Sustainability Management Plan

Report No: 2020-2159-SMP

Date: 23rd December 2020

Address: 15 King Street, Dandenong

Pages: 67

Your EcoResults Consultant: Kirstie Rogerson

Questions?

We have answers.

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Project Details

Project Info	
Property Address	15 King Street, Dandenong
Project Description	Residential development consisting of 15 apartments
Council	City of Greater Dandenong
Site Area	699m^2
Client	David Natale
Contact	David Natale

Tracking	Date	Revision	Description
	6th October 2020	-	Draft report issue
	23rd December 2020	1	Final report issued

Purpose & Scope of Report

EcoResults has been engaged as ESD consultants for the proposed development to ensure that the development adequately responds to the City of Greater Dandenong Planning Scheme Local Policy Clause 22.06 (ESD) and Clause 55.07-1 (Energy efficiency) and 55.07-5 (Integrated water and stormwater management) of the Better Apartment Design Standards (BADS)

- The purpose of this report is to detail how the proposed design and operation of the building, as detailed in the planning drawings and our comments and recommendations listed in this herein, satisfies both clauses.
- EcoResults has consulted extensively with the designer, planning consultant and other relevant sub-consultants on how best to incorporate sustainability principles in the proposed design, and to comply with the current benchmarks required.
- The BESS, STORM and HERO NatHERS assessment tools have been used as benchmark assessment tools. The proposed development meets the benchmarks set out by BESS.
- This report should be attached to and read in conjunction with the town planning drawings as well as the BESS printouts in the appendix.
- An in-depth list of all ESD commitments for this project is located on page 11 and 12 of this report

City of Greater Dandenong ESD Policy

Clause 22.06-1 | Policy Basis

Greater Dandenong City Council is committed to creating an environmentally sustainable city. Critical to achieving this commitment is for development to incorporate appropriate environmentally sustainable design standards. This policy aims to integrate environmentally sustainable principles into land-use planning, new developments and redevelopment of existing infrastructure.

This policy provides a framework for early consideration of environmental sustainability at the building design stage in order to achieve the following efficiencies and benefits:

- Easier compliance with building requirements through passive design;
- Reduction of costs over the life of the building;
- Improved affordability over the longer term through reduced running costs;
- Improved amenity and liveability;
- More environmentally sustainable urban form; and
- Integrated water management.

If environmentally sustainable design is not considered at the time of planning approval, the ability to achieve environmentally sustainable development may be compromised by the time these matters are considered as part of a building approval. In addition, there may be difficulties or extra costs associated with retrofitting the development to implement environmentally sustainable design principles.

This policy does not prescribe performance outcomes. The policy enables the provision of information and provides decision guidelines, which will assist in the assessment of whether development meets environmentally sustainable development objectives.

This policy complements a range of non-statutory measures aimed at encouraging environmentally sustainable development. These measures include educating residents and applicants, assisting applicants to use Environmentally Sustainable Development (ESD) tools, leading by example with Council projects, promotion of exemplary private projects and promotion of use of materials with favourable life cycle impacts.

Clause 22.06-2 | Objectives

The overarching objective is that development should achieve best practice in environmentally sustainable development from the design stage through to construction and operation.

In the context of this policy best practice is defined as a combination of commercially proven techniques, methodologies and systems, appropriate to the scale of development and site-specific opportunities and constraints, which are demonstrated and locally available and have already led to optimum ESD outcomes. Best practice in the built environment encompasses the full life of the build.

It is a policy to encourage innovative technology, design and processes in all development, which positively influence the sustainability of buildings. The following objectives should be satisfied where applicable:

Energy Performance

- To improve the efficient use of energy, by ensuring development demonstrates design potential for ESD initiatives at the planning stage
- To reduce total operating greenhouse gas emissions
- To reduce energy peak demand through particular design measures (eg. Appropriate building orientation, shading to glazed surfaces, optimise glazing to exposed surfaces, space allocation for solar panels and external heating and cooling systems)

Water Resources

- 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. greywater)

Indoor Environment Quality

- 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

Stormwater Management

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

Transport

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

Waste management

- To promote waste avoidance, reuse and recycling during the design, construction and operation stages of development
- To ensure durability and long-term reusability of building materials

Urban Ecology

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

Clause 22.06-3 & 22.06-4 | Policy and Application Requirements

It is policy to ensure innovative technology, design and processes positively influence the sustainability of all development.

It is policy that applications for the types of development listed in Table 1 be accompanied by information, which demonstrates how relevant policy objectives, will be achieved:

Table 1 requires a SMP for a development of 10 or more dwellings

A Sustainability Management Plan should:

- Provide a detailed assessment of the development. It may use relevant tools from the examples listed in the table or an alternative assessment approach to the satisfaction of the responsible authority; and
- Identify achievable environmentally performance outcomes having regard to the objectives of this policy (as appropriate) and
- Demonstrate that the building hade the design potential to achieve the relevant performance outcomes, having regard to the site's opportunities and constraints and
- Document the means by which the performance outcomes can be achieved.

Various assessment tools have been listed in Table 1, which may be used to assess how the proposed development addresses the objectives of this policy, as appropriate.

Example tool listed includes BESS, which have been used in preparing this SMP

Clause 22.06-5 | Decision guidelines

In determining an application, the responsible authority will consider as appropriate:

- The extent to which the development meets the objectives and requirements of this policy from the design stage through to construction and operation
- Whether the proposed environmentally sustainable development performance standards are functional and effective to minimise environmental impact
- Whether the proposed environmentally sustainable development initiatives are reasonable having regard to the type and scale of the development and any site constraints
- Whether an appropriate assessment method has been used
- Whether an ESD plan or framework has previously been approved by the responsible authority (whether under a planning control or otherwise)

Clause 55.07 | Better Apartment Design Standards

The Better Apartment Design Standards (BADS) were introduced into Clauses 55.07 of the Victorian Planning Provisions in 2017 to improve apartment design in Victoria. The following objectives of BADS were assessed as part of this SDA, please note the relevant section of the report for details:

55.07-1 | Energy efficiency Objectives (Standard B35)

55.07-5 | Integrated Water & Stormwater Management (Standard B39)

55.07-1 | Energy efficiency objectives

Under Clause 55.07-1, the following objectives apply:

- To achieve and protect energy efficient dwellings and buildings.
- To ensure the orientation and layout of development reduce fossil fuel energy use and make appropriate use of daylight and solar energy.
- To ensure dwellings achieve adequate thermal efficiency.

Standard B35

Buildings should be:

- Oriented to make appropriate use of solar energy.
- Sited and designed to ensure that the energy efficiency of existing dwellings on adjoining lots is not unreasonably reduced.
- Living areas and private open space should be located on the north side of the development, if practicable.
- Developments should be designed so that solar access to north-facing windows is optimised.
- Dwellings located in a climate zone identified Table B4 in should not exceed the maximum NatHERS annual cooling load specified in this clause.

All sample dwellings rated are below the maximum cooling load in Table B4 of 21 MJ/m2

55.07-5 | Integrated Water & Stormwater Management

Under Clause 55.07-5, Standard B39 applies, which includes the following requirements:

- Buildings should be designed to collect rainwater for non-drinking purposes such as flushing toilets, laundry appliances and garden use
- Buildings should be connected to a non-potable dual pipe reticulated water supply, where available from the water authority.

The stormwater management system should be:

- Designed to meet the current best practice performance objectives for stormwater quality as contained in the Urban Stormwater – Best Practice Environmental Management Guidelines (USBPEG) (Victorian Stormwater Committee 1999) as amended

A STORM assessment has been conducted, which includes proposed rainwater capture and reuse in order to comply with Melbourne Water's STORM assessment tool benchmarks

- Designed to maximise infiltration of stormwater, water and drainage of residual flows into permeable surfaces, tree pits and treatment areas.

A STORM score of 100% means that the proposal meets the Best Practice standard. Refer to ESD schedule below for detailed specific requirements for compliance with STORM

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ESD Schedule of Commitments

All ESD measures listed below are commitments and should be shown / noted on plans

Building Fabric	▪ Minimum 6.5-star average NatHERS rating for the dwellings will be achieved, with no dwelling achieving less than 5 Stars ○ Based on preliminary NatHERS modelling of 10 of the 15 dwellings undertaken a BESS weighed average of 7 stars has been achieved ○ Refer to preliminary energy rating results below for more information ▪ No apartment will exceed the annual cooling load requirement of 21MJ per m^2 as per Clause 55.07-1 (Energy efficiency objectives), Standard B35 of BADS
Lighting	▪ LED downlights and other high efficiency light fittings to be used throughout ▪ External lighting will be controlled by a motion detector ▪ The maximum illumination power density (W/m2) in at least 90% of the relevant Building Class will be at least 20% lower than required by Table J6.2a of the NCC Volume 1 for the apartments
Appliances	▪ 3 star reverse cycle electric heating and cooling systems ▪ 6 star central gas storage solar boosted hot water system ▪ 4 star WELS rated dishwashers
Water	▪ 5 star WELS rated basin taps in kitchens and bathrooms ▪ 4 star WELS rated toilets connected to rainwater tanks for flushing ▪ 3 star WELS rated shower heads (flow between 6.0 and 7.5 L/min) ▪ Water efficient landscaping will be provided ▪ Refer to WSUD Commitments below
WSUD	▪ Toilets connected to 6,000L rainwater tank(s) ○ Tank(s) and any associated filtration to be specified by civil/services engineer so as to be appropriate for the intended usage of harvested water ○ Selected fittings and appliances to be suitable for the RWT/filtration system specified ▪ See detailed WSUD measures required to achieve the STORM score below
Shading	▪ As shown on plans dated 26/10/2020, assessed by EcoResults ▪ The north facing glazing to the ground and level one dwellings feature balcony overhangs. The remaining north facing glazing will feature a 600mm eave

IEQ	▪ BESS built in calculations have been used to assess the living areas and bedrooms for the development
	  ○ 100% of the living areas have been calculated to achieve a daylight factor of greater than 1%
	  ○ 100% of the bedrooms have been calculated to achieve a daylight factor greater than 0.5%
	▪ All bedrooms will have an external window
	▪ 93% of dwellings are effectively naturally ventilated

Transport	▪ 5 secure bike parking spaces for the resident's use, located within the basement
Waste	▪ Recycling facilities are adjacent to general waste and are therefore as convenient as facilities for waste to landfill ○ Refer to Waste Management Plan by EcoResults (2020-2159-WMP)
Construction	▪ At least 70% of demolition and construction waste will be reused or recycled
Management	▪ Utility Meters to be provided for all individual dwellings ▪ Major common areas to be separately sub metered

Implementation Schedule

The ESD initiatives set out in this report will be coordinated by the Development Manager in conjunction with the listed project design team members

#	Requirement (Refer to ESD Schedule of Commitments above)	Responsibility	Stage
Coordination	Full Implementation of all ESD Commitments as per this SMP	Development Manager	All Stages
Building Fabric	NCC Reports for Building Approval	ESD Consultant (EcoResults)	Construction Documentation
	Drawings and specifications to reflect requirements of NCC Reports when completed	Architect Services Engineer	Construction Documentation
Materials	Specify materials in accordance with nominated schedule. Refer also to Building Materials section within this SMP for additional specific commitments	Architect Builder	Construction Documentation
Appliances	All appliances must be specified in line with SMP	Services Engineer Builder	Construction Documentation
Lighting	Specification of nominated energy efficiency lighting types to the relevant commitment (noting there may be a commitment over NCC requirements in the SMP). Refer to ESD Schedule of Commitments above for details	Building Services Engineer	Construction Documentation

Stormwater	Specify all WSUD treatment measures required by this SMP	Services Engineer	Construction Documentation
Waste	Specify bin and associated waste management equipment in line with Waste Management Section within this SMP and Waste Management Plan (if available)	Architect Waste Management consultant	Construction Documentation Occupation
Water	Specify water fixtures and fittings in line with SMP. Refer to ESD Schedule of Commitments within this SMP for details	Architect Services Engineer	Construction Documentation
Transport	All Transport commitments must be specified in line with SMP	Architect Builder	Construction Documentation Occupation
Construction	All endorsed ESD Commitments to be implemented including any commitment to recycle demolition/construction waste	Builder	Construction
Commissioning	Specification to include performance standards for commissioning	Services Engineer	Construction Documentation
	Commission and tune all equipment in accordance with performance standards and targets	Services Contractor Independent Commissioning Agent (if applicable)	Pre- Occupancy Post-Occupancy

Confirmation	ESD Implementation Report confirming all ESD commitments are included as built. Please contact EcoResults prior to construction to confirm process	ESD Consultant (EcoResults)	Post-Construction Pre-Occupancy
Maintenance	Maintain all ESD measures in accordance with ESD commitments	Owners Corporation Building Manager	Occupancy

10 Key Sustainable Building Categories

The objectives below explain how the design and operation addresses the 10 key sustainable building categories identified by the Municipal Association of Victoria's SDAPP (Sustainable Design Assessment in the Planning Process) program.

