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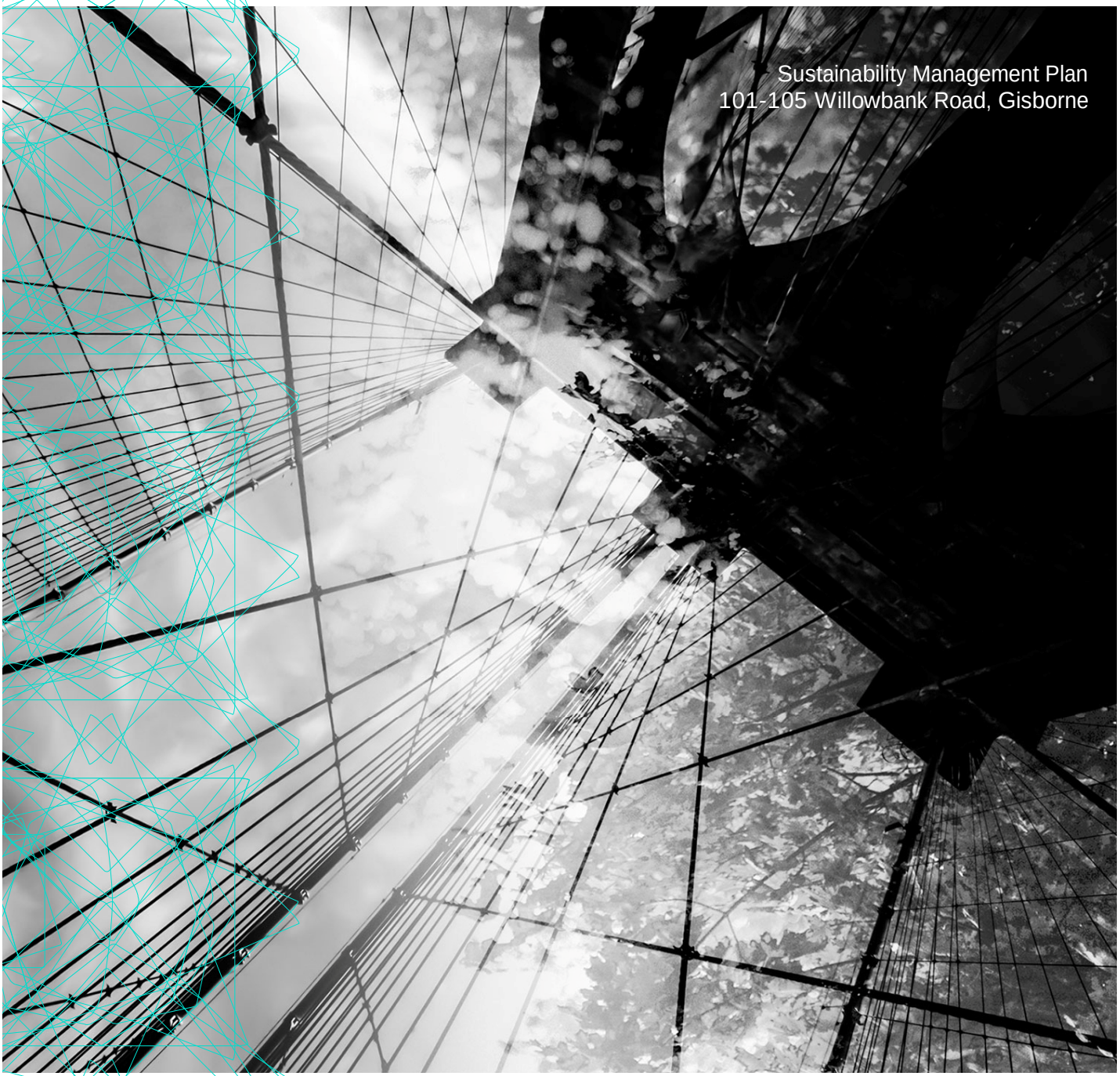

Sustainability Management Plan
101-105 Willowbank Road, Gisborne

SUSTAINABLE DEVELOPMENT
_CONSULTANTS

Proposed Mixed Use Development
101-105 Willowbank Road, Gisborne

Sustainability Management Plan

June 2022

S4689 SMP.V1

PREPARED BY:

Sustainable Development Consultants

2nd Floor, 555 Riversdale Rd.
Camberwell VIC 3124

T: (03) 9882 9967 F: (03) 9882 9969
info@sdconsultants.com.au

sdconsultants.com.au

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Version	Date of Issue	Description	Author	Approved
V1	29-06-2022	For Council Approval	SD	LR

1. Introduction

This Sustainability Management Plan (SMP) has been prepared to assist the design, construction and operation of the proposed development at 101-105 Willowbank Road, Gisborne. The Willowbank Road Activity Centre is to be a two-storey development comprising retail, medical and commercial tenancies.

Sustainable Development Consultants have assessed the proposed development and provided input to the design team. This SMP captures initiatives necessary to ensure that the development meets the sustainability requirements of the Macedon Ranges Shire Council, as outlined in Section 1.3 of this report.

This document has been prepared by Sustainable Development Consultants with reference to the architectural drawings prepared by Clarke Hopkins Clarke architects.

1.1 Site Description

The site at 101-105 Willowbank Road, Gisborne is situated along Willowbank Road, approximately 1.2km west of the Calder Freeway. It is approximately 47km northwest of the Melbourne CBD, within the heart of the Gisborne residential zone. The roughly 3,549m^2 site at Willowbank Road is currently undeveloped.

