Northern Environmental Design

SUSTAINABLE DESIGN ASSESSMENT(SDA)

Proposed Apartment Development
58 Princes Hwy
Dandenong

FOR

AARON ZHOU

5 April 2023

File 149CE

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Issue	Date	Prepared by	Checked	Status
A	20 October 2022	JD	MD	Draft
A	25 October 2022	JD	MD	Final
B	5 April 2023	JD	MD	Final

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1. EXECUTIVE SUMMARY

This Sustainable Design Assessment (SDA) is intended to support the planning application.

A detailed sustainability review and assessment of the project has been undertaken in accordance with the Sustainable Design Assessment in the Planning Process (SDAPP). The following Key Sustainable Building Categories have been addressed:

1. Water Efficiency
2. Energy Efficiency
3. Stormwater Management
4. Indoor Environment Quality
5. Building Materials
6. Transport
7. Waste Management
8. Urban Ecology
9. Innovation
10. Construction & Building Management

The proposed residential development will meet the Planning Scheme requirements for Greater Dandenong city council. This will ensure an appropriate level of sustainability for the dwelling and in doing so, will help manage environmental impact, create benefits for the urban realm and provide occupants with a good level of risk reduction against rising utility costs.

The proposed residential development is within an area already well serviced by infrastructure (community, transport, etc.) and will also provide significant sustainability benefits such as the following:

- All electric development (no natural gas)
- 15 kW solar photovoltaic system
- Provisions to correctly dispose of recyclable and other waste from the site.
- Ready access to available public transport and cycling.

2. INTRODUCTION

Northern Environmental Design has been engaged by Aaron Zhou to identify and provide sustainability advice in relation to the proposed apartment building at 58 Princes Hwy, Dandenong.

This report was based on plans provided by JAG Building Design:

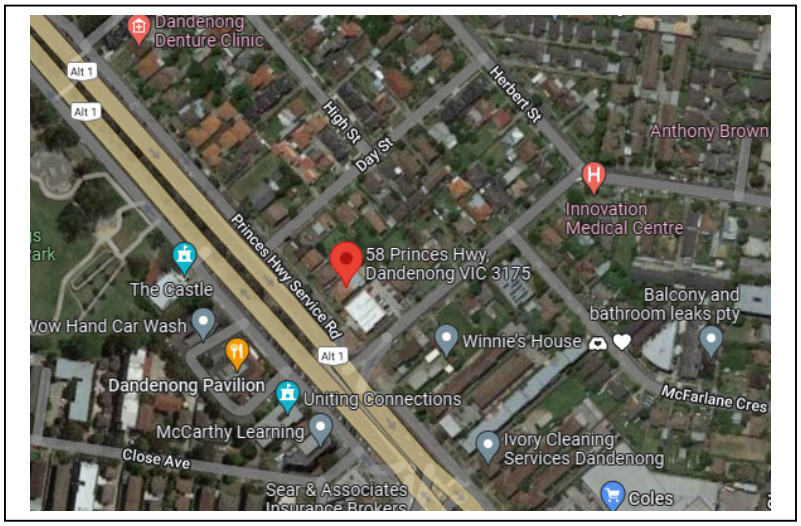
Drawing No.	Description	Revision	Date
TP01	Site description plan	-	28 Feb 2023
TP02	Ground floor plan	-	28 Feb 2023
TP03	Level 1/3 plan	-	28 Feb 2023
TP04	Level 4 plan	-	28 Feb 2023
TP06	Elevations	-	28 Feb 2023

- Discussions and correspondence with:
  - JAG Building Design

2.1 Site Description

The total site is approximately 696 m^2. The development is located within the City of Greater Dandenong.

An aerial photo showing the location of the site and surrounding is presented below.



2.2 Building Constituents

The proposed development comprises of 15 apartments:

Level	Use
Ground level	• Lobby, carpark and bin store
Level 1-3	• 12 apartments
Level 4	• 3 apartments

3. KEY ESD INITIATIVES

The following key ESD initiatives have been incorporated into this project:

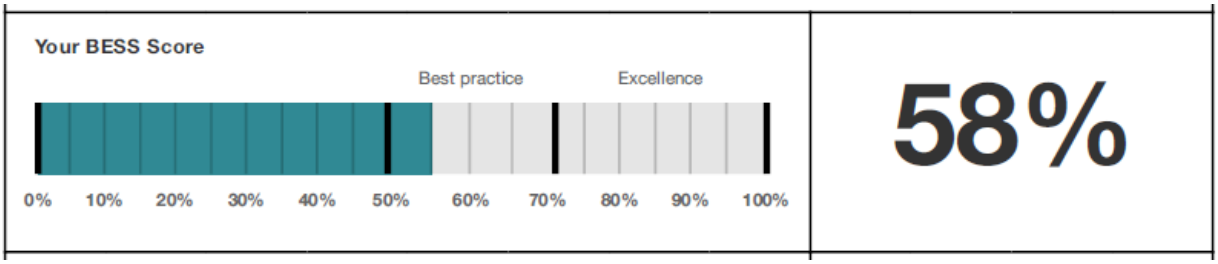
- Efficient air conditioning
- Renewable energy system: 15 kW solar photovoltaic system
- Materials selections to be in accordance with ESD principles.
- Rainwater harvesting for toilet flushing

An assessment of sustainable design outcomes of the proposed development has been undertaken with BESS, STORM and FirstRate (Version 5) benchmarking tools.

The BESS results are summarised below:

3.1 BESS

BESS score for the development is showed below.



Please refer to Appendix 1 for details of the BESS results.

4. ESD CATEGORIES

4.1 Water Efficiency

Rainwater Harvesting

Design Response/ Performance Commitments		Notes
Proposed rainwater collection and reuse system as detailed below:		Rainwater tank reliability analysis has been undertaken to estimate annual mains water savings Savings: 77KL Supply reliability for toilet flushing: 84% Please refer to **Appendix 4** for details of predicted harvested rainwater volumes.
Collection area All roof areas	**Tank Size** 10,000L tank	
Re-use of water for toilet flushing		
Re-use of water for irrigation		

Water Efficient Appliances

Design Response/ Performance Commitments	Notes
Water efficient appliances (where appliances are provided by the developer) will have a 3 WELS star	This includes dishwashers and any other appliances using water.