Objective: Indoor Environment Quality

City of Greater Dandenong Clause 22.06

- 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

Indoor Environment Quality

Indoor Environment Quality

Issue	Assessment Results and Design Response
BESS IEQ Score	BESS requires a pass score of 50% for this category. The IEQ score for the development is 82% and is contributing 14% to the overall BESS score
Natural Ventilation	All habitable rooms feature windows/doors with openability to enable good ventilation and passive cooling for the occupants
Cross Ventilation	93% of dwellings are effectively naturally ventilated. This means most habitable rooms are designed to achieve natural cross flow ventilation, which creates a breeze path to let in fresh air and flush out stale air
Thermal Comfort	▪ Double glazing will be provided for habitable/conditioned room windows which contributes to comfortable indoor spaces and reduce energy needed for heating and cooling ▪ 7 of the Living rooms are orientated to the north which provides the best opportunity for passive heating ▪ See also comments regarding the Preliminary NatHERS Assessments which model thermal comfort outcomes
Natural Daylight	▪ All habitable rooms feature direct (not borrowed) openings for natural daylight ▪ BESS built in calculations have been used to assess the living areas and bedrooms. ○ 100% of the living areas have been calculated to achieve a daylight factor of greater than 1% ○ 100% of the bedrooms have been calculated to achieve a daylight factor greater than 0.5%

Hazardous Materials & VOC	Low Volatile Organic Compounds (VOC) paints and/or adhesives to be used throughout the development
Efficient Shading	North facing glazing ▪ The north facing glazing to the ground and level one dwellings feature balcony overhangs ▪ The remaining north facing glazing will feature a 600mm Horizontal eave ▪ This shading will reduce unwanted solar heat gains during the summer months whilst allowing passive solar heat gains during the winter months East and West facing glazing ▪ The large unprotected habitable east and west facing windows on the ground floor will have an internal shading device such as louvres or blinds with an outer reflective coating to effectively reduce solar heat gains (see below for example) ▪ There is no large unprotected habitable east or west facing glazing on the upper levels  Image: Example of internal blind | Source: www.helioscreen.com.au
Acoustics	▪ Acoustic rating will apply to party walls ▪ Concrete flooring reduces noise from neighbouring dwellings
External Views	▪ The ground level apartments feature external views onto a private area with a landscaped area providing a pleasant outdoor space for the residents to enjoy ▪ The upper level's apartments feature external views onto a private balcony providing a pleasant space for residents

Objective: Energy Efficiency

City of Greater Dandenong Clause 22.06

- To improve the efficient use of energy, by ensuring development demonstrates design potential for ESD initiatives at the planning stage
- To reduce total operating greenhouse gas emissions
- To reduce energy peak demand through particular design measures (eg. Appropriate building orientation, shading to glazed surfaces, optimise glazing to exposed surfaces, space allocation for solar panels and external heating and cooling systems)

BADS Clause 55.07-1 | Energy efficiency Objectives (Standard B35)

- To achieve and protect energy efficient dwellings and buildings
- To ensure the orientation and layout of development reduce fossil fuel energy use and make appropriate use of daylight and solar energy
- To ensure dwellings achieve adequate thermal efficiency

Energy Efficiency

	Issue	Assessment Results and Design Response
Energy Efficiency	**BESS Energy Score**	BESS requires a pass score of 50% for this category. The Energy score for the development is 57% and is contributing 16% to the overall BESS score
	NCC Energy efficiency Requirements	▪ Based on preliminary NatHERS modelling of 10 dwellings undertaken, EcoResults has determined the specifications required to achieve an average of 7 stars, which is 1 star higher than the minimum required by the NCC. The lowest rating in the sample group is 5.3 stars and the highest is 8.8 stars ▪ Refer below for the results of the energy ratings conducted on these dwellings, and the specifications required to achieve the ratings ▪ Final ratings will be completed at building approval stage, once construction information has been finalised ▪ The development is committed to achieving a 6.5 Star average NatHERS rating at building approval stage, with no dwelling achieving less than 5 stars
	BADS Energy Efficiency Requirements Exceeded	▪ Under Clause 55.07-1 (Energy efficiency objectives), Standard B35 applies, which includes the requirement that all apartments should not exceed the maximum NatHERS (National House Energy Rating Scheme) annual cooling load of 21 MJ per m^2 as specified in Table B4 (Cooling Load) ▪ Preliminary NatHERS assessments show no apartments exceed a cooling load of 21 MJ per m^2 and an average annual cooling load of 14.6MJ per m^2 therefore the project complies
	Appliances/Fittings	▪ 3 star reverse cycle electric heating and cooling systems ▪ 6 star central gas storage solar boosted hot water system ▪ 4 star WELS rated dishwashers

Greenhouse Gas Emissions	Based on initial BESS calculations there is a reduction of 52% in greenhouse gas emissions in comparison with the baseline benchmark
Electricity Consumption	Based on initial BESS calculations there is an improvement of 58% in annual electricity consumption in comparison with the baseline benchmark
Gas Consumption	Natural Gas will be connected. Based on initial BESS calculations there is an improvement of 19% in annual gas consumption in comparison with the baseline benchmark
Hot Water	6 star central gas storage solar boosted hot water systems will be connected. Based on initial BESS calculations there is an improvement of 14% in annual hot water system energy use (gas and electricity) in comparison with the baseline benchmark
Lighting	▪ LED downlights and other high efficiency light fittings to be used throughout ▪ External lighting will be controlled by a motion detector ▪ The maximum illumination power density (W/m2) in at least 90% of the relevant Building Class will be at least 20% lower than required by Table J6.2a of the NCC Volume 1 for the apartments
Renewable Energy Systems	Only solar hot water system proposed at this time
Clustered Design	Many walls, floors and ceilings being shared with another conditioned area, this building can potentially be much more energy efficient than individually constructed dwellings
Energy Sub-Metering	All of the apartments will feature their own electricity and gas meters, which incentivises energy efficiency for occupants
Carpark Ventilation	Enclosed carpark will be partially naturally ventilated with fresh air supplied via grill in garage door and vented out an exhaust system within service shaft behind the lift area

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NatHERS Energy Rating Results

Energy Rating Results

Unit	Heating MJ/m^2	Cooling MJ/m^2	Total MJ/m^2	Star Rating
G01	142	12	154	5.3
G03	105	12	117	6.2
G04	68	20	88	7.1
102	91	20	111	6.4
103	26	9	35	8.8
201	135	14	149	5.4
203	25	12	37	8.7
204	69	14	82	7.3
301	82	12	95	6.9
302	50	21	70	7.6
Average	**79.3**	**14.6**	**93.8**	**7.0**

6 Star Benchmark for this climate zone (Moorabbin): 114 MJ per m² annually

BADS cooling load limits for this NatHERS Climate Zone: 21 MJ per m^2

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NatHERS Energy Rating Specifications for dwellings

Construction of energy ratings was based on the below

Roofs	Roofs	▪ Kingspan K10 (or similar) 86mm board (R3.80)
	Downlights	▪ Downlights have been modelled according to the default values under NatHERS protocol
Walls	External Walls (All types)	▪ R2.0 added insulation
	Party Walls	▪ R2.0 added insulation to each side ▪ R2.0 to single stud corridor walls
	Internal Walls	▪ R2.0 added insulation to wet areas ▪ No insulation to remaining areas
	Suspended Concrete Floors	▪ Kingspan K10 (or similar) 31mm board (R1.1)
Glazing	All Glazing	▪ All fixed and sliding glazing to have combined frame and glass values of U=4.3 and SHGC=0.53 ▪ All remaining glazing to have combined frame and glass values of U=4.3 and SHGC=0.47
	Glazing Notes	▪ Any windows may be used as long as the U-value does not exceed the values listed and the SHGC is within a 5% tolerance above or below the values listed

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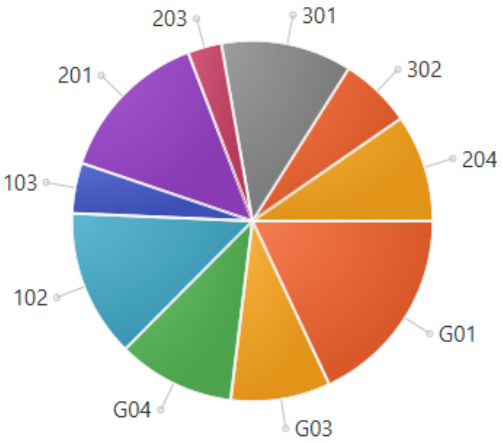
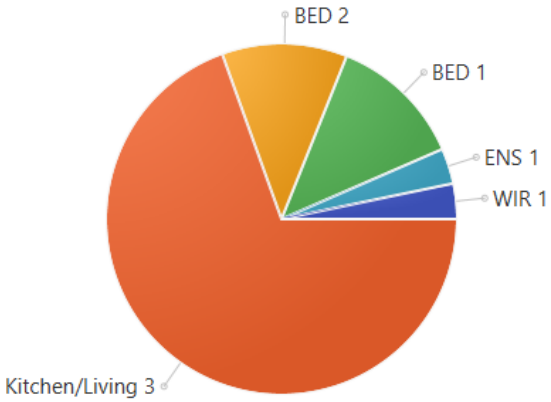
Snapshot of Preliminary Results

Average: 7.0 stars	6 stars	93.8 MJ/m²yr
Minimum: 5.3 stars	5 stars	5844 MJ/yr
Star Rating	Limit	Average Heating and Cooli...
Average: 79.2 MJ/m²yr	109 MJ/m²yr	Conditioned: 62 m²
Max: 141.8 MJ/m²yr	147 MJ/m²yr	Average Areas [c]
Heating [a]	Limit [b]	
Average: 14.5 MJ/m²yr	26 MJ/m²yr	
Max: 20.5 MJ/m²yr	37 MJ/m²yr	
Cooling [a]	Limit [b]	

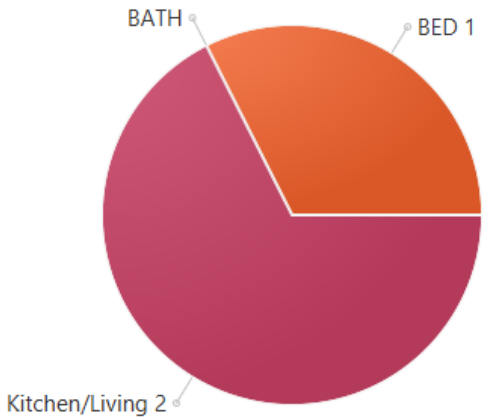
Energy Consumption (Per Dwelling)



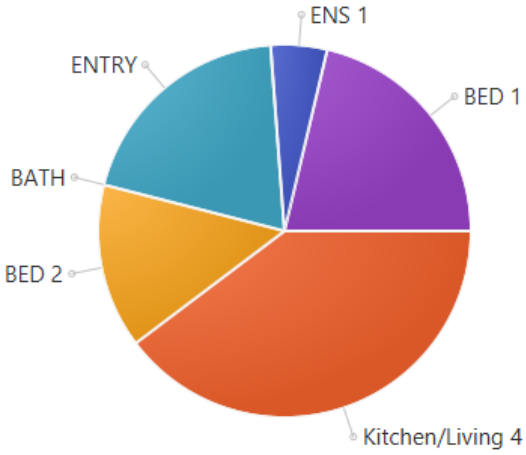
G01 Energy Consumption (by zone)