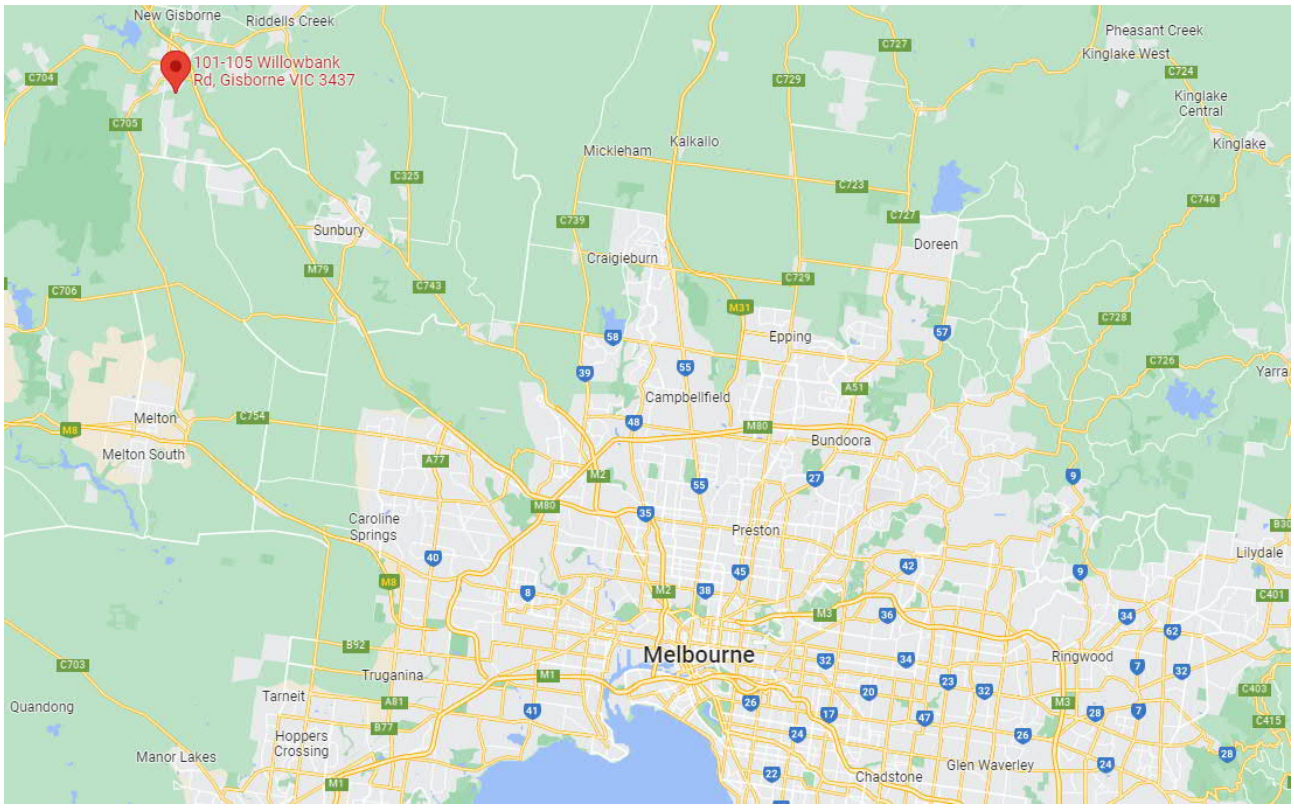


Figure 1: Location of 101-105 Willowbank Road, Gisborne, in relation to the Melbourne CBD (Source: Google Maps)

Figure 2: Aerial image of the development site at 101-105 Willowbank Road, Gisborne (Source: LandChecker, mark-up by SDC)

1.2 Development Summary

Set out in Table 1 below is a development summary for this project.

Table 1: Development Summary

Development Information	
Total Site Area	Approximately 3,549m^2
Carparking and Bikes	57 on-site car spaces, 2 secure staff bike spaces and 6 external visitor bike spaces
Ground Floor	Medical Practice (452m^2) Mini Mart (370 m^2) Food & Beverage (2 x 85 m^2)
First Floor	Commercial (300m^2) Mezzanine Office (80m^2)

1.3 Macedon Ranges Shire Council Requirements

From a policy perspective, Macedon Ranges Shire Council has no strict ESD Policy but is committed to achieving building design and siting outcomes that contribute positively to the local context, enhance the public realm and support environmentally sustainable development. Critical to achieving this commitment is for development to meet should target best practice in environmentally sustainable development from the design stage through to construction and operation.

The project will, therefore, comply with those ESD objectives set out in other Local Planning Schemes, including the proposed Clause 15.01-2S *Building Design.* As such, the project will aim to satisfy such objectives, as set out within the following categories (or similar), where applicable:

- Building Energy Management
- Water Sensitive Urban Design/Integrated Water Management
- Construction Materials Selection
- Indoor Environment Quality (IEQ)
- Transport
- Demolition and Construction Phase
- Operational Waste Management
- Urban Ecology

This requires a Sustainability Management Plan (SMP) which demonstrates how for this project, the relevant policy objectives will be achieved.

The Macedon Ranges Shire also requires that this project addresses the following planning scheme provisions:

- Clause 52.34 *Bicycle Facilities*
- Clause 53.18 *Stormwater Management in Urban Development*
- Clause 22.06 *Design of Industrial and Commercial Development*

In March 2021, the Macedon Ranges Shire declared a climate emergency and as part of this, are committed to enhanced Environmentally Sustainable Design.

1.4 ESD Assessment Tools

There are several calculators and modelling programs available in Victoria to assess proposed developments against benchmarks for ESD, as set by the Victorian government, local councils, and the Building Code of Australia.

For this project, set out below are the assessment tools that have been adopted for this project.

1.4.1 MELBOURNE WATER STORM CALCULATOR

Melbourne Water has developed the STORM calculator to simplify the analysis of stormwater treatment methods. The calculator is designed to enable a simple assessment of Water Sensitive Urban Design (WSUD) measures. The STORM Calculator determines the amount of treatment that typical WSUD measures will provide in relation to best practice targets.

The results of the STORM assessment can be found in Appendix 1 of this report.

2. Sustainability Initiatives

The following sections outline the initiatives that will be incorporated into the development throughout its design, construction and operation.

The following sections, as well as nominating the sustainability initiatives, also identify the party/parties responsible for implementation of the initiative, and the stage at which implementation will be demonstrated.

The following are the broad project stages:

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

2.1 Building Energy Management

Initiatives included in this section promote adoption of environmental initiatives at different stages of the project – not just in the project design stage.

Design Requirements	Responsibility & Implementation	Project Stage
Thermal Performance		
The development will meet all Part J assessment criteria in accordance with NCC 2019 Section J to demonstrate that the design meets the Section J requirements for the building fabric.	ESD Consultant/ Architect/ Services Consultant	Design Development/ Construction Documentation
Metering		
Separate utility meters (water and electricity) will be provided for each tenancy. This will allow each tenant to monitor and reduce their consumption. Further, common area services will be separately sub-metered. These could include rainwater for toilet flushing and irrigation, and electricity for the lift, common area lighting and solar PV generation.	Services Consultant	Construction Documentation
Heating and Cooling Systems		
Heating and cooling for all spaces within the development will be provided by energy efficient air conditioners (within one energy rating star of the best available, if no star rating applies, achieve an EER/COP at least 10% more efficient than minimum allowed under MEPS for an equivalent sized unit).	Mechanical Engineer	Design Development
Domestic Hot Water		
Hot water to the development will be provided via electric heat pump with a minimum 3.5 COP. All pipework will be insulated to minimise distribution heat losses.	Services Consultant	Design Development
Gas Substitution Roadmap		
The Victorian Government has committed to decarbonizing the gas sector via their Gas Substitution Roadmap, with the aim of transitioning to net zero emissions. This project will not be connected to a gas supply and will be an electric only development.	Services Consultant	Design Development
Building User Guide		
A Building User's Guide (BUG) will be developed and made available to building management, staff and visitors. It will comprehensively feature the manuals of the systems installed in the development and offer relevant suggestions for sustainable operation.	Developer	Post Occupancy
Indoor Lighting		
Energy consumption from artificial lighting throughout the development will be reduced by using LED lighting and optimising daylight diffusion via light-coloured internal surfaces (particularly walls, furniture and ceilings). Lighting levels must not exceed the maximum wattages listed in Table J6.2a of the 2019 BCA without the use of any adjustment factor.	Electrical Engineer	Design Development

Design Requirements	Responsibility & Implementation	Project Stage
External Lighting		
External lighting will be LED and will have controls (e.g., motion detectors, and timers) to minimise consumption during off-peak times (e.g., 11pm-5am).	Electrical Engineer	Design Development
Lift		
The design places the lift in adjacent to the stairs, thus making it easier for users to have the choice of using the stairs. An energy efficient lift will be specified that includes measures to specifically reduce stand-by consumption such as: • Switching off control devices when the lift is not in motion & using more efficient power supply unit; • LED lights and display; and • Suspension specifically designed to reduce friction.	Service Consultant	Design Development
Building Sealing		
All windows, doors, exhaust fans and pipe penetrations will be constructed to minimise air leakage as required by the provisions outlined in Section J3 of the 2019 BCA. This will include the use of seals around operable windows and doors as well as caulking to pipe penetrations, and the addition of self-closing louvers or dampers to exhaust fans.	Architect	Design Development
Solar PV System		
Peak electricity demand to be reduced with the addition of flush-mounted solar photovoltaic arrays on east- and west-facing roofs. This would generate green energy and help to offset the HVAC and internal lighting loads of the development. Solar panels are proposed to be installed on the roof to provide at least 20kW electricity generation. With the specification for high efficiency panels, this could be provided with an array of 50 panels based on the current readily available 400W panels.	Architect / Electrical Engineer	Design Development

