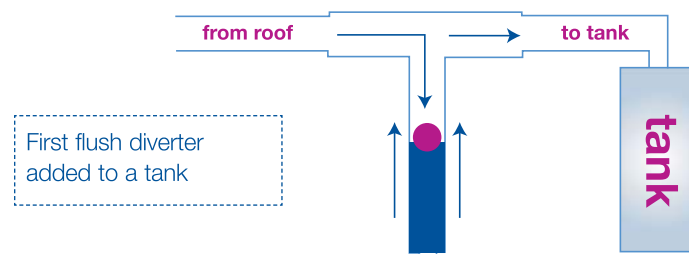
Tank systems:

Gravity Systems - rely on gravity to supply rainwater to the household and the garden by placing the tank on a stand at height.

Dual Supply Systems - top your rainwater tank with mains water when tank level is low ensuring reliable water supply.

Pressure Systems - use a pump to deliver rainwater to household and garden fixtures.

To reduce the amount of sediment and debris entering a tank, mesh screens and 'first flush diverters' can be fitted. A screen will filter large debris such as leaves and sticks while 'first flush diverters' store the 'first flush' of the rainfall that carries the sediment and other pollutants initially washed from your roof (see figure below).



Costs & rebates

Costs of installing a tank vary however a standard 2000Lt tank or bladder will cost around \$1000.

Additional plumbing and/or.....

- Above ground tanks cost approximately \$250 for a 500 litre tank.
- Below ground tanks cost between \$300-\$600 per 1000 litres of storage
- The costs of pumps start from \$200.

Additional plumbing and/or excavation costs vary on intended use, pipe layout, materials and site accessibility.

The Victorian Government offers a total rebate of \$300 for the installation of a rainwater tank that is plumbed to toilet and connected by a licensed plumber. For further details refer to the Department of Sustainability and Environment website www.dse.vic.gov.au.

For more information:

Melbourne Water's Water Sensitive Urban Design Website: www.wsud.melbournewater.com.au

Municipal Association of Victoria Clearwater Program: www.clearwater.asn.au

Water Sensitive Urban Design in the Sydney Region: www.wsud.org

Urban Stormwater Best Practice Environmental Management Guidelines, Victorian Stormwater Committee, CSIRO publishing, 1999.

WSUD Engineering Procedures: Stormwater, Melbourne Water, 2005.

Delivering Water Sensitive Urban Design: Final Report of Clean Stormwater – a planning framework, ABM, 2004.