Water Efficient fittings

Design Response/ Performance Commitments	Notes
Water efficient fittings will be specified in accordance with the following minimum performance standard as rated by the Water Efficiency Labelling Scheme (WELS) ❖ Toilets minimum 4-stars WELS rated ❖ Tap minimum 5-stars WELS rated ❖ Showers minimum 4-stars WELS rated (>6L/min and <= 7.5L/min)	

4.2 Energy Efficiency

Building Design

Design Response/ Performance Commitments	Notes
The following sustainable design features have been integrated into the design of the apartments: ❖ Specification of double glazing to all new windows/glazed door to reduce excessive summer heat gain and winter heat loss	

Energy Rating

Design Response/ Performance Commitments	Notes
The proposed residential development is expected to achieve an average energy rating of **7.3 stars**	The development preliminary energy rating achieved meets the BCA 2019 energy efficiency requirements for Class 2 dwelling. Refer to **Appendix 5** for details of energy rating.

Renewable Energy System

Design Response/ Performance Commitments	Notes
The following renewable energy system will be installed. • A 15kW peak solar photovoltaic system providing renewable energy to offset greenhouse emissions arising from energy usage	The proposed renewable energy system is predicted to result in equivalent avoided greenhouse emissions of approximately 26 tonne $CO_{2\text{-}e}$ each year Refer to Appendix 6 for details about solar panels

Heating & Cooling

Design Response/ Performance Commitments	Notes
4 star (heating and cooling) reverse cycle split systems will be installed in the apartments to provide heating and cooling. Non-star rated units will have performance co-efficient with similar relative efficiency within the range of products commercially available	Product listings and energy efficiency performance information is located at www.energyrating.gov.au

Domestic Hot Water

Design Response/ Performance Commitments	Notes
Domestic hot water will be provided by: ❖ A centralised electric heat pump system with a high COP	

Lighting

Design Response/ Performance Commitments	Notes
Energy efficient lighting systems will be installed throughout including: ❖ LED lighting (within 4W/m^2) to apartments. ❖ An energy efficient external lighting system comprising of LED lighting. ❖ An energy efficient carpark lighting system comprising of LED lighting.	All external area lighting will be controlled through motion/daylight sensor. Also external lighting will be designed to avoid light spill to the night sky.

Carpark Ventilation

Design Response/ Performance Commitments	Notes
Carpark will be naturally ventilated.	

4.3 Stormwater Management

Stormwater Quality

Design Response/ Performance Commitments	Notes
The development achieves a STORM score of 100%. Rainwater tank connected to toilets is required to meet the STORM requirement.	The STORM score attained demonstrates that the development attains the Best Practice Standard for Urban Stormwater. Refer to **Appendix 2** for the STORM report.

4.4 Indoor Environmental Quality

Daylight Access

Design Response/ Performance Commitments	Notes
All liveable rooms should be designed to have excellent access to natural light to maximise energy efficiency.	

Thermal comfort

Design Response/ Performance Commitments	Notes
The use of double-glazing or better performance glazing together with the use of adequate insulation will maximise energy efficiency. High efficiency inverter drive air-conditioning units will also help in providing comfortable indoors.	

Natural Ventilation

Design Response/ Performance Commitments	Notes
All living rooms and bedrooms are effectively ventilated through access to natural ventilation. All liveable rooms have operable windows which exceed BCA windows opening sizes requirement.	Refer to **Appendix 7** for cross flow diagrams.

Acoustics

Design Response/ Performance Commitments	Notes
The use of double-glazing windows and adequate insulation will buffer excessive noise generated by traffic, neighbours and hard surfaces.	

Volatile Organic Compounds

Design Response/ Performance Commitments	Notes
All internal painted surfaces will meet the Total Volatile Organic Compound (TVOC) Content	Low VOC paints will be specified in accordance with the VOC limits set out in Credit IEQ-13.1 Indoor Pollutant of the Green Star Design & As Built Version 1.2.

4.5 Building Materials

Concrete

Design Response/ Performance Commitments	Notes
Concrete used should be specified with the absolute amount of Portland cement across all concrete mixes, which at the same time will reduce embodied energy by substituting it with industrial waste product(s) or oversized aggregate as follows: ❖ 30% for in situ concrete ❖ 20% for precast concrete ❖ 10% for stressed concrete Non-structural concrete will not use natural aggregate.	Note that this is subject to meeting structural requirements and project management constraints

Timber

Design Response/ Performance Commitments	Notes
All timber used within the development including structural timber (subject to engineer's approval) will be recycled or from accredited sustainably harvested plantation sources (FSC or AFS)	Note that this is subject to meeting structural requirements and project management constraints

Flooring

Design Response/ Performance Commitments	Notes
Flooring will be selected from Ecospecifier or have GECA or ISO14001 Certification	Note that this is subject to meeting structural requirements and project management constraints

Paint

Design Response/ Performance Commitments	Notes
All interior paints used will be low VOC type.	Low-VOC paints will be specified in accordance with the VOC limits set out Credit IEQ-13.1 Indoor Pollutant of the Green Star Design & As Built Version 1.2.

4.6 Sustainable Transport

Bicycle Racks

Design Response/ Performance Commitments	Notes
Sufficient storage area within 5 bicycle space within garage.	The bike parking facility available meets the ratios set out in Clause 52.34 of the city of Greater Dandenong Planning Scheme.