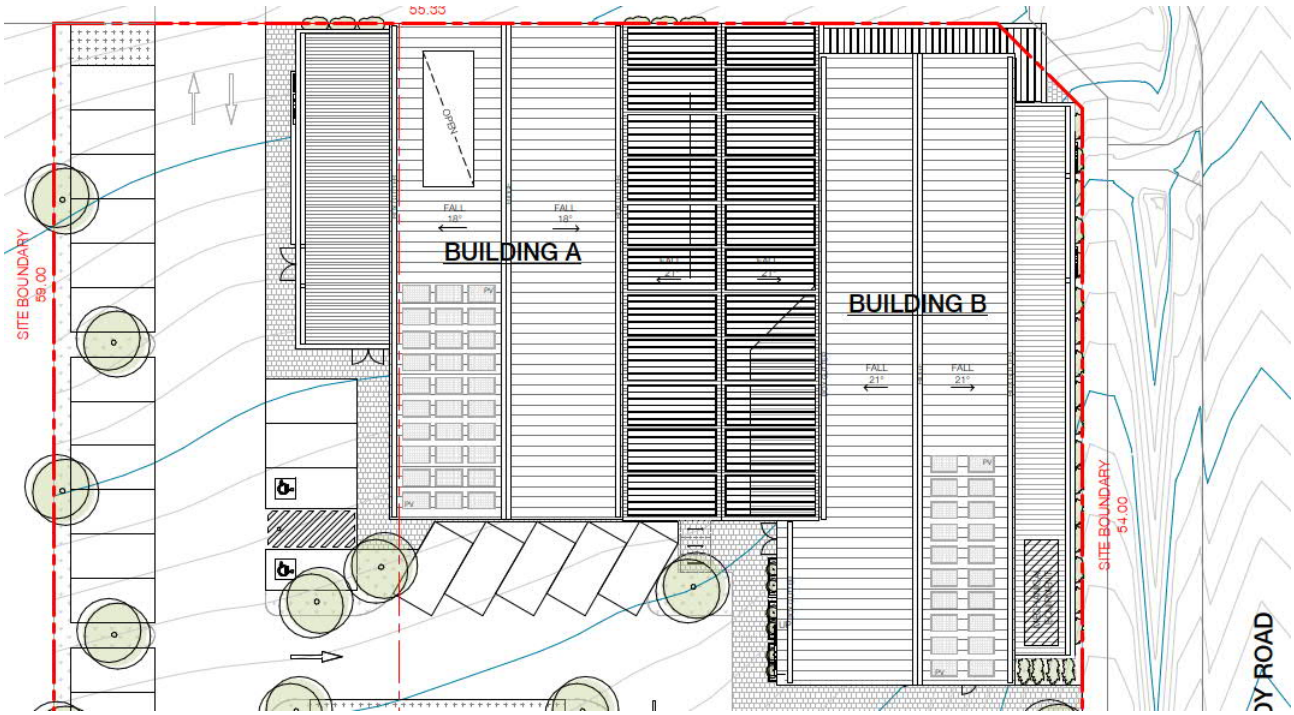


Figure 3: Indicative solar PV location

2.2 Water Sensitive Urban Design/ Integrated Water Management

Water will be used efficiently throughout the development through efficient fixtures and fittings, and collection and use of rainwater which helps to reduce mains water requirements and diverts stormwater.

Design Requirements	Responsibility & Implementation	Project Stage
Water Fixtures and Fittings		
Efficient water fittings and fixtures will be installed to reduce the volume of mains water used. The following Water Efficiency Labelling Scheme (WELS) star ratings will be specified: • Kitchen and Bathroom taps: 5 Star; • Urinals: 6 Star; • Toilets: 4 Star; and • Showers: 4 Star (<7.5L/min).	Architect / Services Consultant	Design Development
Rainwater Collection and Reuse		
A total effective roof catchment area of 700m² will harvest stormwater into rainwater tank(s) with an effective storage capacity of 10,000L. Collected water will be used for toilet flushing and made available for irrigation. The total carpark and footpath catchment area of 1,750m² will harvest stormwater into a minimum 35m² of raingarden(s). Please refer to Appendix 1 for the detailed STORM assessment results.	Civil / Hydraulic Engineer	Design Development
Water Efficient Landscaping		
Landscaping in planter boxes will be drought tolerant and will include mulch and soil wetting agents to reduce the potable water which will be required to water these garden areas in future. Alternatively, this portion of landscaping will be designed in accordance with xeriscape principles, emphasizing drought tolerance and grouping plants with similar water demand characteristics together. If required, a sub-surface drip irrigation system with moisture sensor override will be specified, however it is a requirement that some landscaped areas be designed so as not to require any watering after an initial establishment period.	Developer	Construction Documentation

Figure 4: Examples of drought tolerant landscaping that could be incorporated into the development design

Design Requirements	Responsibility & Implementation	Project Stage
Waterless HVAC System		
Air-conditioning units will use air-cooled condenser components which will help to reduce the development's overall water usage, whilst also preventing the growth of legionella bacterium which thrive in warm stagnant water.	Mechanical Engineer	Construction Documentation

2.3 Construction Materials Selection

Materials initiatives help reduce the use of virgin materials and generating waste and promote the use of materials with lower embodied energy and environmental impacts.

Design Requirements	Responsibility & Implementation	Project Stage
Asphalt		
Warm mix asphalt technology allows the production and placement of asphalt concrete at reduced temperatures when compared to conventional hot mix methods. The benefits of warm mix asphalt include lower energy use and emissions, as well as the potential for reclaimed asphalt, recycled plastic, and other recycled content within the mix. Such products include Reconophalt recycled road surfacing.	Builder / Structural Engineer	Construction Documentation
Concrete		
A minimum of 50% of the concrete mix will contain non-potable mains water (rainwater or purchased recycled water).	Builder / Structural Engineer	Construction Documentation
Steel		
Wherever possible, steel for the development will be sourced from a Responsible Steel Maker[1]. Reinforcing steel for the project will be manufactured using energy reducing processes.	Builder / Structural Engineer	Construction Documentation
Timber		
All timber used in the development will be Forest Stewardship Council (FSC) or Program for the Endorsement of Forest Certification (PEFC) certified, or recycled / reused.	Architect	Construction Documentation
Cables, pipes, floors and blinds		
All standard uses of cables, pipes, flooring and blinds within the development will either not contain any PVC or will be sourced from a manufacturer/supplier that adheres to the Green Building Council of Australia's *Best Practice Guidelines for PVC in the Built Environment*.	Services Consultant	Construction Documentation
Product Transparency and Sustainability		
The project will preference the selection of products that meet transparency and sustainability requirements under one of the following initiatives: • Reused products; • Recycled content products; • Environmental Product Declarations; • Third-Party Certification; or • Stewardship Programs. Examples of opportunities under these initiatives are: • Re-used formwork	Builder/ Architect/ ESD Consultant	Construction Documentation

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

Design Requirements	Responsibility & Implementation	Project Stage
• Reinforcing rod, bar, mesh and wire from InfraBuild • Steel – Welded Beams and Columns from Bluescope • Colorbond steel from Bluescope • Hot Rolled structural steel products from InfraBuild • Structural Steel products from Hyundai Steel • Many Laminex products • InterfaceFlor and Onterra (and other) Carpets • Marmoleum flooring All flooring will be selected from products/materials certified under any of the following: • Carpet Institute of Australia Limited, Environmental Certification Scheme (ECS) v1.2; • Ecospecifier GreenTag GreenRate V3.2; and/or • Good Environmental Choice (GECA). • The Institute for Market Transformation to Sustainability (MTS) Sustainable Materials Rating Technology Standard Version 4.0 – SMaRT 4.0. Alternatively, floor coverings must be durable, include some eco-preferred content, be modular and/or come from a manufacturer with a product stewardship program and ISO 14001certification.		