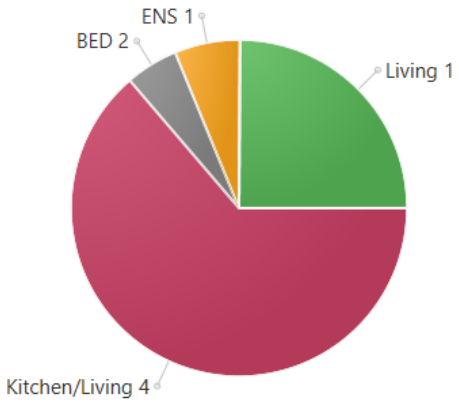
G03 Energy Consumption (by zone)



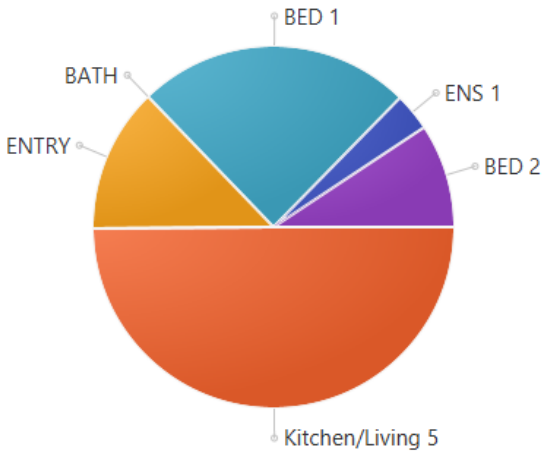
G04 Energy Consumption (by zone)



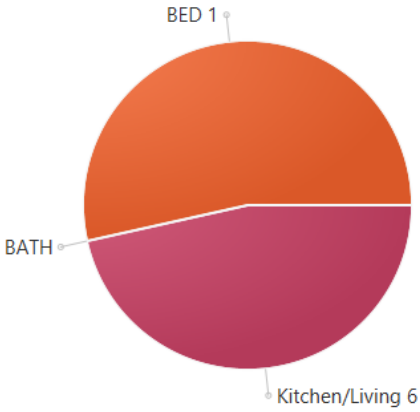
102 Energy Consumption (by zone)



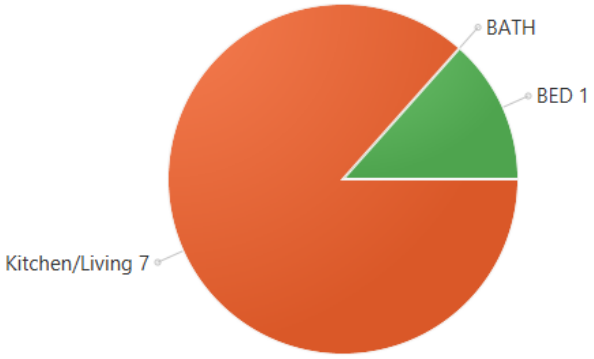
103 Energy Consumption (by zone)



201 Energy Consumption (by zone)



203 Energy Consumption (by zone)



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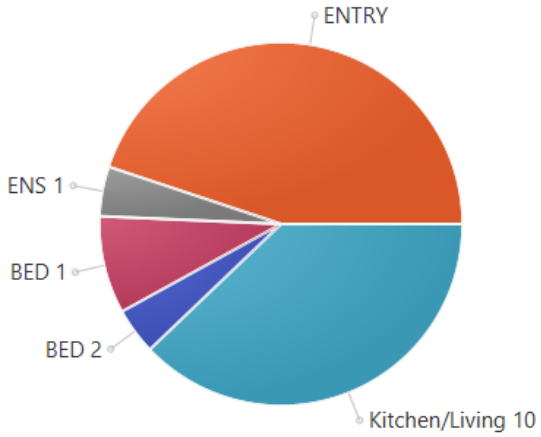
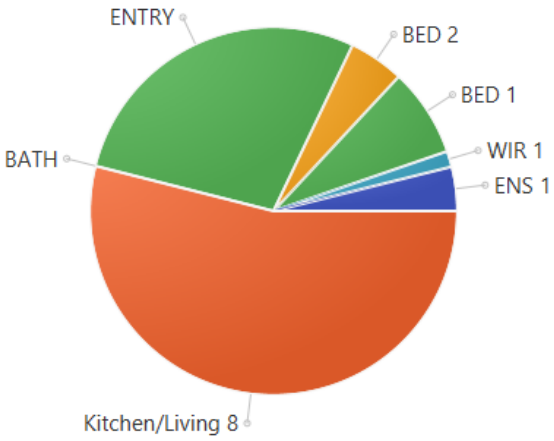


301 Energy Consumption (by zone)



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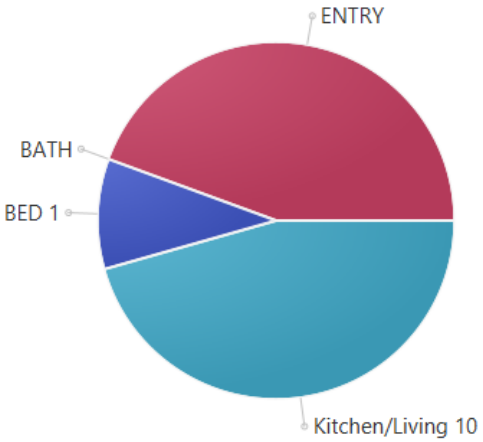


Objective: Water Resources

City of Greater Dandenong Clause 22.06

- 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 (e.g. Grey water)

Water Resources

Water Resources	Issue	Assessment Results and Design Response
	BESS Water Score	BESS requires a pass score of 50% for this category. The Water score for the development is 50% and is contributing 4% to the overall BESS score
	Potable Water Use Reduction	▪ BESS has calculated a 29% reduction in Potable Water Consumption due to efficient fixtures, appliances, rainwater and recycled water use ▪ Rainwater tank(s) with a total capacity dedicated to re-use of 6,000L will store stormwater for re-use in the flushing of all toilets and, if practicable, irrigation system
	Fixtures/Fittings and Connections	▪ 5 star WELS rated kitchen and bathroom taps ▪ 3 star WELS rated shower heads (flow between 6.0 and 7.5 L/min) ▪ 4 star WELS rated toilets will reduce mains flushing demand ▪ 4 star WELS rated dishwashers
	Water Meter	All apartments are to have individual water meters, which will have the effect of incentivising water efficiency for occupants
	Landscaping and Irrigation	▪ Water efficient landscaping will be provided and therefore no irrigation system connected to watermains will be provided ▪ EcoResults recommends that any external taps for irrigation be supplied with water from the rainwater tanks, however this is not required to achieve the BESS/STORM scores
	Building Systems Water Use Reduction	Not applicable to this development

Objective: Stormwater Management (WSUD)

BADS Clause 55.07-5 | Integrated Water & Stormwater Management (Standard B39)

- To promote the use of water sensitive urban design, including stormwater re-use
- To mitigate the detrimental effect of development on downstream waterways, by the application of best practice stormwater management through water sensitive urban design for new development
- To minimise peak stormwater flows and stormwater pollutants to improve the health of water bodies, including creeks, rivers and bays
- To reintegrate urban water into the landscape to facilitate a range of benefits including microclimate cooling, local habitat and provision of attractive spaces for community use and wellbeing

Stormwater Management (WSUD)

Srotmwater Managment

Issue	Assessment Results and Design Response
BESS Stormwater Score	BESS requires a pass score of 100% for this category. The Stormwater score for the development is 100% and is contributing 14% to the overall BESS score
STORM Rating	▪ To comply with the objectives outlined in Clause 55.07-5 Standard B39 a STORM assessment has been conducted, which includes proposed rainwater capture and reuse in order to comply with Melbourne Water's STORM assessment tool benchmarks ▪ Stormwater quality for this project is assessed as performing at 100%, meeting the current best practice design for urban pollutant loads ▪ A compliant STORM assessment meets the current best practice performance objectives for stormwater quality as contained in the Urban Stormwater Best Practice Environmental Management Guidelines (BPEM). We have noted the results and required treatment measures listed below ▪ Plans and design details to be shown on plans by designer. See below for more information and contact EcoResults with any queries on compliance.

WSUD Measures	▪ Runoff from the roof (377m^2) to be diverted to 6,000L rainwater tank(s) dedicated to reuse
	  ○ The tanks are to be connected to the toilet flushing of all toilets in the dwelling
	  ○ The tanks may be connected to other uses, e.g. outdoor taps, laundry etc, but this is not required to achieve the STORM score
	  ○ The tanks capacity may be achieved by installing several independent tanks as long as they are connected to operate in series as if they were one tank
	▪ The detailed, site specific design of WSUD measures should be undertaken by a suitably qualified person
	▪ All areas measured in STORM are in a horizontal plan and open to sky

	Maintenance for WSUD measures	**Rainwater tanks** ▪ The project's hydraulic/services engineers will be responsible for the design of the tanks and rainwater reticulation, shall inform the building facility manager and/or owners corporation in writing, of the required maintenance tasks to keep the system operational including: ▪ Regular inspections of the tank(s), pump(s), reticulation system and toilets to ensure that the system is operating for toilet flushing as designed ▪ Periodic cleaning and major maintenance of the tank(s), pump(s) and reticulation system to ensure the long term viability of the system ▪ The building facility manager and/or owners corporation shall include on their building maintenance schedule the required maintenance tasks specified by the hydraulic/services engineers at the required intervals.

STORM Rating Results

Melbourne Water

STORM Rating Report

TransactionID: 1053699
Municipality: GREATER DANDENONG
Rainfall Station: GREATER DANDENONG
Address: 15 King Street
Dandenong
VIC 3175
Assessor: Savannah McMaster
Development Type: Residential - Multiunit
Allotment Site (m2): 698.00
STORM Rating %: 100

Description	Impervious Area (m2)	Treatment Type	Treatment Area/Volume (m2 or L)	Occupants / Number Of Bedrooms	Treatment %	Tank Water Supply Reliability (%)
Roofs	377.00	Rainwater Tank	6,000.00	25	134.80	72.00
Balconies	92.00	None	0.00	0	0.00	0.00
Entrance Path	8.00	None	0.00	0	0.00	0.00
Driveway Ramp	24.00	None	0.00	0	0.00	0.00
Landscaped Areas above Basement (self-treating)	18.00	Buffer Strip	18.00	0	66.00	0.00

Objective: Building Materials

City of Greater Dandenong Clause 22.06

- To minimise the environmental impact of materials used by encouraging the use of materials with a favourable lifecycle assessment based on fate of material, recycling/reuse, embodied energy, biodiversity, human health, environmental toxicity, environmental responsibility

Building Materials

Building Materials

Issue	Design Response
Embodied Energy (EE) of Materials	The following will most likely be provided based on discussions with the architect: ▪ Concrete floors and roof ▪ Timber framing ▪ Lightweight cladding ○ Refer to material schedule on floorplans. For more details
Maintenance/ Durability	▪ Aluminium framed windows and concrete are low in maintenance and high in durability relative to the usage and life expectancy of the development, which reduces the need for replacement of materials during the lifecycle of the building
Recyclability of materials	▪ Steel and metal items including roof sheet, window frames and other steel framing materials can be melted and reused within new steel products ▪ Aluminium can be 100% recycled ▪ Gypsum plasterboard can and should be recycled ▪ Timber can either be directly reused or turned into horticultural mulch ▪ Brickwork, concrete slabs and asphalt can be crushed and used as aggregate for new concrete or road base and fill ▪ Any bricks in good enough condition to be reused may be cleaned and re-sold as garden/paving supplies ▪ Plastics can often be granulated and reused to make new plastic products
Toxicity	Low VOC paints and adhesives to be used throughout the development