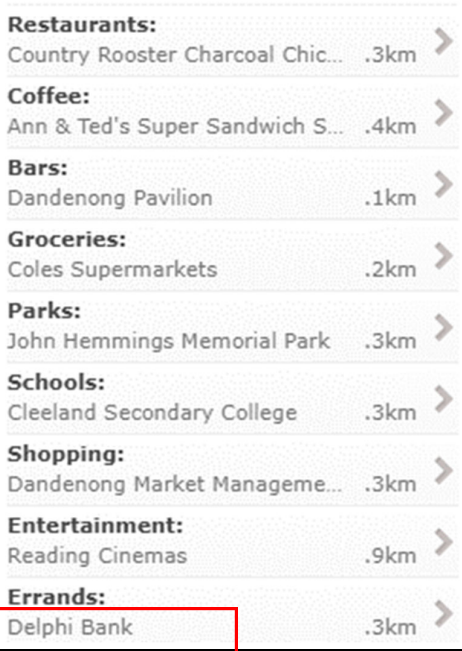
Electric Vehicle Infrastructure

Design Response/ Performance Commitments	Notes
Charging infrastructure for 5 electric vehicles will be installed within the carpark. (32 Amp minimum)	

Walk Score

Design Response/ Performance Commitments	Notes
This development scored 89 out of 100 which is considered to be very walkable.	Walk Score® takes into account the number of facilities within close proximity and provides a numerical score of between 1 and 100, with 1 being heavily car dependant 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.

Trip Reduction

Design Response/ Performance Commitments	Notes
The development is positioned in an ideal location to meet the resident's daily needs. The development is located within close proximity to a number of shops, shopping centres, restaurant, parks and a number of community facilities. ADVERTISED PLAN	

Public Transport Access

Design Response/ Performance Commitments	Notes
This site is well serviced by various forms of public transport including buses. These provide access to a number of various places throughout Greater Dandenong as well as the CBD and outer suburbs. ❖ Closest railway station is Dandenong Station which is approximately 1 km from the dwelling.	

4.7 Waste Management

Operational Waste Management

Design Response/ Performance Commitments	Notes
Waste management facilities will be provided	Refer to WMP

Construction Waste Minimisation

Design Response/ Performance Commitments	Notes
A target recycling rate of 80% of construction and demolition waste has been adopted for the construction phase of the development to minimise the volume of waste to landfill. This will be achieved by the development of a comprehensive waste minimisation strategy including:	A dedicated recycling contractor will be engaged to facilitate separation of commercially viable recyclable waste streams in accordance with the target adopted.

❖ Separation of all commercially viable recyclable waste streams ❖ Training in waste minimisation for all site staff and contractors to form part of site induction training. ❖ Record keeping of landfill waste and recyclable stream volumes to track performance against the 80% recyclable target.	

4.8 Urban Ecology

Landscape

Design Response/ Performance Commitments	Notes
Landscaping has been integrated into the building design including the following:	This feature enhances the ecological value of the dwellings. Drought tolerant plants will be used.

4.9 Innovation

Design Response/ Performance Commitments	Notes
N/A	N/A

4.10 Construction & Building Management

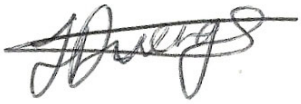
Design Response/ Performance Commitments	Notes
N/A	N/A

6. CONCLUSION

This report presents the environmentally sustainable design (ESD) principles, strategies and mechanism of the proposed apartment building at 58 Princes Hwy, Dandenong. Integrated passive and active sustainable design will aid in the delivery of an energy efficient, water efficient and healthy building.

In terms of performance outcomes, the analysis presented in this report demonstrates that the proposed dwellings exceed the standard of residential building envelope energy efficiency required to satisfy the Building Code of Australia. Furthermore, the combination of design features and services initiatives exceeds Best Practice Standard of the BESS assessment

Accordingly, the sustainable design outcomes detailed in this report are consistent with current industry practice for a residential development of this scale.



Dr. Jonathan Duverge
Director

Appendix 1: BESS

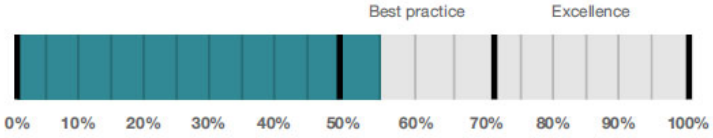
BESS Report

Built Environment Sustainability Scorecard

This BESS report outlines the sustainable design commitments of the proposed development at 58 Princes Hwy Dandenong Victoria 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.

Your BESS Score



58%

Project details

Address	58 Princes Hwy [illegible]
Project no	B7DB8E0E-R2
BESS Version	BESS-6
Site type	Multi unit development (planning)
Account	info@nedesign.net.au
Application no.	
Site area	696.00 m²
Building floor area	1,104.30 m²
Date	05 April 2023
Software version	1.7.1-B.396

Performance by category ● Your development ○ Maximum available

Category	Weight	Score	Pass
Management	5%	25%	
Water	9%	50%	✓
Energy	28%	64%	✓
Stormwater	14%	100%	✓
IEQ	17%	100%	✓
Transport	9%	22%	
Waste	6%	33%	
Urban Ecology	6%	22%	
Innovation	9%	0%	

The Built Environment Sustainability Scorecard is an initiative of the Council Alliance for a Sustainable Built Environment (CASBE).
For more details see **www.bess.net.au**