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

2.4 Indoor Environment Quality

Indoor Environment Quality (IEQ) will be improved through various initiatives which help to create a healthy indoor environment free from toxins with ample supply of daylight and outside air.

Design Requirements	Responsibility & Implementation	Project Stage
Daylight Access		
Access to natural daylight is extremely important for all occupants and will provide an essential connection with nature and improve occupants' health and well-being. Daylight penetration through windows/openings will be enhanced with the use of light internal colours, allowing for a better internal reflection of daylight.	Architect	Construction Documentation
Acoustic Comfort		
Acoustic comfort will be achieved ensuring good acoustic separation between spaces Air-conditioning units will be placed away from windows where possible.	Acoustic/ Mechanical Engineer	Construction Documentation
Ventilation		
The HVAC system of the will provide outside air at a rate that exceeds the minimum required rate per person outlined in AS 1668.2:2012, by a minimum of 50%, to provide a comfortable and healthy internal environment to the occupants throughout.	Mechanical Engineer	Design Development
Shading		
North, east, and west shading provide comfortable indoor spaces and reduce energy needed for heating and cooling. These include canopy awnings, shading battens and window shrouds on the north, and windows shrouds on the west façade.	Architect	Design Development
Volatile Organic Compounds (VOCs)		
All paints, adhesives and sealants and flooring (including carpets) will not exceed the limits outlined in Appendix 2. Alternatively, products with no VOCs will be selected.	Builder	Construction Documentation
Formaldehyde Minimisation		
All engineered wood products will have 'low' formaldehyde emissions, certified as E0 or better. Alternatively, products will be specified with no formaldehyde. Emissions limits are listed in Appendix 2.	Builder	Construction Documentation

2.5 Transport

The proposed development site has been assessed using the "Walk Score" locational performance tool. The tool was developed in 2007 by Front Seat using the Google Maps tools. This tool takes into account the number of facilities within close proximity, and public transit based on distance and type of nearby transit lines. Numerical scores of between 0 and 100 for the following 2 aspects are provided:

- Walk Score: 0 being heavily car dependent with access to community facilities that are located some distance away, and 100 reflecting a location that is easily accessible to abundant facilities by foot.
- Transit Score: 0 being the location only provides minimal transit while 100 reflecting a location that is well served by public transport.

The proposed development in Gisborne achieves a Walk score of 4 out of 100 – "Car Dependent" and a Transit Score of 0 out of 100 – "Minimal Transit", which indicate that the building occupants require a car to complete most daily errands. We note though that this demonstrates the need for a facility of this nature in the local area, to help provide a more walkable neighbourhood for those local residents.

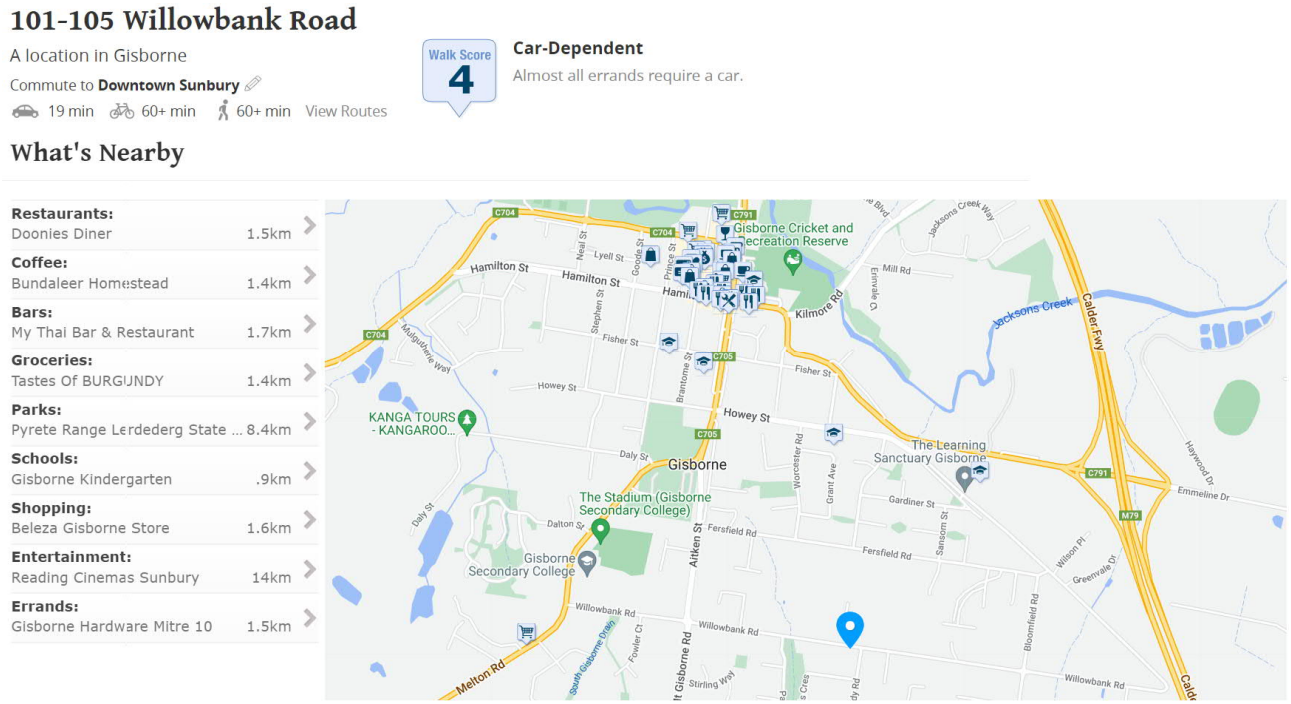


Figure 6: Walk Score results and map showing amenities surrounding 101-105 Willowbank Road, Gisborne. (Source: walkscore.com)

Design Requirements	Responsibility & Implementation	Project Stage
Bicycle Parking		
2 secure parking spaces will be provided for staff near the Brady Road carpark entry, as well as 6 visitor bike parking spaces provided at the carpark entrance to the covered walkway.	Architect	Construction Documentation
Electric Vehicle Infrastructure		
To enhance the development's ability to reduce vehicle emissions, car at least 1 parking space will be nominated for electric vehicle charging (and provided with charging infrastructure). This will encourage building users to consider purchasing electric vehicles by making their use more convenient. The design of charging infrastructure should take into consideration requirements for further expansion to more spaces as electric vehicles become more prevalent.	Services Consultant	Design Development

Design Requirements	Responsibility & Implementation	Project Stage
Public Transport		
The proposed development has direct access within 1km walking distance to the following public transport options: Bus Lines: • 473: Gisborne Station via Gisborne Centre and Fersfield Road • 474: Gisborne Railway Station	Inherent in Location	