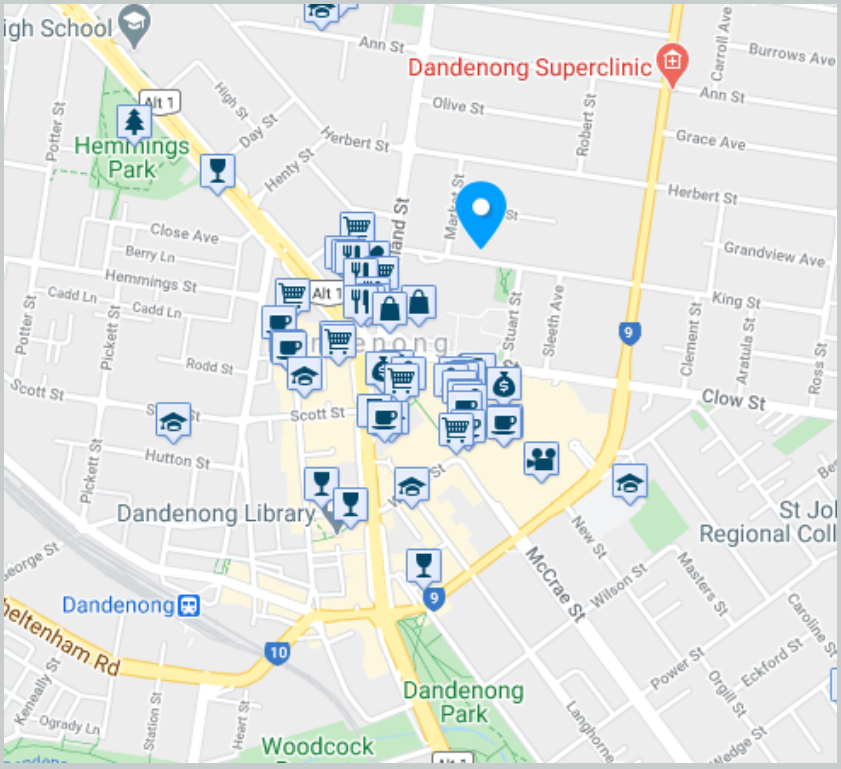
Objective: Transport

City of Greater Dandenong Clause 22.06

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

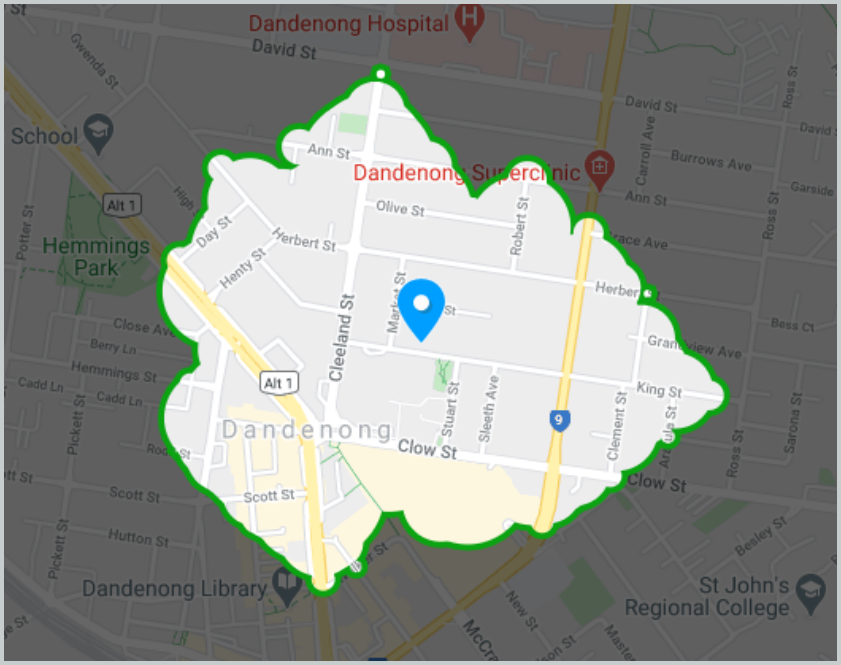
Transport/ Green Travel Plan

Transport

Issue	Assessment Results and Design Response
BESS Transport Score	The Transport score for the development is 0% and is therefore not contributing to the overall BESS score
Proximity to Amenities and other Offsite Facilities	This location is in the Dandenong neighbourhood in Melbourne. Nearby parks include John Hemmings Memorial Park, Dandenong Park and Greaves Reserve Various shopping centres including grocery stores, post offices, banks, cafes, bars, and restaurants are within 1km of the site. See map below – the site is shown as a blue pin  Source: www.walkscore.com
Improving Pedestrian Spaces	Pedestrian entry to all apartments is via a pedestrian pathway from King Street. It is professionally landscaped and illuminated to improve accessibility and create a sense of address.

Walk Score

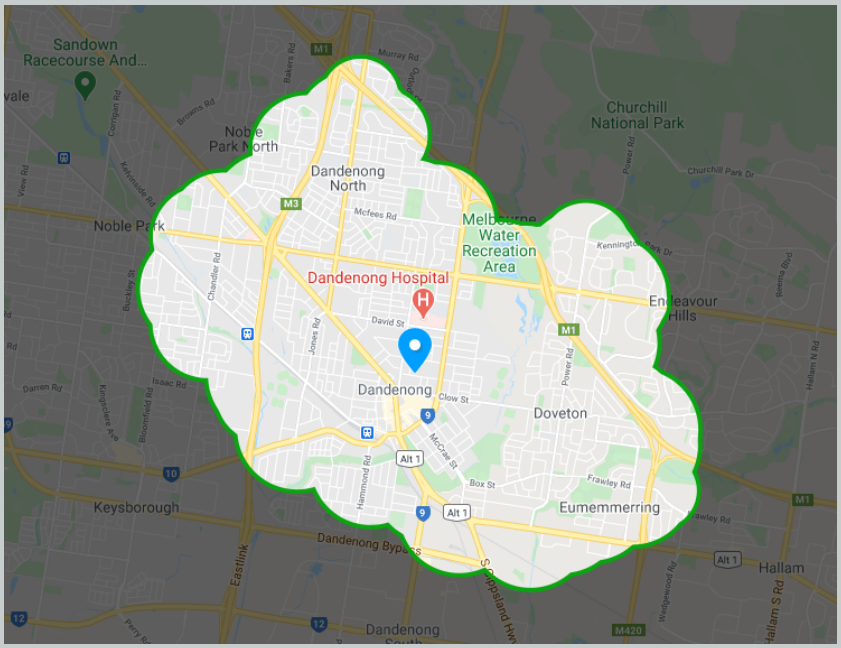
- The walk score for the development is 93 which is classified as Walker's Paradise, meaning that daily errands do not require a car
- The map below shows how far you can walk from the site in 10 minutes



Source: www.walkscore.com

Providing Convenient & Secure Bike Storage

- The development is providing 5 bike parking spaces for the residents within the basement carpark. These spaces are aimed at encouraging the use of alternative transport, thus reducing traffic congestion and pollution
- The map below shows how far you can ride a bike from the site in 20 minutes



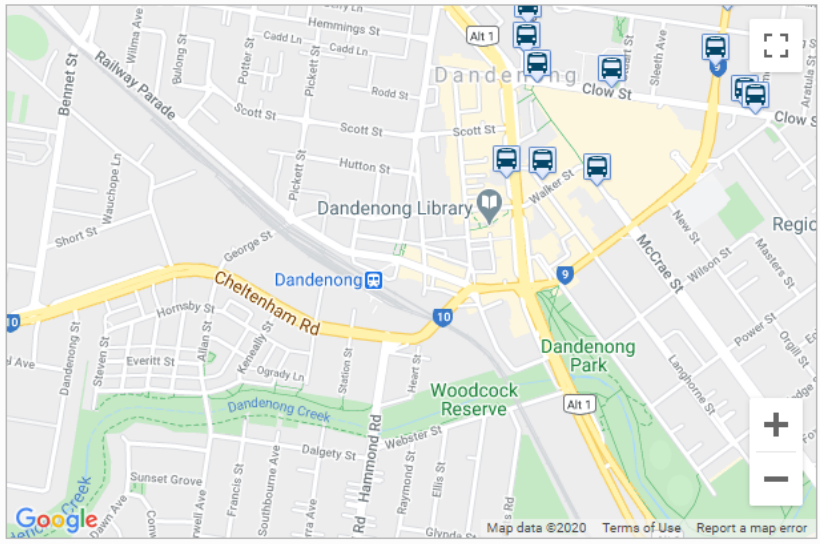
Source: www.walkscore.com

Transit Score

- The transit score for the development is 66 which is classified as Good Transit, meaning that there are many nearby public transport options

Transit Score (Continued…)

- The development is 1.4 km from the Cranbourne & Pakenham railway lines, Dandenong Railway Station
- The development is 200 meters from the 802 Dandenong – Chadstone SC bus stop



Rail lines:

Pakenham City (Flinders Str...	2.3 km	Cranbourne City (Flinders St...	2.3 km

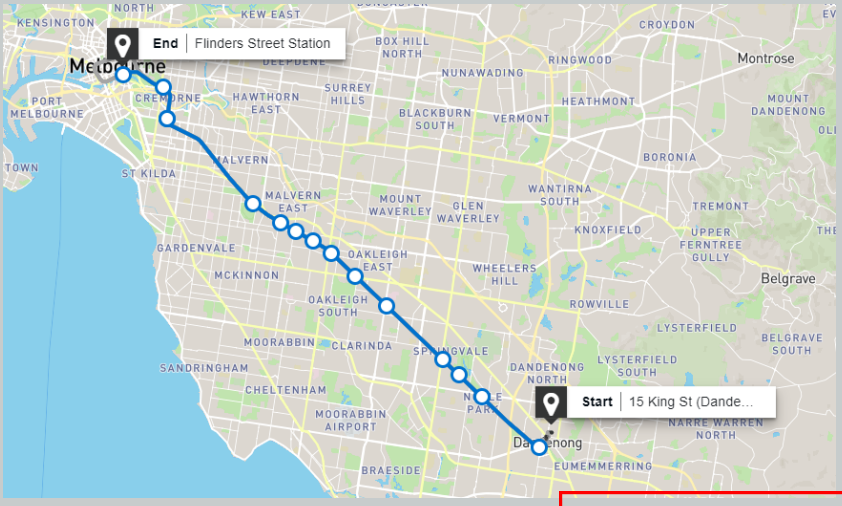
Bus lines:

811 Dandenong - Brighton	0.2 km	802 Dandenong - Chadston...	0.2 km
804 Chadstone SC - Danden...	0.2 km	901 Melbourne Airport - Fra...	0.2 km
861 Dandenong - Endeavou...	0.2 km	849 Dandenong - Mossgiel ...	0.2 km
843 Endeavour Hills - Dand...	0.2 km	862 Dandenong - Chadston...	0.2 km
845 Dandenong - Endeavou...	0.2 km	697 Belgrave - Belgrave South	0.3 km