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Appendix 2: STORM Results

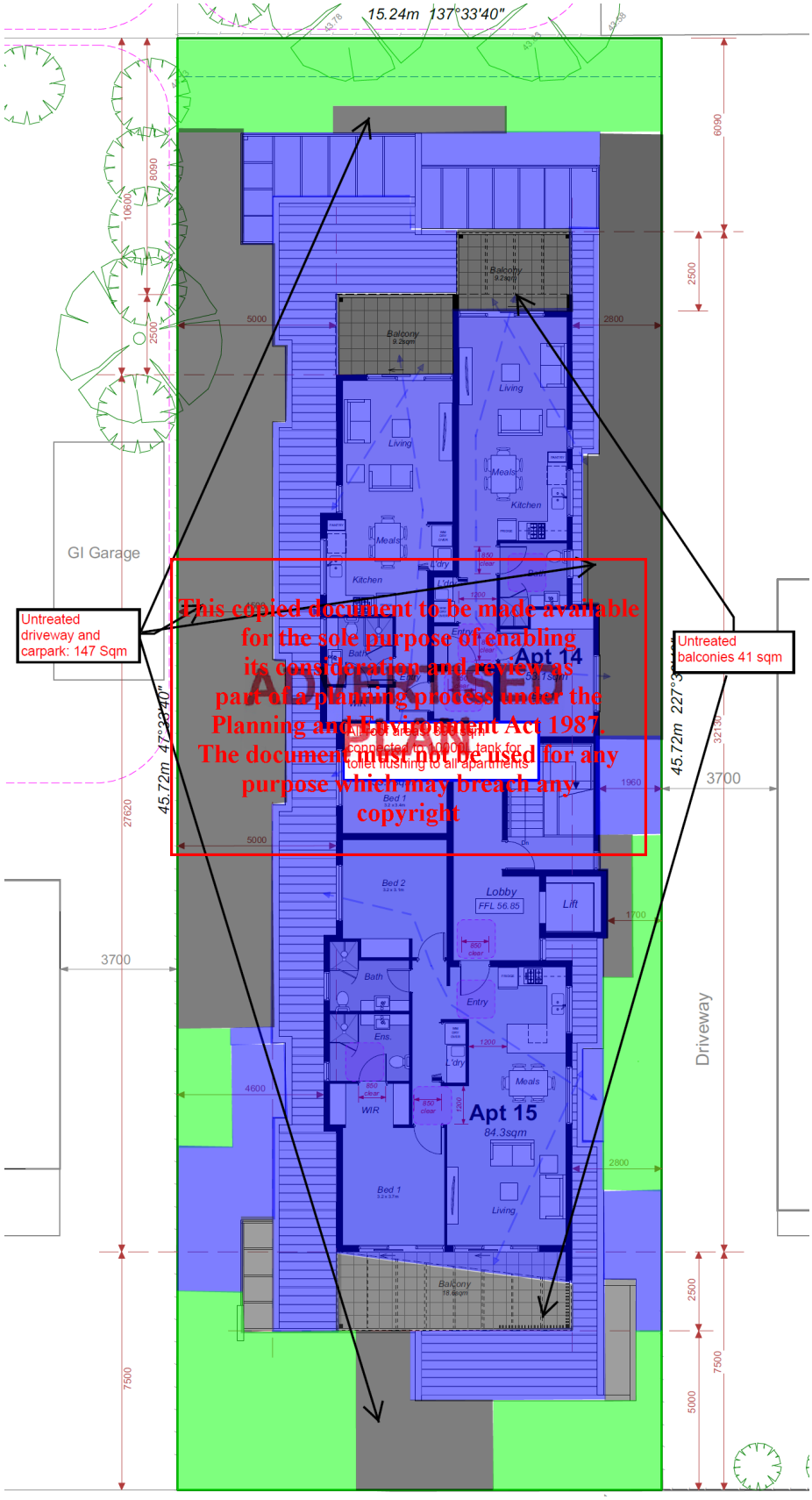
STORM Rating Report

TransactionID:	1557953
Municipality:	GREATER DANDENONG
Rainfall Station:	GREATER DANDENONG
Address:	58 Princess Hwy
	Dandenong
	VIC 3175
Assessor:	Michel Duverge
Development Type:	Residential - Multiunit
Allotment Site (m2):	696.00
STORM Rating %:	105

Description	Impervious Area (m2)	Treatment Type	Treatment Area/Volume (m2 or L)	Occupants / Number Of Bedrooms	Treatment %	Tank Water Supply Reliability (%)
All roof areas	393.00	Rainwater Tank	10,000.00	30	155.20	81.00
Untreated balconies	41.00	None	0.00	0	0.00	0.00
Untreated driveway & carpark	147.00	None	0.00	0	0.00	0.00

Date Generated: 05-Apr-2023 Program Version: 1.0.0

Appendix 3: WSUD Mark-Up Plan



Appendix 4: Rainwater Tank Reliability Analysis

Summary of Required Parameters	
Item	Value
Rainfall Profile	415 mm/yr
Catchment Surface: catchment area	393 m^2
Catchment Surface: runoff coefficient	0.60
First-Flush Volume	0 litres
Rainwater Filter: filter coefficient	0.90
Additional Inputs profile	0.00 m^3/yr
Water Demand profile	91 m^3/yr