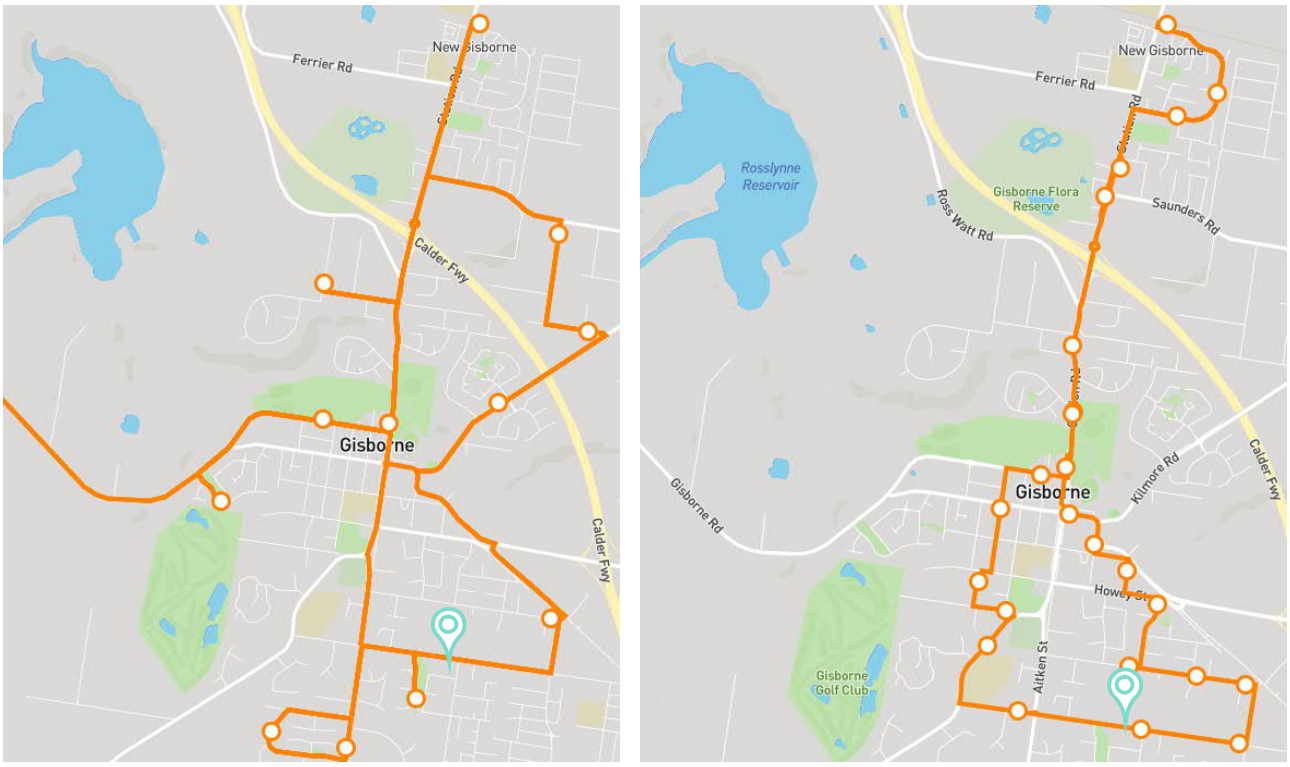


Figure 7: PTV Local Area Map indicating the public transport options surrounding the site; left: bus route 474, right: bus route 473 (site marked by the pin in aqua. Source: ptv.vic.gov.au)

2.6 Demolition and Construction Phase

Initiatives included in building and construction waste management promote adoption of environmental initiatives at different stages of the project – not just in the project design stage.

Design Requirements	Responsibility & Implementation	Project Stage
Construction Waste Management		
The builder will develop a construction waste management plan (CWMP) for the construction phase. This will include the following: • Waste generation; • Any waste systems; • Minimisation Strategy; • Performance / Reduction targets; • Bin quantity and size; • Collection frequency; • Signage; and • Monitoring and reporting including frequency and method. The CWMP will include a requirement for not less than 80% of all civil works and built form construction waste to be recycled or re-used. The CWMP will require that all hazardous substances, pollutants and contaminants must be managed and disposed of in accordance with all state regulatory requirements. Where these materials are treated, or used on site, they must be in accordance with a sanctioned remediation process. The CWMP may form part of a broader Construction Environmental Management Plan (CEMP).	Builder	Construction Documentation

2.7 Operational Waste Management

Initiatives included in building waste management promote adoption of environmental initiatives at different stages of the project – not just in the project design stage.

Design Requirements	Responsibility & Implementation	Project Stage
Operational Waste – Food & Garden Waste		
Dedicated bin spaces will be provided for general waste (landfill waste), organic & green waste, and commingled recyclables. This will assist to minimise the risk of food and garden waste, glass and commingled recyclables ending up in landfill.	Architect/ Building Owner	Design Development/ Post Occupancy
Operational Waste – Convenience of Recycling		
Recycling facilities will be adjacent general waste, but bin colouring and signage will ensure distinction between different waste streams. The recycling facilities of the development will be just as convenient to access as the general waste facilities.	Architect/ Building Owner	Design Development/ Post Occupancy

Figure 8: Examples of waste management bins incorporated in businesses

2.8 Urban Ecology

Design Requirements	Responsibility & Implementation	Project Stage
Communal Spaces		
The covered area provides a dedicated space for users to gather in, facilitating interaction between users, with communal seating areas to encourage social exchange.	Architect	Design Development
Vegetation		
9% of the site (326m^2) is covered with vegetation including landscape buffers, raingardens, and planter boxes across the development. It is recommended that several indigenous species be included in the landscaping of the site. This will help maintain/enhance local biodiversity and encourage native birds to visit the space.	Architect / Landscape Architect	Design Development
Refrigerant Ozone Depleting Potential		
All HVAC refrigerants used in the development will be selected to have an Ozone Depletion Potential (ODP) of zero.	Mechanical Engineer	Construction Documentation

Design Requirements	Responsibility & Implementation	Project Stage
Insulation Ozone Depleting Potential		
All thermal insulation used in the development will not contain any ozone-depleting substances and will not use any in its manufacturing.	Architect	Construction Documentation
Light Pollution		
No external luminaire on the project will have an Upward light Output Ratio (ULOR) exceeding 5%, relative to its mounted orientation. External lighting will be designed to avoid light spill off the site or into the night sky.	Architect/ Electrical Engineer	Schematic Design
Urban Heat Island Effect Reduction		
The development will adopt multiple initiatives to reduce the impacts of The Urban Heat Island Effect, including areas of landscaping and light-coloured surfaces. Such landscaping, especially canopy trees within the carpark, reduce the development's contribution to the Urban Heat Island Effect by providing cooling.	Architect	Design Development

3. Conclusion

As set out in this SMP the proposed mixed use development at 101-105 Willowbank Road, Gisborne, will meet best practice requirements through the initiatives outlined in this report including the use of energy efficient systems, rainwater tank(s) and the use of low to zero VOC content materials, as well as reduced environmental impacts during the construction stage.

The initiatives that have been included within this SMP all have a proven track record of serving their individual purpose and can be easily maintained with any failures obvious to the staff of the development. This helps to ensure the ongoing sustainability of the building, as the systems installed in the beginning are maintained for purpose throughout the life of the building.

The implementation of this SMP requires a clear process that will include:

- Full integration with architectural and building services plans and specifications;
- Endorsement of the SMP with town planning drawings; and
- SMP initiatives to be included in plans and specifications for building approval.