Source: www.walkscore.com

Commuting to Melbourne by Public Transport

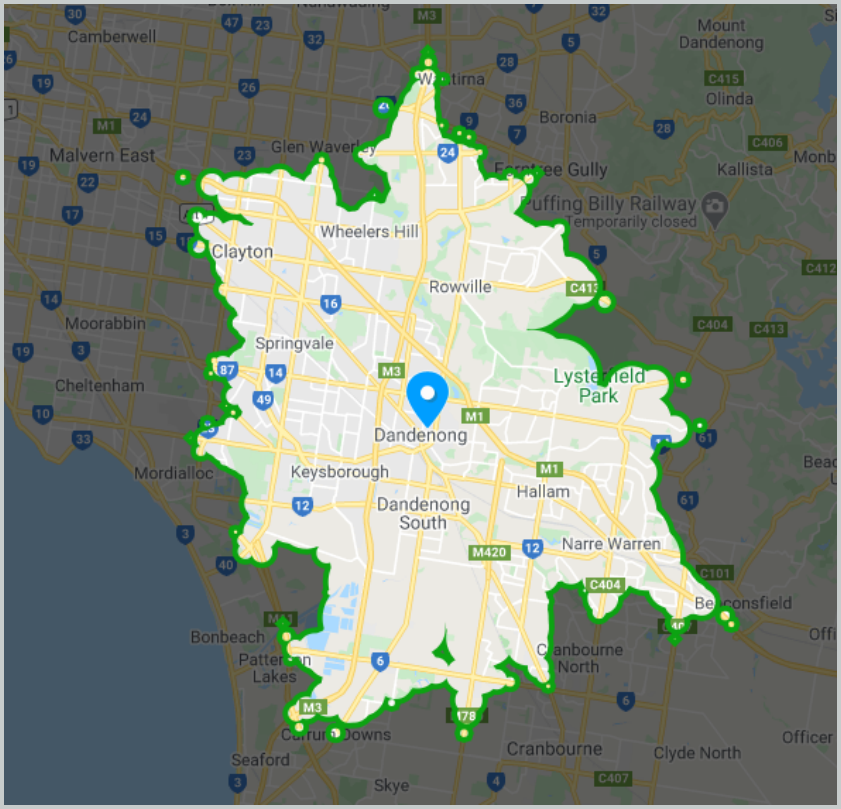
The commute from the development to Melbourne CBD (Flinders Street Station) using public transport during peak hour is approximately 1 hour 13 mins including a 24 minute walk to the Dandenong Railway Station



Source: PTV.com.au

Car Parking Spaces

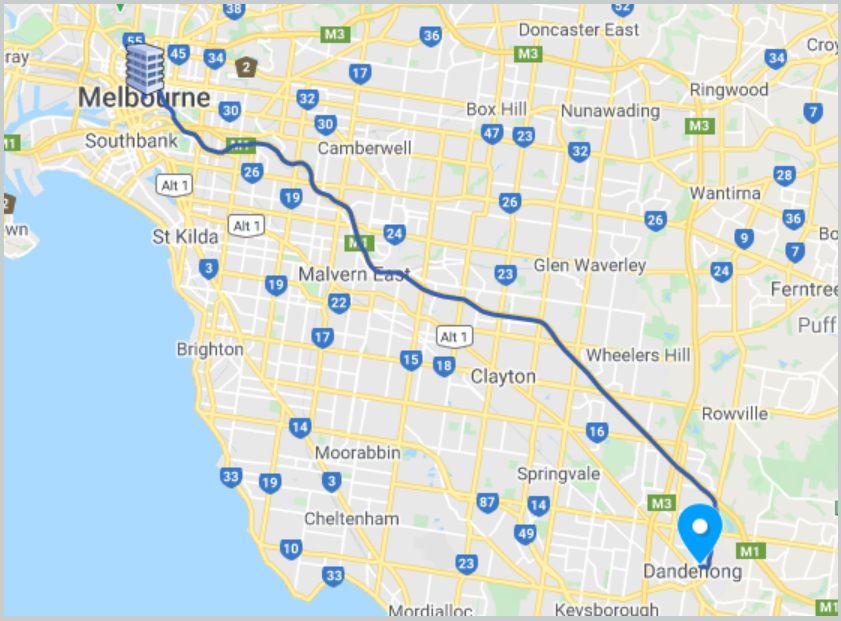
- The development will be providing 15 car parking spaces
- The map below shows how far you can drive from the site in 15 minutes.



Source: www.walkscore.com

Commuting to Melbourne By Car

The commute from the development to Melbourne CBD by car (35km) during peak hour is approximately 38 mins and 34 mins out of peak hour



Source: www.walkscore.com

Objective: Waste Management

City of Greater Dandenong Clause 22.06

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

Waste Managment

Waste Management Commitments

Issue	Assessment Results and Design Response
BESS Waste Score	The Waste score for the development is 33% and is contributing 2% to the overall BESS score
Construction Waste Management	▪ A commitment has been made to recycle or reuse at least 70% of the materials through the demolition/construction phase. For example: ○ Steel and metal items including roof sheet, window frames and other steel framing materials can be melted and reused within new steel products ○ Aluminium can be 100% recycled ○ Gypsum plasterboard can and should be recycled ○ Timber can either be directly reused or turned into horticultural mulch ○ Brickwork, concrete slabs and asphalt can be crushed and used as aggregate for new concrete or road base and fill ○ Any bricks in good enough condition to be reused may be cleaned and re-sold as garden/paving supplies or crushed for backfill, aggregate and gravel ○ Plastics can often be granulated and reused to make new plastic products ▪ During the construction of the proposed development, skips containing construction waste will be sorted into recyclable categories – plastics and cardboard packaging, metal offcuts and cable, concrete and rubble ○ Only non-recyclable products are be sent to landfill ▪ To help minimise waste generated during the construction phase, standard size materials and pre-fabricated materials will be used where possible. This will reduce the amount of off-cuts and on-site waste production
Operational Waste Management	▪ Refer to Waste Management Plan prepared by EcoResults (2020-2159-WMP) ○ A shared bin room has been provided in the basement level, with 2 x 1,100L recycling bins and 2 x 1,100L general waste bins. ○ Recycling facilities are as convenient for occupants as facilities for general waste. Collection will take place weekly by private collection company.

Objective: Urban Ecology

City of Greater Dandenong Clause 22.06

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

Urban Ecology

Urban Ecology	Issue	Assessment Results and Design Response
	BESS Urban Ecology Score	The Urban Ecology score for the development is 33% and is contributing 2% to the overall BESS score
	Maintaining & Enhancing Ecological Value	▪ The proposed development reuses land which is already developed with a single storey dwelling ▪ The existing site has some ecological value in its current state. 28% of the new development will be covered with vegetation. ▪ It is envisaged that the landscaping will include small trees and evergreen shrubs, improving the overall ecological and aesthetic value of the development. These shrubs and trees can be of various sizes and heights providing visual interest as well as “softening” the lines of the building
	Private Open Space Ecology	The balconies of the apartments could feature planter boxes, increasing biodiversity by providing a green environment and a pleasant open space for the residents and visitors to enjoy
	Food Production	Not proposed for this development
	Green Walls/Roofs	Not proposed for this development

Objective: Innovation

City of Greater Dandenong Clause 22.06

- To encourage innovative technology, design and processes in all development, which positively influence the sustainability of buildings

Innovation		
Innovation	**Issue**	**Assessment Results and Design Response**
	BESS Innovation Score	The Innovation score for the development is 0% and is not contributing to the overall BESS score
	Significant Enhancements to Environmental Performance	▪ BESS has met required benchmarks and exceeded the 50% benchmark for Energy and IEQ ▪ BESS has calculated a 52% reduction in greenhouse gas emissions ▪ Rainwater tanks for reuse in toilet flushing
	Passive Solar Design	Consideration has been given to passive solar design principals with 7 dwellings having north facing orientations, shading to north facing glazing as well as insulation to be used throughout including under the slab

Objective: Construction and Building Management

Objective details (not in City of Greater Dandenong Clause 22.06)

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

Construction and Building Management

Issue	Assessment Results and Design Response
BESS Management Score	The Management score for the development is 62% and is contributing 3% to the overall BESS score

Building User's Guide that Explains ESD Principles	A Building Users' Guide is to be written in non-technical language, for the benefit of property managers and contractors, as well as provided to occupants prior to occupation. It will detail how to operate the building efficiently and how to service and maintain the building systems, as well as include advice on maximising sustainability within the building and outline the development's:
	▪ Key environmental strategies and targets
	▪ Concept and implementation of passive design strategies (e.g. use of adjustable shading/automated windows and the like)
	▪ Building service controls, for example:
	  ○ How to minimise the need to operate HVAC systems
	  ○ How to minimise energy use when operating HVAC systems
	  ○ How to minimise the use of artificial lighting
	▪ Potable and non-potable water supply
	▪ Onsite energy generation (if applicable)
	▪ Pro-active maintenance regime
	▪ Fine-tuning strategy (especially for complex HVAC systems)
	▪ How to maintain biodiversity and sustainable gardening
	▪ Waste minimisation and separation policies
	▪ Sustainable transport options, for example
	  ○ Bike parking provisions
	  ○ End of trip facilities
	  ○ Car sharing schemes
	  ○ Public transport availability
	▪ Provision of sub-metering and the interpretation of the metering data
	▪ Environmental monitoring or participation in environmental reporting schemes
	▪ Building Management and other building supply contacts

Construction Management	▪ For comments regarding Construction Waste Management see the Waste Management section of this SMP ▪ A stormwater pollution reduction strategy for the building construction works to be prepared by the construction company

	○ This can be incorporated into a broader Construction or Site/Environment Management Plan which may include control of noise, dust, erosion/sediment, waste, chemicals, significant flora and fauna and archelogy/heritage
Commissioning	▪ Regular fine-tuning and ongoing maintenance of the building services will be conducted to ensure the buildings maximum environmental performance. ▪ The BUG should be reviewed in conjunction with the commissioning to ensure that it includes all items that will assist building users and management to achieve optimum ESD performance
Ongoing Building Management	The Operator will be responsible to arrange for regular fine-tuning of the building services and their ongoing maintenance to ensure efficient optimum performance The Operator will be responsible to ensure the commitments made to within the WMP are adhered to The Operator will be responsible to arrange for a copy of the BUG to provide to building occupants and contractors (when applicable)

BESS assessment and scores for this project

BESS assessment scores are percentages. Best practice in ESD is defined as an overall 50% score, and WSUD 100%. The scores achieved for each category on this project are shown as a percentage, with Energy, Water and IEQ each requiring a score of 50% to pass and Stormwater requiring a score of 100%.

- For the building to achieve the BESS and STORM scores listed, it must be constructed according to the planning drawings, as well as the specifications listed in the notes and BESS printouts below.

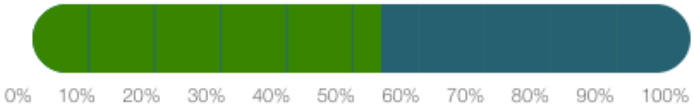
15 King St, Dandenong 3175 Dandenong

Site area: 699 m^2 · Building Floor Area: 1059 m^2 ·
Date of Assessment: 23 Dec 2020 · Version: V5, 1.6.2-B.292 ·
Applicant: kirstie@ecoresults.com.au

Project Identifier
72CEDA38
Published
http://bess.net.au/projects/72CEDA38-V1

Your BESS score is

+ 53%



50% + Best Practice

70% + Excellence

% of Total	Category	Score	Pass
3 %	Management	62 %	
4 %	Water	50 %	✓
16 %	Energy	57 %	✓
14 %	Stormwater	100 %	✓
14 %	IEQ	82 %	✓
0 %	Transport	0 %	
2 %	Waste	33 %	
2 %	Urban Ecology	33 %	
0 %	Innovation	0 %	

Conclusion

Our sustainable building consultants have found that:

- The proposal has met the benchmarks set out by the HERO, BESS and STORM assessment tools.
- The project has included a range of other ESD features over and above those measured by the HERO, BESS and STORM benchmarks.
    - These features combine significantly to further enhance the energy efficiency of the development,
    - Lessen its environmental impact, and
    - Encourage sustainable lifestyle choices by the occupants of the building during its life-cycle.
- The development will meet the objectives and application requirements of the City of Greater Dandenong ESD Clause 22.06 and the objectives of the Better Apartment Design Standards (BADS) Clauses 55.07-1 (Energy Efficiency) and 55.07-5 (Integrated Water and Stormwater Management) if it is constructed in accordance with the application drawings and the measures detailed in this SMP.

Appendix (27 Pages)

- Appendix A – BESS Assessment Printout (25 pages)
- Appendix B – Melbourne Water Rainwater Tank Fact Sheet (2 pages)

Print Report (/projects/72CEDA38-V1/report-print)

This BESS report outlines the sustainable design commitments of the proposed development at 15 King St Dandenong VIC 3175. 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 Dandenong 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.