Analysis Criteria		
Max. tank size to simulate	10	m^3
Range: 2-1000		

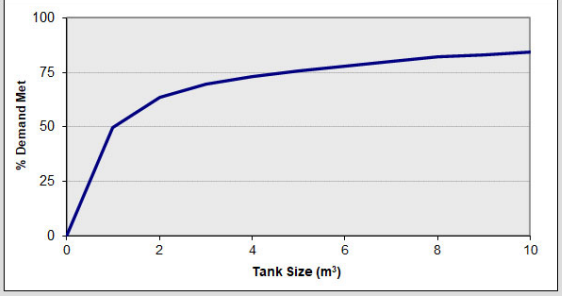
ANALYSE
Click to Start

Analysis status	Complete
Simulating tank size	10m³
% Demand Met	84.3%

Results

Table of Results	
Tank Size	% Met
10	84.3

Tank Size vs. % of Demand Met Graph

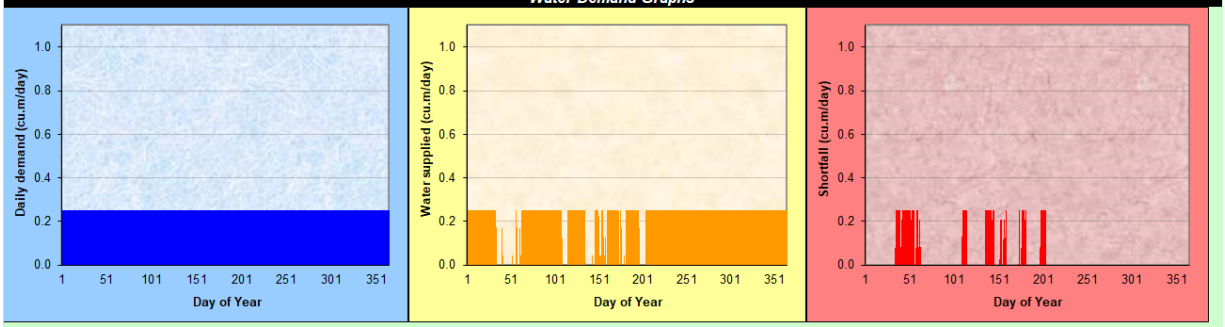


Water Demand Data	View Module
Yearly water demand	91 m³/yr

Summary of Water Demand Results			
		Total yearly water demand	92 m³/yr
		Average daily water demand	0.3 m³/day
Supplied	77 m³/yr	As % of total	84 %
Shortfall	14 m³/yr	As % of total	16 %

Toggle Graphs

Water Demand Graphs



Water demand/day | Water supplied from tank/day | Shortfall (mains top-up required)/day

Appendix 5: Preliminary Energy Rating

Preliminary energy ratings using FirstRate (Version 5.3.2b) are summarised in the table below.

Dwelling	Star Rating	Total (MJ/m^2)	Heating (MJ/m^2)	Cooling (MJ/m^2)
Apt 1	6.9	94.4	70.9	23.5
Apt 2	7.4	79.4	57.2	22.2
Apt 3	7.1	87.2	75.1	12.1
Apt 4	6.9	92.5	77.7	14.8
Apt 5	7.7	66.6	41.7	24.9
Apt 6	8.1	55.3	31.7	23.6
Apt 7	8.0	56.7	43.5	13.2
Apt 8	7.6	71.8	56.6	15.2
Apt 9	7.3	80.2	55.0	25.2
Apt 10	7.4	75.8	50.0	25.8
Apt 11	7.7	68.6	54.8	13.8
Apt 12	7.2	83.8	68.1	15.7
Apt 13	7.4	78.5	60.6	17.9
Apt 14	6.8	97.5	80.8	16.7
Apt 15	6.7	101.1	88.2	12.9
Average Rating	**7.3**	**79.3**	**60.8**	**18.5**

Results shows that proposed apartments exceed the standard required by the Building Code of Australia (Victoria) 2019 in relation to residential sustainability.

BUILDING MATERIALS

Element	Description	Added R Value
Floor Type	Floor: Suspended slab	
Floor Insulation	First floor slab shared with carpark below: R 2.0 insulation	**R 2.0**
Wall Insulation	External lightweight walls: R 2.0 insulation or alternative	**R 2.0**
	Internal walls surrounding bathrooms R 2.0 insulation	**R 2.0**
	Party walls and shared with corridors R 2.0 insulation	**R 2.0**
	All remaining internal walls	**Nil**
Roof Insulation	R 3.5 insulation to ceilings + sarking to underside of flat roof	**R 3.5**
	R 3.5 insulation to ceilings shared with balcony above	**R 3.5**

GLAZING

Glazing Type	Group	Whole of Window Value		Location
Default		**U**	**SHGC**	
ALM-005-03 Aluminium Double Glazed Argon Fill High Solar Gain Low-E Clear	A	4.10	0.47	Group A glazing
ALM-006-03 Aluminium Double Glazed Argon Fill High Solar Gain Low-E Clear	B	4.10	0.52	Group B glazing

Group	Opening
A	• Awning, bifold, casement, tilt & turn, entry door, French door, hinged door
B	• Double hung, fixed, louvre, sliding, stacker door

GENERAL ASSUMPTIONS

Item	Details
Floor Coverings	Tiles to kitchen & wet areas Carpet to remaining areas
Window Coverings	Holland blinds to all windows. (Regulation Mode)[1] Fly screens to all operable windows and sliding doors
Draught Proofing	Weather strips to all doors and windows. Seal all exhaust fans.
Downlights	Recessed down lights in ceiling space (external roof areas) to be fitted with nonvented down light covers to provide air tightness and contact with insulation
General	All rooms classed as conditioned except for bathrooms & ensuites with operable glazing and all party walls are classed as neighbour walls.
Shading	Overshadowing from adjoining buildings/shading devices and screens have been incorporated into the energy ratings
NCC requirement	BCA 2019 vol. 2 Part 3.12.3 requires that seals are to be provided to: a) chimneys and flues b) roof lights i.e. skylights or windows installed in a roof c) around external doors and windows and d) exhaust fans

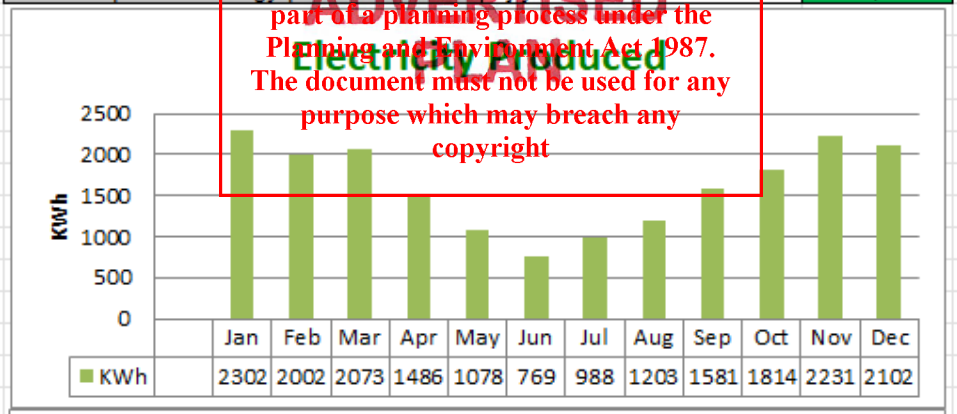
• [1] Holland blinds are assumed as required by BCA Practice No te 55 (Clause 5.2) Assumption for regulatory purposes only.