Appendix 1 – STORM Assessment & WSUD Report

Objectives

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

Developments in the Macedon Ranges Shire must comply with Clause 53.18 *Stormwater Management in Urban Development* and the best practice performance targets for suspended solids, total phosphorous and total nitrogen, as set out in the Urban Stormwater Best Practice Environmental Management Guidelines, Victoria Stormwater Committee 1999. Currently, these water quality performance targets require:

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

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

Site Characteristics

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

- Total site area (pink line): 3,548.7m²
- Roof to rainwater tank catchment area (purple): 700.0m²
- Remaining roof area (grey): 397.15m²
- Carpark to raingarden area (blue): 1750.0m^2
- Landscaping (green): 272.3 m^2
- Raingarden (aqua): 35m^2
- Remaining impervious surfaces (unshaded): 394.2m²

Figure 9: Site delineation

Stormwater Management Initiatives

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

Table 2: List of areas and their stormwater treatment measures

Surfaces	Topographic Area (m^2)	Required Treatment
Roof to rainwater tank catchment area	700.0m^2	Runoff from the roof catchment area of 700m^2 will be diverted to rainwater tank(s) with a total storage capacity of 10,000L. The stored water will be used for toilet flushing throughout the development and be made available for irrigation. Overflow from the tank(s) will be diverted to the Legal Point of Discharge (LPD) on site.
Remaining roof area	397.15m^2	The remaining roof area will be diverted directly to the LPD onsite.
Carpark to raingarden area	1750.0m^2	Runoff from the carpark and surrounding footpaths will be appropriately filtered through a minimum 35m^2 of raingarden(s), then diverted to the LPD.
Remaining Impervious Area	394.2m^2	All remaining impervious area runoff (including runoff from planter boxes) will be diverted directly to the LPD onsite.

Note: There has been no indication of detention requirements on this site. Compliance against the Urban Stormwater Best Practice Environmental Management Guidelines has been achieved via STORM, without detention.

Rainwater Collection and Reuse

For the purpose of water consumption calculations within the STORM tool, occupancy has been estimated based on the Green Star Potable Water Calculator.

GENERAL

Building occupancy, areas and operation

Space type description	Area (m²)	Peak days of operation (remaining days assumed off-peak)	Occupancy profile	Maximum design occupancy used in water use calculations (m²/person) (Enter manually OR use default)		Percentage of building users who occupy the space continually for periods greater than one hour.
				Proposed Building design occupancy (m2/person)	Default design occupancy (Not applicable for residential areas)	
Medical Practice	450	7 days a week	Class 5, Class 7 Class 8 or Class 9a		Office (10m2/person)	100%
Mini Mart	370	7 days a week	Class 6 shop or shopping centre	3	Please select	50%
Food & Beverage	170	7 days a week	Class 6 restaurant or cafe	1	Please select	50%
Commerical Office	300	5 days a week	Class 5, Class 7 Class 8 or Class 9a		Office (10m2/person)	100%
Mezzanine Office	80	7 days a week	Class 5, Class 7 Class 8 or Class 9a		Office (10m2/person)	100%
Non occupied areas		n/a	n/a			
TOTAL AREA	1,370					

1. SANITATION

Water demand from sanitation fixtures and fittings (Annual water demand from fixtures and fittings is calculated using assumed usage rates based on the space types and occupancies entered above. See pages 10-

TOILETS

Description	Water efficiency (Enter manually OR nominate WELS Star Rating)		Water efficiency used in calculations (L/flush)	Percentage of each type	Proposed Building water demand (kL/year)	Standard Practice Building water demand (kL/year)
	Manufacturer's data (L/flush)	WELS Star Rating selection				
Toilets		4 Star	3.5	100%		
			Total	100%	338	387

URINALS

Description	Water efficiency (Enter manually OR nominate WELS Star Rating)		Water efficiency used in calculations (L/min)	Percentage of each type	Proposed Building water demand (kL/year)	Standard Practice Building water demand (kL/year)
	Manufacturer's data (L/min)	WELS Star Rating selection				
Urinals		6 Star	1.0	100%		
			Total	100%	74	149

Figure 10: Occupancy based on demand calculation

The Potable Water Calculator assumes toilet flushing water demand based on the projected occupancy of the building. The calculated toilet demand was 413kL/year, equivalent to 1131.5L/day (assuming a 7-day working week). Assuming each person has a demand of 20L/day (as per STORM methodology), this equates to a conservative 50 occupants in total.

STORM Results

The recommended treatments have been applied to the STORM tool and as a result, the proposed development has achieved score of 101%. With the proposed stormwater treatment measures incorporated into the development, the design will meet the minimum performance standards required by BESS.

Melbourne Water **STORM Rating Report**

TransactionID:	1396417	
Municipality:	MACEDON RANGES	
Rainfall Station:	MACEDON RANGES	
Address:	101-105 Willowbank Road	
	Gisborne	
	VIC	3437
Assessor:	SDC	
Development Type:	Commercial/Retail	
Allotment Site (m2):	3,548.70	
STORM Rating %:	101	

Description	Impervious Area (m2)	Treatment Type	Treatment Area/Volume (m2 or L)	Occupants / Number Of Bedrooms	Treatment %	Tank Water Supply Reliability (%)
Roof to Tank	700.00	Rainwater Tank	10,000.00	50	145.80	72.00
Remaining Roof	397.15	None	0.00	0	0.00	0.00
Carpark to Raingarden	1,750.00	Raingarden 100mm	35.00	0	128.10	0.00
Remaining Impervious Areas	394.23	None	0.00	0	0.00	0.00

Figure 11: Stormwater calculator result

Stormwater Runoff from Roof Catchment Areas

Treatment – Rainwater Tanks

Rainwater tanks are considered one of the most practical and effective mechanisms to reduce the quantity and velocity of stormwater leaving a site. Rainwater tanks will capture the stormwater that runs off the roof surfaces and store it for toilet flushing re-use throughout the redevelopment site, effectively reducing the actual volume of water leaving the site. Instead of rainwater being considered as waste and a burden on the infrastructure, it is seen as a resource which has the double benefit of reducing demand on potable water supplies and as a stormwater mitigation initiative.

Treatment – Raingardens

Raingardens are low-maintenance stormwater filtration measures employed to reduce the concentration of pollutants within stormwater leaving a property. Stormwater is captured when running off hard surfaces, in this case the trafficable terrace areas, and subsequently flows through adjacent raingardens encountering various filtration media and appropriate plants[2].