15 King St, Dandenong 3175 Dandenong

Site area: 699 m^2 · Building Floor Area: 1059 m^2 ·
Date of Assessment: 23 Dec 2020 ·
Version: V5, 1.6.2-B.292 ·
Applicant: kirstie@ecoresults.com.au

Project Identifier
72CEDA38

Published
http://bess.net.au/projects/72CEDA38-V1

Your BESS score is

+ 53%

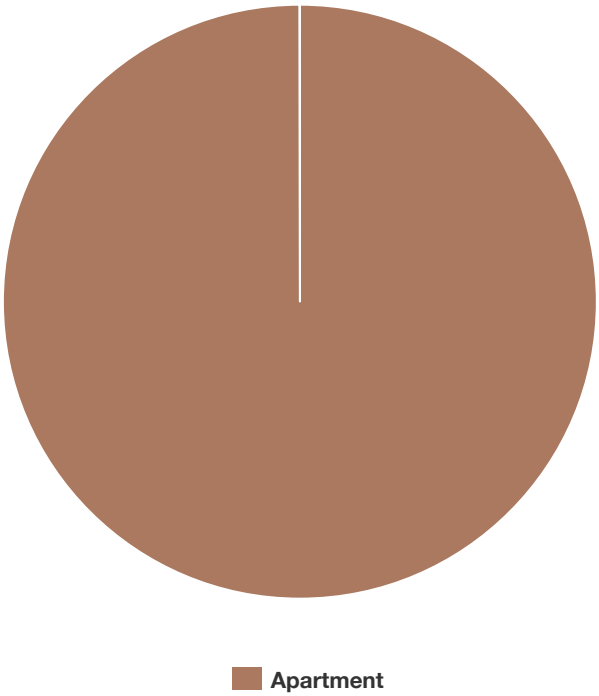
0% 10% 20% 30% 40% 50% 60% 70% 80% 90% 100%

50% + Best Practice

70% + Excellence

% of Total	Category	Score	Pass
3 %	Management	62 %	
4 %	Water	50 %	✔
16 %	Energy	57 %	✔
14 %	Stormwater	100 %	✔
14 %	IEQ	82 %	✔
0 %	Transport	0 %	
2 %	Waste	33 %	
2 %	Urban Ecology	33 %	
0 %	Innovation	0 %	

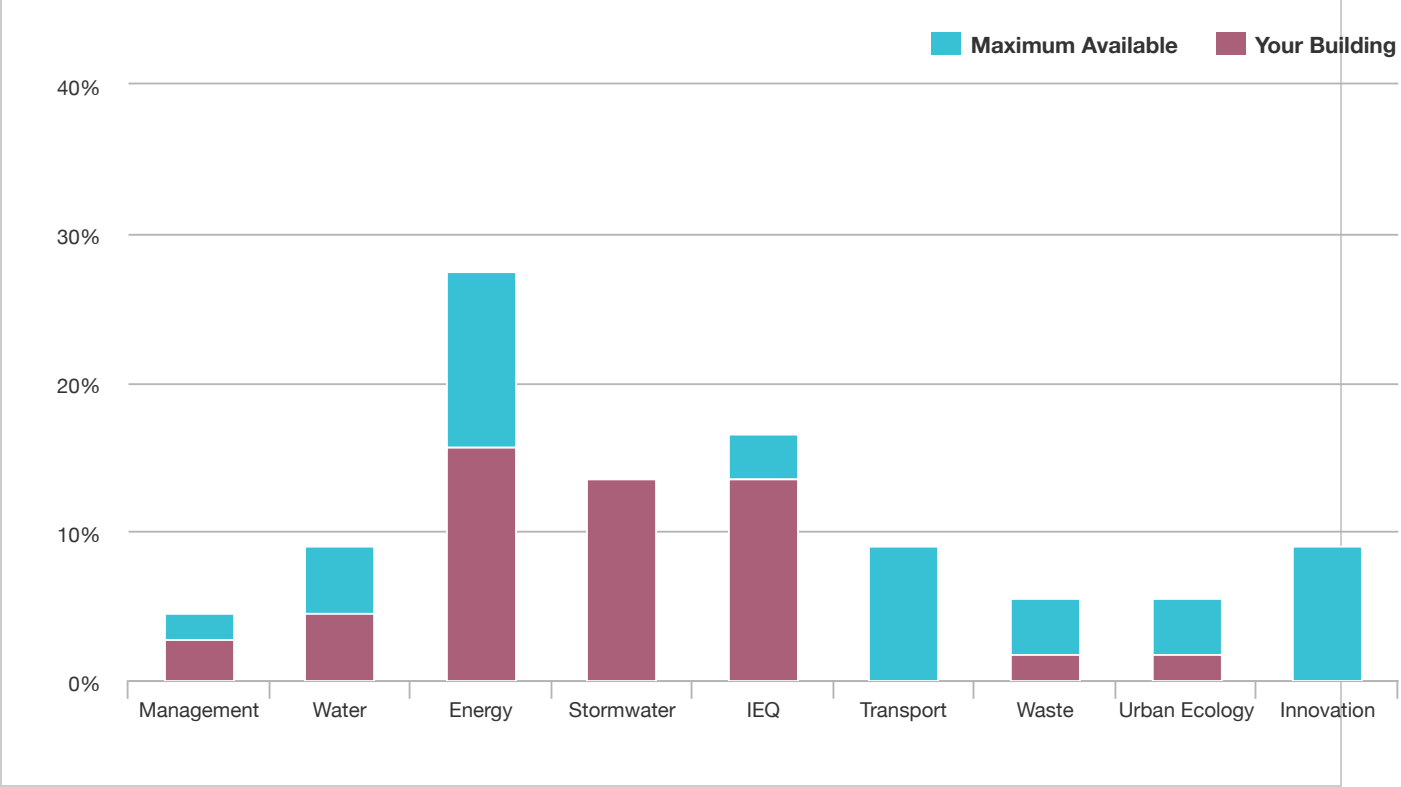
Building Composition



Dwellings

Type	Name	Quantity	Area
Apartment	G01	1	77 m^2
Apartment	G03	1	52 m^2
Apartment	G04 + G02 + 104	3	77 m^2
Apartment	102 + 202	2	77 m^2
Apartment	103 + G05	2	81 m^2
Apartment	201 +101	2	61 m^2
Apartment	203	1	53 m^2
Apartment	204	1	72 m^2
Apartment	301	1	75 m^2
Apartment	302	1	57 m^2

How did this Development Perform in each Environmental Category?



Sustainable design commitments by category

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

Management

62% - contributing 3% to overall score

Credit	Disabled	Scoped out	Score
Management 2.2 Thermal Performance Modelling - Multi-Dwelling Residential			100 %
Management 3.1 Metering			100 %
Management 3.3 Metering			100 %
Management 4.1 Building Users Guide			100 %

Management 2.2 Thermal Performance Modelling - Multi-Dwelling Residential

100%

Score Contribution	This credit contributes 25.0% towards this section's score.
Aim	To encourage and recognise developments that have used modelling to

	inform passive design at the early design stage

Questions

Have preliminary NatHERS ratings been undertaken for all thermally unique dwellings? *

Yes

Management 3.1 Metering 100%

Score Contribution	This credit contributes 12.5% towards this section's score.
Aim	To provide building users with information that allows monitoring of energy and water consumption

Questions

Have utility meters been provided for all individual dwellings? *

Yes

Management 3.3 Metering 100%

Score Contribution	This credit contributes 12.5% towards this section's score.
Aim	To provide building users with information that allows monitoring of energy and water consumption

Questions

Have all major common area services been separately submetered? *

Yes

Management 4.1 Building Users Guide 100%

Score Contribution	This credit contributes 12.5% towards this section's score.
Aim	To encourage and recognise initiatives that will help building users to use the building efficiently

Questions

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

Yes

Water

50% - contributing 4% to overall score

Credit	Disabled	Scoped out	Score
Water 1.1 Potable water use reduction			40 %
Water 3.1 Water Efficient Landscaping			100 %
Water 4.1 Building Systems Water Use Reduction			N/A

Water Approachs

What approach do you want to use Water?	Use the built in calculation tools
Do you have a reticulated third pipe or an on-site water recycling system?	No
Are you installing a swimming pool?	No
Are you installing a rainwater tank?	Yes

Water fixtures, fittings and connections

	G01	G03	G04 + G02 + 104
Showerhead	3 Star WELS (>= 6.0 but <= 7.5)	3 Star WELS (>= 6.0 but <= 7.5)	3 Star WELS (>= 6.0 but <= 7.5)
Bath	Scope out	Scope out	Scope out
Kitchen Taps	>= 5 Star WELS rating	>= 5 Star WELS rating	>= 5 Star WELS rating
Bathroom Taps	>= 5 Star WELS rating	>= 5 Star WELS rating	>= 5 Star WELS rating
Dishwashers	>= 4 Star WELS rating	>= 4 Star WELS rating	>= 4 Star WELS rating
WC	>= 4 Star WELS rating	>= 4 Star WELS rating	>= 4 Star WELS rating
Urinals	Scope out	Scope out	Scope out
Washing Machine Water Efficiency	Default or unrated	Default or unrated	Default or unrated
Which non-potable water source is the dwelling/space connected to?	tanks	tanks	tanks
Non-potable water source			

connected to Toilets	Yes	Yes	Yes
Non-potable water source connected to Laundry (washing machine)	No	No	No
Non-potable water source connected to Hot Water System	No	No	No

	102 + 202	103 + G05	201 +101
Showerhead	3 Star WELS (>= 6.0 but <= 7.5)	3 Star WELS (>= 6.0 but <= 7.5)	3 Star WELS (>= 6.0 but <= 7.5)
Bath	Scope out	Scope out	Scope out
Kitchen Taps	>= 5 Star WELS rating	>= 5 Star WELS rating	>= 5 Star WELS rating
Bathroom Taps	>= 5 Star WELS rating	>= 5 Star WELS rating	>= 5 Star WELS rating
Dishwashers	>= 4 Star WELS rating	>= 4 Star WELS rating	>= 4 Star WELS rating
WC	>= 4 Star WELS rating	>= 4 Star WELS rating	>= 4 Star WELS rating
Urinals	Scope out	Scope out	Scope out
Washing Machine Water Efficiency	Default or unrated	Default or unrated	Default or unrated
Which non-potable water source is the dwelling/space connected to?	tanks	tanks	tanks
Non-potable water source connected to Toilets	Yes	Yes	Yes
Non-potable water source connected to Laundry (washing machine)	No	No	No
Non-potable water source connected to Hot Water System	No	No	No

	203	204	301
Showerhead	3 Star WELS (>= 6.0 but <= 7.5)	3 Star WELS (>= 6.0 but <= 7.5)	3 Star WELS (>= 6.0 but <= 7.5)
Bath	Scope out	Scope out	Scope out
Kitchen Taps	>= 5 Star WELS rating	>= 5 Star WELS rating	>= 5 Star WELS rating
Bathroom Taps	>= 5 Star WELS rating	>= 5 Star WELS rating	>= 5 Star WELS rating
Dishwashers	>= 4 Star WELS rating	>= 4 Star WELS rating	>= 4 Star WELS rating
WC	>= 4 Star WELS rating	>= 4 Star WELS rating	>= 4 Star WELS rating
Urinals	Scope out	Scope out	Scope out

Washing Machine Water Efficiency	Default or unrated	Default or unrated	Default or unrated
Which non-potable water source is the dwelling/space connected to?	tanks	tanks	tanks
Non-potable water source connected to Toilets	Yes	Yes	Yes
Non-potable water source connected to Laundry (washing machine)	No	No	No
Non-potable water source connected to Hot Water System	No	No	No

	302
Showerhead	3 Star WELS (>= 6.0 but <= 7.5)
Bath	Scope out
Kitchen Taps	>= 5 Star WELS rating
Bathroom Taps	>= 5 Star WELS rating
Dishwashers	>= 4 Star WELS rating
WC	>= 4 Star WELS rating
Urinals	Scope out
Washing Machine Water Efficiency	Default or unrated
Which non-potable water source is the dwelling/space connected to?	tanks
Non-potable water source connected to Toilets	Yes
Non-potable water source connected to Laundry (washing machine)	No
Non-potable water source connected to Hot Water System	No

Rainwater Tanks

		tanks
Name		tanks
What is the total roof area connected to the rainwater tank?	Square Metres	377.0
Tank Size	Litres	6000.0

Water 1.1 Potable water use reduction

40%

Score Contribution	This credit contributes 83.3% towards this section's score.
Aim	Water 1.1 Potable water use reduction (interior uses) What is the reduction in total water use due to efficient fixtures, appliances, and rainwater use? To achieve points in this credit there must be >25% potable water reduction. You are using the built in calculation tools. This credit is calculated from information you have entered above.
Criteria	What is the reduction in total potable water use due to efficient fixtures, appliances, rainwater use and recycled water use? To achieve points in this credit there must be >25% potable water reduction.