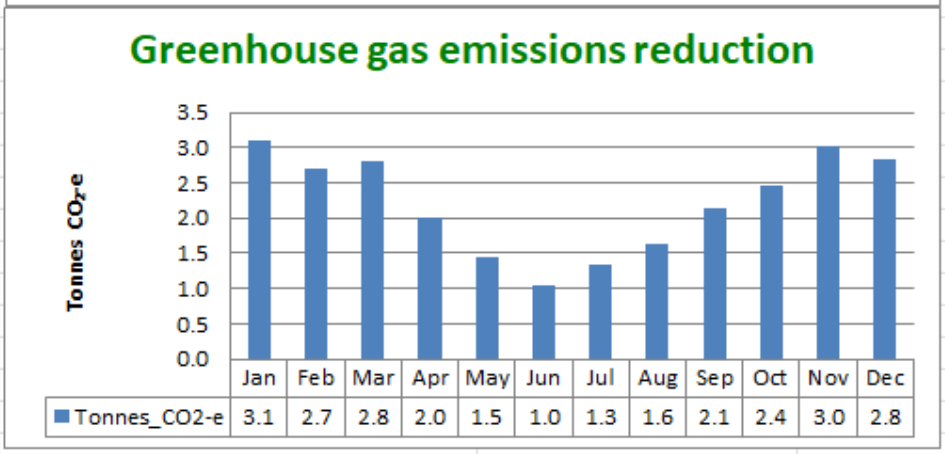
Appendix 6: Solar Photovoltaic System

Site Location: Melbourne
Latitude: 37.67°S
Longitude: 144.83°E
Weather Data: IWEC
Array tilt: 37.67°

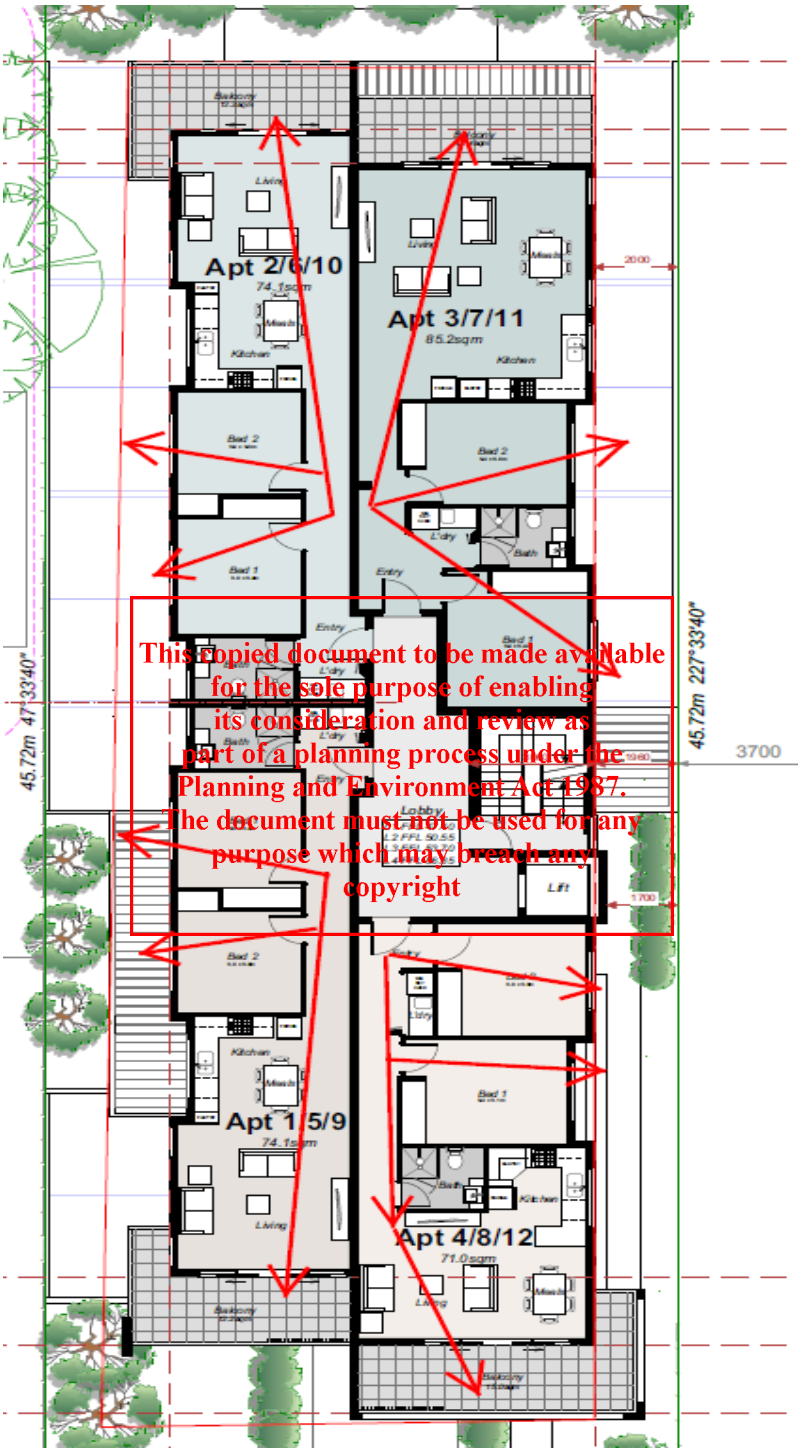
Data		
Total number of bedrooms		28
Average number of people per bedroom		1.1
Total occupants		28