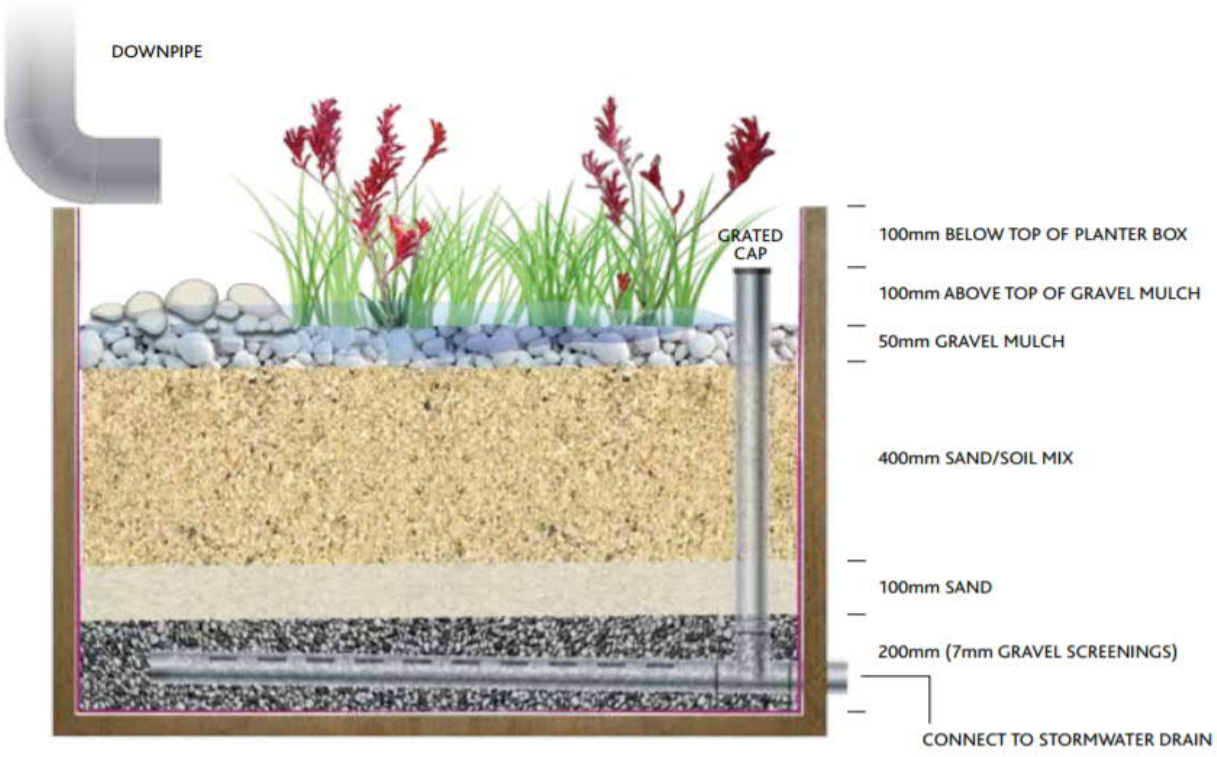


Figure 12: Example cross-sectional view of proposed planter box raingardens (Source: Melbourne Water[2])

Raingarden Design

Planter box raingardens are designed to filter runoff from adjacent areas, as shown in the figure above. The terrace areas are to be designed to drain the runoff directly into the raingarden. Note that raingardens are to be designed with no more than 50m^2 impervious area draining to each 1m^2 of raingarden filter area.

The following steps are to be taken when constructing the raingardens:

- Excavate with a gentle incline toward the stormwater outlet.
- Line raingarden base and sides with a PVC liner, sealing joins with PVC tape.

[2] Please refer to "Planter box raingarden instruction sheet" and ''Inground raingarden instruction sheet" from "How do I build a raingarden" section of Melbourne Water website https://www.melbournewater.com.au/water-data-and-education/environment-and-sustainability/why-we-need-save-water/tips-saving-water-0 accessed 30 September 2021. It is noted that the cross-sectional composition of the proposed raingardens will resemble Figure 12.

- Add 7mm screenings (gravel, which must be free from excess dirt) up to a depth of 50mm.
- Place a 90mm diameter slotted drainage pipe along the centre of the raingarden, capped at one end.
- Connect a 90mm diameter vertical overflow pipe to the slotted drainage pipe, ensuring that the top of the overflow pipe sits 100mm above gravel mulch and 100mm below surrounding ground level.
- Cap the overflow pipe temporarily to prevent soil/filter media from entering during construction.
- Prepare and install a frame for the raingardens, with the top edge level with surrounding ground level. Note that the frame is required to sit higher than the overflow pipe. The PVC liner is to be placed between the frame and surrounding ground.
- Add an additional 150mm depth of 7mm screenings (gravel), covering the drainage pipe.
- Place 100mm of white-washed sand over the gravel layer, pressed firmly.
- Add 400mm depth of a mixture of 4 parts white-washed sand and 1 part topsoil, over the sand layer, pressed firmly.
- Direct pipework into the raingardens.
- Select suitable plant species. 50% of the raingarden is to be planted with plants which are effective pollutant removers, such as:
    - *Carex appressa*
    - *Lomandra longifolia*
    - *Juncus flavidus*
    - *Melaleuca ericifolia*
    - *Goodenia ovata*

  The other 50% of raingarden area is to be planted with species which survive well in a dry environment with intermittent wet periods. Suitable native species include:
    - *Anigozanthus sp.*
    - *Calocephalus lacteus*
    - *Dianella sp.*
    - *Lomandra sp.*
    - *Pattersonia occidentalis*
    - *Wahlenbergia communis*

  Ensure to plant densely, minimum 6 plants per m^2.
- Following planting, cover with 50mm gravel mulch around the plants. Where pipes enter each raingarden, place some large flat rocks to help spread the incoming water. Note that timber mulch is to be avoided, as it is liable to causing blockages.
- Finally, remove the temporary end cap on the overflow pipe and replace with a 90mm PVC finishing collar with domed pipe grate.

Melbourne Water provides detailed advice on how to build a raingarden, which should be referenced by the landscaping contractor during construction:

https://www.melbournewater.com.au/water-data-and-education/environmental-issues/why-we-need-save-water/tips-saving-water/raingardens

Management and Maintenance Guidelines

Inspections and maintenance of the proposed stormwater treatment systems should occur regularly to ensure their ongoing performance. It is the responsibility of the facility management team to ensure the appropriate measures are undertaken for the rainwater tank maintenance. Some general maintenance requirements are provided in the table below. However, any specific maintenance requirements nominated by the product's manufacturer may also apply and would supersede those outlined below. The proposed system will be nominated at the detailed design stage.

Rainwater Tank

Task	When?	Requirement
Inspect rainwater tanks	Every 6 months	• Check for any damage/compression • Check any blockage of first flush diverter • Correct operation of potable mains back up switch • Check that mesh covers have not deteriorated and intact. • Check that supporting base is free of cracks and movement. • Mosquito infestation
	Every 3-5 years	• Sludge Build up – if sludge build up occurs a vacuum tank needs to be called out to site
Inspect pumps	Every 2 years	• Serviced to prolong the pump life
Inspect roofs & gutters	Every 6 months	• Clean out of leaves / debris • Remove any overhanging branches onsite

Raingardens

The standard maintenance activities that typically take place as part of an ongoing maintenance schedule for the raingardens are as follows:

Raingarden system element	Frequency	Maintenance Task
Plants	As required	• Replace plants when necessary • Remove weeds as required
Gravel mulch	As required	• Repair erosion by rearranging gravel/rocks after initial heavy rain events if required
Downpipe	As required	• Remove any sediment/build-up from the downpipe if blocked
Roof and gutters	Every 6 months	• Clean out of leaves/debris

Disposal of Waste Materials

The accumulated pollutants found in the stormwater treatment systems must be handled and disposed of in a manner that is in accordance with all applicable waste disposal regulations. When scheduling maintenance, consideration must be made for the disposal of solid and liquid wastes.