Calculations

Reference (kL) *

1688

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

1362

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

169

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

1193

% Reduction in Potable Water Consumption * Percentage %

29 %

Water 3.1 Water Efficient Landscaping 100%

Score Contribution	This credit contributes 16.7% towards this section's score.
Aim	Are water efficiency principles used for landscaped areas? This includes low water use plant selection (e.g. xeriscaping). Note: food producing landscape areas and irrigation areas connected to rainwater or an alternative water source are excluded from this section.

Questions

Will water efficient landscaping be installed? *

Yes

Water 4.1 Building Systems Water Use Reduction N/A

This credit was scoped out: These building systems are not proposed for this building.

Aim	Will the project minimise water use for building systems such as evaporative cooling and fire testing systems?

Energy

57% - contributing 16% to overall score

Credit	Disabled Scoped out	Score
Energy 1.2 Thermal Performance Rating - Residential		50 %
Energy 2.1 Greenhouse Gas Emissions		100 %
Energy 2.3 Electricity Consumption		100 %
Energy 2.4 Gas Consumption		100 %
Energy 3.2 Hot Water		100 %
Energy 3.6 Internal Lighting - Residential Multiple Dwellings		100 %

Dwellings Energy Approachs

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

Dwelling Energy Profiles

	G01	G03	G04 + G02 + 104
Below the floor is	Ground or Carpark	Ground or Carpark	Ground or Carpark
Above the ceiling is	Another Occupancy	Another Occupancy	Another Occupancy
Exposed sides	2	1	2
NatHERS Annual Energy Loads - Heat MJ/sqm	142.0	105.0	68.0
NatHERS Annual Energy Loads - Cool MJ/sqm	12.0	12.0	20.0
NatHERS star rating	5.3	6.2	7.1
	D Reverse cycle	D Reverse cycle	D Reverse cycle

Type of Heating System	space	space	space
Heating System Efficiency	3 Star	3 Star	3 Star
Type of Cooling System	Refrigerative space	Refrigerative space	Refrigerative space
Cooling System Efficiency	3 Stars	3 Stars	3 Stars
Type of Hot Water System	G Gas Storage 6 star	G Gas Storage 6 star	G Gas Storage 6 star
Central Hot Water System	Yes	Yes	Yes
% Contribution from solar hot water system	60 %	60 %	60 %
Clothes Line	A No drying facilities	A No drying facilities	A No drying facilities
Clothes Dryer	A No clothes dryer	A No clothes dryer	A No clothes dryer
	102 + 202	**103 + G05**	**201 +101**
Below the floor is	Another Occupancy	Another Occupancy	Another Occupancy
Above the ceiling is	Another Occupancy	Another Occupancy	Another Occupancy
Exposed sides	2	2	2
NatHERS Annual Energy Loads - Heat MJ/sqm	91.0	26.0	135.0
NatHERS Annual Energy Loads - Cool MJ/sqm	20.0	9.0	14.0
NatHERS star rating	6.4	8.8	5.4
Type of Heating System	D Reverse cycle space	D Reverse cycle space	D Reverse cycle space
Heating System Efficiency	3 Star	3 Star	3 Star
Type of Cooling System	Refrigerative space	Refrigerative space	Refrigerative space
Cooling System Efficiency	3 Stars	3 Stars	3 Stars
Type of Hot Water System	G Gas Storage 6 star	G Gas Storage 6 star	G Gas Storage 6 star
Central Hot Water System	Yes	Yes	Yes
% Contribution from solar hot water system	60 %	60 %	60 %
Clothes Line	A No drying facilities	A No drying facilities	A No drying facilities
Clothes Dryer	A No clothes dryer	A No clothes dryer	A No clothes dryer
	203	**204**	**301**
Below the floor is	Another Occupancy	Another Occupancy	Another Occupancy
Above the ceiling is	Another Occupancy	Another Occupancy	Outside
Exposed sides	1	3	2
NatHERS Annual Energy Loads - Heat MJ/sqm	25.0	67.0	82.0

NatHERS Annual Energy Loads - Cool MJ/sqm	12.0	14.0	12.0
NatHERS star rating	8.7	7.3	6.9
Type of Heating System	D Reverse cycle space	D Reverse cycle space	D Reverse cycle space
Heating System Efficiency	3 Star	3 Star	3 Star
Type of Cooling System	Refrigerative space	Refrigerative space	Refrigerative space
Cooling System Efficiency	3 Stars	3 Stars	3 Stars
Type of Hot Water System	G Gas Storage 6 star	G Gas Storage 6 star	G Gas Storage 6 star
Central Hot Water System	Yes	Yes	Yes
% Contribution from solar hot water system	60 %	60 %	60 %
Clothes Line	A No drying facilities	A No drying facilities	A No drying facilities
Clothes Dryer	A No clothes dryer	A No clothes dryer	A No clothes dryer

	302
Below the floor is	Another Occupancy
Above the ceiling is	Outside
Exposed sides	3
NatHERS Annual Energy Loads - Heat MJ/sqm	50.0
NatHERS Annual Energy Loads - Cool MJ/sqm	21.0
NatHERS star rating	7.6
Type of Heating System	D Reverse cycle space
Heating System Efficiency	3 Star
Type of Cooling System	Refrigerative space
Cooling System Efficiency	3 Stars
Type of Hot Water System	G Gas Storage 6 star
Central Hot Water System	Yes
% Contribution from solar hot water system	60 %
Clothes Line	A No drying facilities
Clothes Dryer	A No clothes dryer

Energy 1.2 Thermal Performance Rating - Residential 50%

Score Contribution	This credit contributes 28.6% towards this section's score.
	Reduce reliance on mechanical systems to achieve thermal comfort in

Aim	summer and winter - improving comfort, reducing greenhouse gas emissions, energy consumption, and maintenance costs.
Criteria	What is the average NatHERS rating?

Calculations

Average NATHERS Rating (Weighted) * Stars

7.0

Energy 2.1 Greenhouse Gas Emissions 100%

Score Contribution	This credit contributes 9.5% towards this section's score.
Aim	Reduce the building's greenhouse gas emissions
Criteria	What is the % reduction in annual greenhouse gas emissions against the benchmark?

Calculations

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

64410.3

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

30695.8

% Reduction in GHG Emissions * Percentage %

52 %

Energy 2.3 Electricity Consumption 100%

Score Contribution	This credit contributes 9.5% towards this section's score.
Aim	Reduce consumption of electricity
Criteria	What is the % reduction in annual electricity consumption against the benchmark?

Calculations

Reference * kWh

53525.0

Proposed * kWh

22344.1

Improvement * Percentage %

58 %

Energy 2.4 Gas Consumption 100%

Score Contribution	This credit contributes 9.5% towards this section's score.
Aim	Reduce consumption of gas
Criteria	What is the % reduction in annual gas consumption against the benchmark?

Calculations

Reference * MJ

190951.2

Proposed * MJ

153790.8

Improvement * Percentage %

19 %

Energy 3.2 Hot Water 100%

Score Contribution	This credit contributes 4.8% towards this section's score.
Criteria	What is the % reduction in annual hot water system energy use (gas and electricity) against the benchmark?

Calculations

Reference * kWh

53042.0

Proposed * kWh

45141.6

Improvement * Percentage %

14 %

Energy 3.6 Internal Lighting - Residential Multiple Dwellings 100%

Score Contribution	This credit contributes 9.5% towards this section's score.
Aim	Reduce energy consumption associated with internal lighting

Questions

Is the maximum illumination power density (W/m2) in at least 90% of the relevant building class at least 20% lower than required by Table J6.2a of the NCC 2019 Vol 1 (Class 2-9) and Clause 3.12.5.5 NCC 2019 Vol 2 (Class 1 & 10)? *

Yes

Stormwater 100% - contributing 14% to overall score

Credit	Disabled	Scoped out	Score
Stormwater 1.1 Stormwater Treatment			100 %

Which stormwater modelling are you using?	Melbourne Water STORM tool

Stormwater 1.1 Stormwater Treatment 100%

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

Questions

STORM score achieved *

100

Calculations

Min STORM Score *

100

IEQ

82% - contributing 14% to overall score

Credit	Disabled	Scoped out	Score
IEQ 1.1 Daylight Access - Living Areas			100 %
IEQ 1.2 Daylight Access - Bedrooms			100 %
IEQ 1.5 Daylight Access - Minimal Internal Bedrooms			100 %
IEQ 2.1 Effective Natural Ventilation			67 %

Use the BESS Deemed to Satisfy (DtS) method for IEQ?	No
Are all living areas and bedrooms less than 8m deep (5m if south facing)?	Yes
Do all living areas and bedrooms have a floor-to-ceiling height of at least 2.7m?	No
Does all glazing to living areas achieve at least 60% Visible Light Transmittance (VLT)?	Yes
Do all living areas have an external facing window (not into a courtyard, light well or other major obstruction)?	Yes
Does the building(s) comply with the requirements of the building separation tables?	Yes
What approach do you want to use for IEQ?	Use the built in calculation tools

Please provide the following room profiling information below.

	G01, G01, G02, G03, G04, G05 Livingroom	G01, G01, G02, G03, G04, G05 Bedroom	G01, 101 Livingroom
Name	G01, G02, G03, G04, G05 Livingroom	G01, G02, G03, G04, G05 Bedroom	101 Livingroom
Room Designation	Living	Bedroom	Living
Quantity	5	8	1
Auto-Pass	Yes	Yes	No
Room Floor Area Square Metres	-	-	27.0
Vertical Angle Angle (degrees)	-	-	45.0
Horizontal Angle Angle (degrees)	-	-	90.0

Window Area Square Metres	-	-	9.8
Window Orientation	-	-	South
Glass Type	-	-	Clear Low-E Double (VLT 0.73)

	G01, 101 Bedroom 1	G01, 101 Bedroom 2	G01, 102 Livingroom
Name	101 Bedroom 1	101 Bedroom 2	102 Livingroom
Room Designation	Bedroom	Bedroom	Living
Quantity	1	1	1
Auto-Pass	No	No	No
Room Floor Area Square Metres	12.0	14.0	29.1
Vertical Angle Angle (degrees)	180.0	180.0	45.0
Horizontal Angle Angle (degrees)	180.0	120.0	90.0
Window Area Square Metres	1.0	0.8	9.8
Window Orientation	East	East	South
Glass Type	Clear Low-E Double (VLT 0.73)	Clear Low-E Double (VLT 0.73)	Clear Low-E Double (VLT 0.73)

	G01, 102 Bedroom 1	G01, 102 Bedroom 2	G01, 103 Livingroom
Name	102 Bedroom 1	102 Bedroom 2	103 Livingroom
Room Designation	Bedroom	Bedroom	Living
Quantity	1	1	1
Auto-Pass	No	No	Yes
Room Floor Area Square Metres	13.0	11.0	-
Vertical Angle Angle (degrees)	180.0	180.0	-
Horizontal Angle Angle (degrees)	100.0	180.0	-
Window Area Square Metres	0.8	0.8	-
Window Orientation	West	West	-
Glass Type	Clear Low-E Double (VLT 0.73)	Clear Low-E Double (VLT 0.73)	-