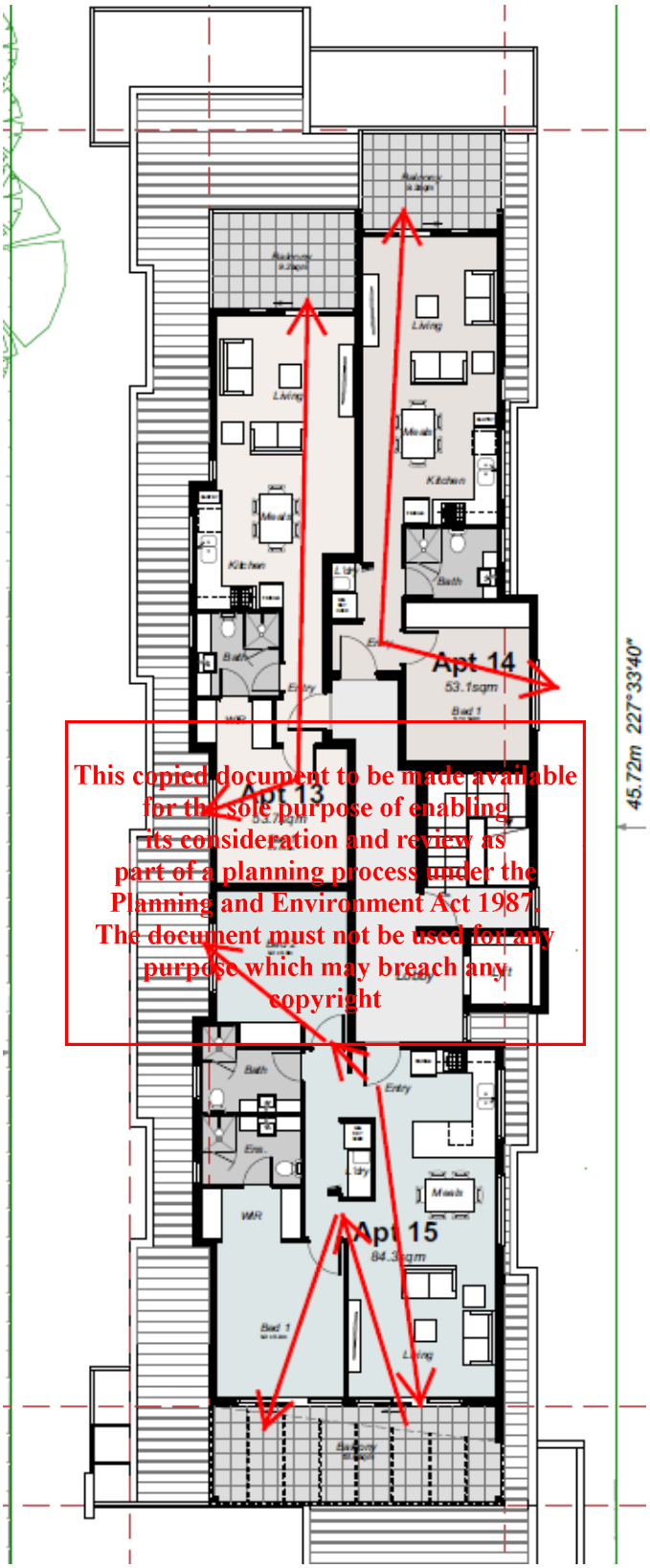
Photovoltaic System		
Electricity gas emissions factor, NG [2]	kg_CO2-e/kWh	1.35
Overall DC-to-AC derate factor		0.77
PV capacity required	kWe	15.0
Typical panel collector	W	400
Number of panels required	rounded up	38
Expected electricity produced	KWh/day	54.9
Annual expected electricity produced	KWh/yr	19,630
Greenhouse gas emissions reduction	tonnes_CO2-e/yr	26.5
Annual equivalent energy produced	MJ/yr	71,649.6





Appendix 7: Cross flow diagrams





BESS Report

Built Environment Sustainability Scorecard

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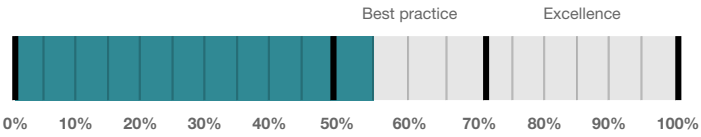
Your BESS Score

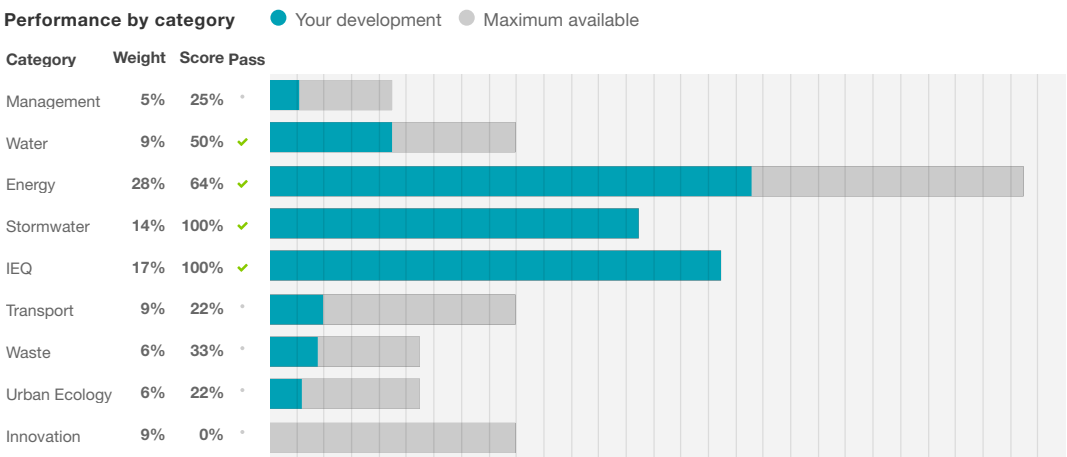


58%

Project details

Address	58 Princes Hwy Dandenong Victoria 3175
Project no	B7DB8E0E-R2
BESS Version	BESS-6
Site type	Multi unit development (apartment building)
Account	info@nedesign.net.a
Application no.	
Site area	696.00 m²
Building floor area	1,104.30 m²
Date	05 April 2023
Software version	1.7.1-B.396