Stormwater Runoff Treatment during the Construction Stage

Treatment – Various

Stormwater management in the construction stage will include measures which will be put in place to minimise the likelihood of contaminating stormwater discharge from the site as well as reduce the velocity of the flows generated from the building as it is being constructed. This will mean ensuring buffer strips are in place, and the site will be kept clean from any loose rubbish. More information is available from "*Keeping Our Stormwater Clean – A Builder's Guide*" by Melbourne Water[3]. The diagram below is an illustration of the various objectives which assist in minimising the impacts of stormwater runoff typical during the construction phase. Typical pollutants that are generated from a construction site during a rainfall event include:

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

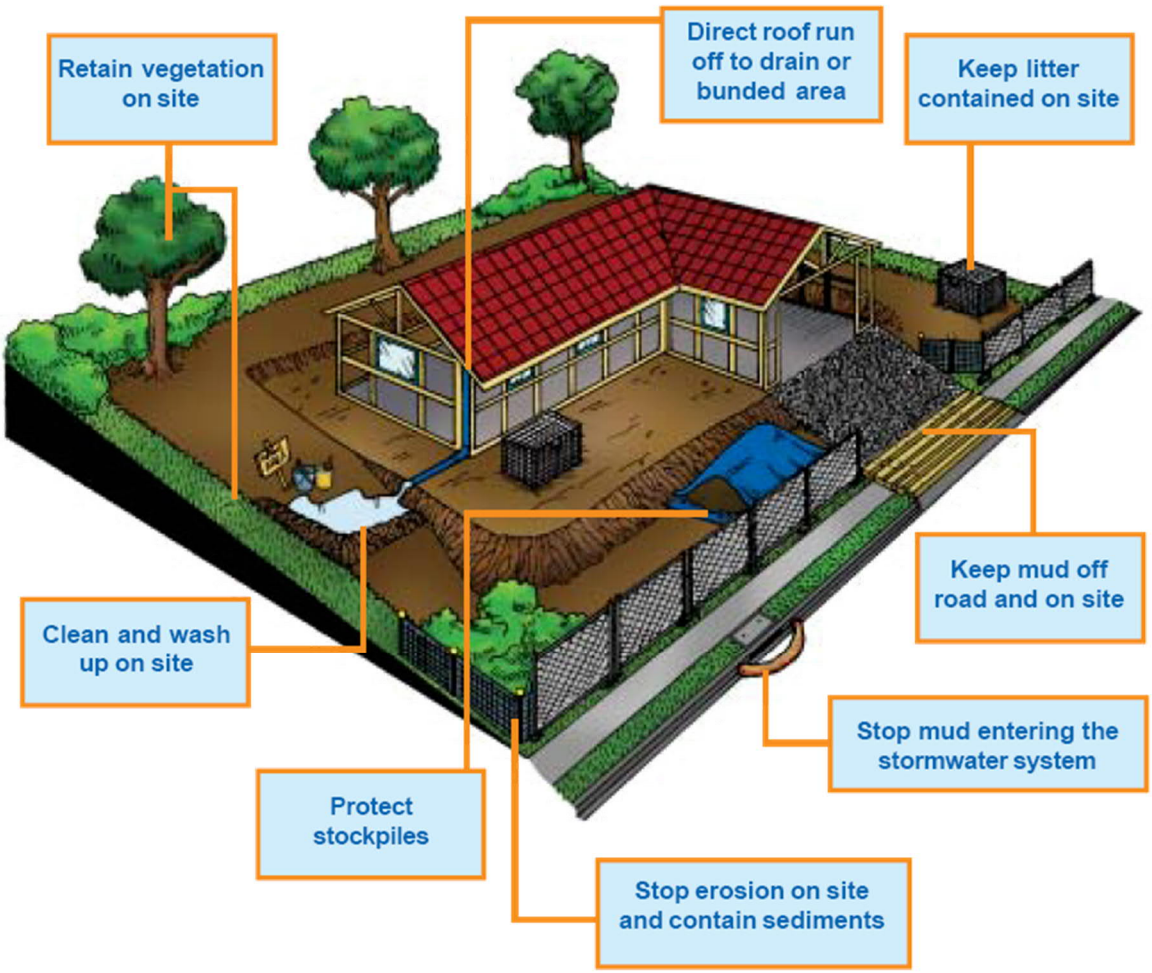
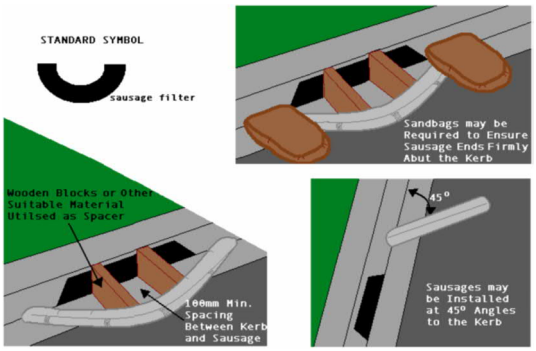


Figure 13: Stormwater will be effectively managed during construction phase according to the requirements listed in "Keeping Our Stormwater Clean – A Builder's Guide

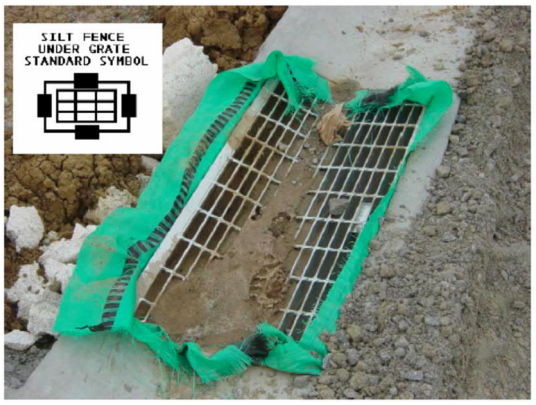
[3] For copies please contact Melbourne Water on 131 722.

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

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



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



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

Appendix 2 – Green Star VOC and Formaldehyde Limits

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

Product Type/Sub Category	Max TVOC Content (g/L of ready-to-use-product)
Paints, Adhesives and Sealants	
General purpose adhesives and sealants	50
Interior wall and ceiling paint, all sheen levels	16
Trim, varnishes and wood stains	75
Primers, sealers and prep coats	65
One and two pack performance coatings for floors	140
Acoustic sealants, architectural sealant, waterproofing membranes and sealant, fire retardant sealants and adhesives	250
Structural glazing adhesive, wood flooring and laminate adhesives and sealants	100
Carpets	
Total VOC limit	0.5 mg/m² per hour
4-PC (4-Phenylcyclohexene)	0.05mg/m² per hour
ISO 16000 / EN 13419 - TVOC at three days	0.5 mg/m² per hour
ISO 10580 / ISO/TC 219 (Document N238) - TVOC at 24 hours	0.5 mg/m² per hour

Table 4: Maximum Formaldehyde levels for processed wood products. (Source: Green Building Council Australia – Green Star Design and As Built v1.3 2019 Manual)

Formaldehyde emission limit values for different testing methods	
Test Method	**Emission Limit/ Unit of Measurement**
AS/NZS 2269:2004, testing procedure AS/NZS 2098.11:2005 method 10 for Plywood	≤1mg/ L
AS/NZS 1859.1:2004 - Particle Board, with use of testing procedure AS/NZS 4266.16:2004 method 16	≤1.5 mg/L
AS/NZS 1859.2:2004 - MDF, with use of testing procedure AS/NZS 4266.16:2004 method 16	≤1mg/ L
AS/NZS 4357.4 - Laminated Veneer Lumber (LVL)	≤1mg/ L
Japanese Agricultural Standard MAFF Notification No.701 Appendix Clause 3 (11) - LVL	≤1mg/ L
JIS A 5908:2003- Particle Board and Plywood, with use of testing procedure JIS A 1460	≤1mg/ L
JIS A 5905:2003 - MDF, with use of testing procedure JIS A 1460	≤1mg/ L
JIS A1901 (not applicable to Plywood, applicable to high pressure laminates and compact laminates)	≤0.1 mg/m²hr
ASTM D5116 (applicable to high pressure laminates and compact laminates)	≤0.1 mg/m²hr
ISO 16000 part 9, 10 and 11 (also known as EN 13419), applicable to high pressure laminates and compact laminates	≤0.1 mg/m²hr (at 3 days)
ASTM D6007	≤0.12mg/m³
ASTM E1333	≤0.12mg/m³
EN 717-1 (also known as DIN EN 717-1)	≤0.12mg/m³
EN 717-2 (also known as DIN EN 717-2)	≤3.5mg/m²hr