	G01, 104 Livingroom	G01, 103 Bedroom 1	G01, 104 Bedroom 1

Name	104 Livingroom	103 Bedroom 1	104 Bedroom 1
Room Designation	Living	Bedroom	Bedroom
Quantity	1	1	1
Auto-Pass	Yes	No	No
Room Floor Area Square Metres	-	14.2	14.2
Vertical Angle Angle (degrees)	-	180.0	180.0
Horizontal Angle Angle (degrees)	-	180.0	180.0
Window Area Square Metres	-	1.2	1.2
Window Orientation	-	West	East
Glass Type	-	Clear Low-E Double (VLT 0.73)	Clear Low-E Double (VLT 0.73)

	G01, 103 Bedroom 2	G01, 104 Bedroom 2	G01, 201 Livingroom
Name	103 Bedroom 2	104 Bedroom 2	201 Livingroom
Room Designation	Bedroom	Bedroom	Living
Quantity	1	1	1
Auto-Pass	No	No	No
Room Floor Area Square Metres	12.3	12.3	27.4
Vertical Angle Angle (degrees)	180.0	180.0	45.0
Horizontal Angle Angle (degrees)	180.0	180.0	110.0
Window Area Square Metres	1.2	1.2	9.8
Window Orientation	West	East	South
Glass Type	Clear Low-E Double (VLT 0.73)	Clear Low-E Double (VLT 0.73)	Clear Low-E Double (VLT 0.73)

	G01, 202 Livingroom	G01, 201 Bedroom 1	G01, 202 Bedroom 1
Name	202 Livingroom	201 Bedroom 1	202 Bedroom 1
Room Designation	Living	Bedroom	Bedroom
Quantity	1	1	1
Auto-Pass	No	No	No
Room Floor Area Square Metres	27.5	12.2	13.5
Vertical Angle Angle			

(degrees)	45.0	180.0	180.0
Horizontal Angle (degrees) Angle	110.0	180.0	180.0
Window Area Metres Square	9.8	1.2	1.2
Window Orientation	South	East	West
Glass Type	Clear Low-E Double (VLT 0.73)	Clear Low-E Double (VLT 0.73)	Clear Low-E Double (VLT 0.73)

	G01, 203 Livingroom	G01, 203 Bedroom	G01, 204 Livingroom
Name	203 Livingroom	203 Bedroom	204 Livingroom
Room Designation	Living	Bedroom	Living
Quantity	1	1	1
Auto-Pass	No	No	No
Room Floor Area Metres Square	31.4	16.3	24.9
Vertical Angle (degrees) Angle	45.0	180.0	90.0
Horizontal Angle (degrees) Angle	90.0	140.0	180.0
Window Area Metres Square	5.2	1.2	9.8
Window Orientation	East	East	North
Glass Type	Clear Low-E Double (VLT 0.73)	Clear Low-E Double (VLT 0.73)	Clear Low-E Double (VLT 0.73)

	G01, 204 Bedroom 1	G01, 204 Bedroom 2	G01, 301 Livingroom
Name	204 Bedroom 1	204 Bedroom 2	301 Livingroom
Room Designation	Bedroom	Bedroom	Living
Quantity	1	1	1
Auto-Pass	No	No	Yes
Room Floor Area Metres Square	14.2	10.8	-
Vertical Angle (degrees) Angle	180.0	100.0	-
Horizontal Angle (degrees) Angle	180.0	160.0	-
Window Area Square Metres	1.2	1.2	-
Window Orientation	East	East	

Glass Type	Clear Low-E Double (VLT 0.73)	Clear Low-E Double (VLT 0.73) -

	G01, 301 Bedroom 2	G01, 301 Bedroom 1	G01, 302 Bedroom 1
Name	301 Bedroom 2	301 Bedroom 1	302 Bedroom 1
Room Designation	Bedroom	Bedroom	Bedroom
Quantity	1	1	1
Auto-Pass	No	No	No
Room Floor Area Square Metres	11.1	10.6	13.0
Vertical Angle Angle (degrees)	100.0	100.0	100.0
Horizontal Angle Angle (degrees)	180.0	140.0	120.0
Window Area Square Metres	1.2	1.2	1.2
Window Orientation	West	West	West
Glass Type	Clear Low-E Double (VLT 0.73)	Clear Low-E Double (VLT 0.73)	Clear Low-E Double (VLT 0.73)

	G01, 302 Livingroom
Name	302 Livingroom
Room Designation	Living
Quantity	1
Auto-Pass	Yes
Room Floor Area Square Metres	-
Vertical Angle Angle (degrees)	-
Horizontal Angle Angle (degrees)	-
Window Area Square Metres	-
Window Orientation	-
Glass Type	-

IEQ 1.1 Daylight Access - Living Areas 100%

Score Contribution	This credit contributes 27.3% towards this section's score.
Aim	To provide a high level of amenity and energy efficiency through design for natural light.
Criteria	What % of living areas achieve a daylight factor greater than 1%

Calculations

Calculated percentage * Percentage %

100 %

IEQ 1.2 Daylight Access - Bedrooms 100%

Score Contribution	This credit contributes 27.3% towards this section's score.
Aim	To provide a high level of amenity and energy efficiency through design for natural light.
Criteria	What % of bedrooms achieve a daylight factor greater than 0.5%

Calculations

Calculated percentage * Percentage %

100 %

IEQ 1.5 Daylight Access - Minimal Internal Bedrooms 100%

Score Contribution	This credit contributes 9.1% towards this section's score.
Aim	To provide a high level of amenity and energy efficiency through design for natural light and ventilation.

Questions

Do at least 90% of dwellings have an external window in all bedrooms? *

Yes

IEQ 2.1 Effective Natural Ventilation 67%

Score Contribution	This credit contributes 27.3% towards this section's score.
Aim	To provide fresh air and passive cooling opportunities.
Criteria	What % of dwellings are effectively naturally ventilated?

Questions

% Achieved ? *

93 %

Transport

0% - contributing 0% to overall score

Waste

33% - contributing 2% to overall score

Credit	Disabled	Scoped out	Score
Waste 2.2 - Operational Waste - Convenience of Recycling			100 %

Waste 2.2 - Operational Waste - Convenience of Recycling

100%

Score Contribution	This credit contributes 33.3% towards this section's score.
Aim	To minimise recyclable material going to landfill

Questions

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

Yes

Urban Ecology

33% - contributing 2% to overall score

Credit	Disabled	Scoped out	Score
Urban Ecology 2.1 Vegetation			75 %

Urban Ecology 2.1 Vegetation

75%

Score Contribution	This credit contributes 44.4% towards this section's score.
Aim	To encourage and recognise the use of vegetation and landscaping within and around developments
Criteria	How much of the site is covered with vegetation, expressed as a percentage of the total site area?

Questions

Percentage Achieved ? * Percentage %

28 %

Innovation

0% - contributing 0% to overall score

Items to be marked on floorplans

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

Management 3.1: Individual utility meters annotated — To be printed

Floorplans & elevations - Architect to note on plans

Management 3.3: Common area submeters annotated — To be printed

Floorplans & elevations - Architect to note on plans

Water 3.1: Water efficient garden annotated — To be printed

Floorplans & elevations - Landscape plan to note

Stormwater 1.1: Location of any stormwater management systems used in STORM or MUSIC modelling (e.g. Rainwater tanks, raingarden, buffer strips)

Floorplans & elevations - Architect to note on plans

To be printed

IEQ 1.1: If using BESS daylight calculator, references to floorplans and elevations showing window sizes and sky angles.

Floorplans & elevations - Refer to elevations and floorplans

To be printed

IEQ 1.2: If using BESS daylight calculator, references to floorplans and elevations showing window sizes and sky angles.

Floorplans & elevations - Refer to floorplans and elevations

To be printed

IEQ 1.5: Floor plans with compliant bedrooms marked

Floorplans & elevations - All bedrooms compliant

To be printed

IEQ 2.1: Dwellings meeting the requirements for being 'naturally ventilated' Floorplans & elevations - Refer to floorplans

To be printed

Waste 2.2: Location of recycling facilities

Floorplans & elevations - Refer to floorplans

To be printed

Urban Ecology 2.1: Vegetated areas

Floorplans & elevations - refer to floorplans

To be printed

Documents and evidence

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

Management 2.2: Preliminary NatHERS assessments

Uploaded

4. HERO TPA Spec.docx (https://d324tj9px8grnd.cloudfront.net/public/supporting-evidence7cb3b2493a8546fe95217ea0c7ae0c6d.docx) - Refer to attachment and SMP for more details

Energy 3.6: Provide a written description of the average lighting power density to be installed in the development and specify the lighting type(s) to be used. SMP - Refer to SMP for commitment

To be printed

Stormwater 1.1: STORM report or MUSIC model

2020-10-27 100% roofs to 6,000L tank to toilets.PDF (https://d324tj9px8grnd.cloudfront.net/public/supporting-evidenceb1f2821ea57b4efa8fa49f2e07c11697.PDF) - Attached and refer to SMP for more details

Uploaded

IEQ 1.1: If using an alternative daylight modelling program, a short report detailing assumptions used and results achieved.

N/A - Bess tools used

To be printed

IEQ 1.2: If using an alternative daylight modelling program, a short report detailing assumptions used and results achieved.

N/A - Bess tools used

To be printed

IEQ 1.5: A list of compliant bedrooms Floorplans - All compliant

To be printed

IEQ 2.1: A list of naturally ventilated dwellings

Floorplans - Refer to floorplans

To be printed

Other Supporting Documents

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

Management Section

Add Supporting Document

Water Section

Add Supporting Document

Energy Section

Add Supporting Document

Stormwater Section

Add Supporting Document

IEQ Section

Add Supporting Document

Transport Section

Add Supporting Document

Waste Section

Add Supporting Document

Urban Ecology Section

Add Supporting Document

Innovation Section

Add Supporting Document

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.

A typical home uses approximately 250,000 litres of water each year.

MelbourneWater

Melbourne Water 131772
Melbourne Water Corporation, PO Box 4342, Melbourne Victoria 3001

Rainwater Tanks

Stormwater Sensitive Homes

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:

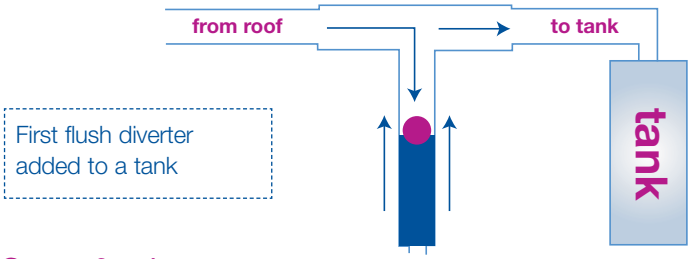
Tank systems:

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.

Legal statement

This Sustainability Management Plan (SMP) has been prepared in conjunction with BESS and FirstRate5, which have been used as Sustainable Design Assessment in the Planning Process (SDAPP) assessment tools.

The development is assessed to achieve the stated ratings only if it is built in accordance with the specifications listed in the attached assessment tool printouts, and according to the plans provided by the designer to EcoResults. This report must be read in conjunction with all assessment tool printouts.

Any variation to the design or construction of the development will deem this SMP void unless the variations are assessed by EcoResults. Please contact EcoResults if there are any questions or variations that are required.

EcoResults is not responsible for any loss or damage arising directly or indirectly from the use of this SMP in circumstances where there has been a variation to the design or construction of the development, which has not been assessed by EcoResults. To the extent permitted by law, EcoResults excludes all liability, including any liability for negligence or for any loss including indirect or consequential damages, arising directly or indirectly from the use of this SMP in circumstances where there has been a variation to the design or construction of the development, which has not been assessed by EcoResults..

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