Performance by category



Buildings

Name	Height	Footprint	% of total footprint
Main Building	5	460 m²	100%

Dwellings & Non Res Spaces

Dwellings

Name	Quantity	Area	Building	% of total area
Apartment				
Apartment 15	1	84.3 m²	Main Building	7%
Apartment 11	1	85.2 m²	Main Building	7%
Apartment 7	1	85.2 m²	Main Building	7%
Apartment 3	1	85.2 m²	Main Building	7%
Apartment 12	1	71.0 m²	Main Building	6%
Apartment 10	1	74.1 m²	Main Building	6%
Apartment 9	1	74.1 m²	Main Building	6%
Apartment 8	1	71.0 m²	Main Building	6%
Apartment 6	1	74.1 m²	Main Building	6%
Apartment 5	1	74.1 m²	Main Building	6%
Apartment 4	1	71.0 m²	Main Building	6%
Apartment 2	1	74.1 m²	Main Building	6%
Apartment 1	1	74.1 m²	Main Building	6%
Apartment 14	1	50.1 m²	Main Building	4%
Apartment 13	1	50.7 m²	Main Building	4%
Total	**15**	**1,101 m²**		**100%**

Supporting information

Floorplans & elevation notes

Credit	Requirement	Response	Status
Management 3.1	Individual utility meters annotated	To be printed Refer to notes on the plans	✔
Management 3.3	Common area submeters annotated	To be printed Refer to notes on the plans	✔
Water 3.1	Water efficient garden annotated	To be printed Refer to notes on the plans	✔
Energy 4.2	Floor plans showing location of photovoltaic panels as described.	To be printed Refer to plans	✔
Stormwater 1.1	Location of any stormwater management systems used in STORM or MUSIC modelling (e.g. Rainwater tanks, raingarden, buffer strips)	To be printed Refer to plans	✔
IEQ 1.1	If using BESS daylight calculator, references to floorplans and elevations showing window sizes and sky angles.	To be printed Refer to plans	✔
IEQ 1.2	If using BESS daylight calculator, references to floorplans and elevations showing window sizes and sky angles.	To be printed Refer to plans	✔

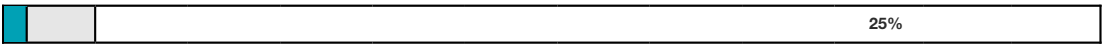
Credit	Requirement	Response	Status
IEQ 1.3	If using BESS daylight calculator, references to floorplans and elevations showing window sizes and sky angles.	To be printed Refer to plans	✔
IEQ 1.5	Floor plans with compliant bedrooms marked	To be printed Refer to plans	✔
IEQ 2.1	Dwellings meeting the requirements for being 'naturally ventilated'	To be printed Refer to plans (All habitable rooms have operable windows	✔
Transport 2.1	Location of electric vehicle charging infrastructure	To be printed Refer to notes on the plans	✔
Waste 2.2	Location of recycling facilities	To be printed Refer to plans	✔
Urban Ecology 2.1	Vegetated areas	To be printed Refer to plans	✔

Supporting evidence

Credit	Requirement	Response	Status
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.	To be printed SDA report Refer to SDA report	✔
Energy 4.2	Specifications of the solar photovoltaic system(s).	To be printed SDA report Refer to SDA report	✔
Stormwater 1.1	STORM report or MUSIC model	To be printed SDA report Refer to SDA report	✔
IEQ 1.1	If using an alternative daylight modelling program, a short report detailing assumptions used and results achieved.	To be printed N/A Daylight modelling not undertaken	✔
IEQ 1.2	If using an alternative daylight modelling program, a short report detailing assumptions used and results achieved.	To be printed Daylight modelling not undertaken	✔
IEQ 1.3	If using an alternative daylight modelling program, a short report detailing assumptions used and results achieved.	To be printed N/A Daylight modelling not undertaken	✔
IEQ 1.5	A list of compliant bedrooms	To be printed Plans Refer to plans	✔
IEQ 2.1	A list of naturally ventilated dwellings	To be printed Plans Refer to plans	✔

Credit summary

Management Overall contribution 4.5%



1.1 Pre-Application Meeting	0%
2.2 Thermal Performance Modelling - Multi-Dwelling Residential	0%
3.1 Metering - Residential	100%
3.3 Metering - Common Areas	100%
4.1 Building Users Guide	0%

Water Overall contribution 9.0%

	Minimum required 50%	50%	Pass
1.1 Potable water use reduction		40%	
3.1 Water Efficient Landscaping		100%	
4.1 Building Systems Water Use Reduction		N/A	Scoped Out
		No chillers or fire safety systems proposed	

Energy Overall contribution 27.5%

	Minimum required 50%	64%	Pass
1.2 Thermal Performance Rating - Residential		50%	
2.1 Greenhouse Gas Emissions		100%	
2.2 Peak Demand		0%	
2.3 Electricity Consumption		100%	
2.4 Gas Consumption		N/A	Scoped Out
		No gas connection in use	
3.1 Carpark Ventilation		N/A	Scoped Out
		Carpark open	
3.2 Hot Water		100%	
3.4 Clothes Drying		0%	
3.6 Internal Lighting - Residential Multiple Dwellings		100%	
4.2 Renewable Energy Systems - Solar		100%	
4.4 Renewable Energy Systems - Other		0%	Disabled
		No other (non-solar PV) renewable energy is in use.	

Stormwater Overall contribution 13.5%

	Minimum required 100%	100%	Pass
1.1 Stormwater Treatment		100%	

IEQ Overall contribution 16.5%

	Minimum required 50%	100%	Pass
1.1 Daylight Access - Living Areas		100%	
1.2 Daylight Access - Bedrooms		100%	
1.3 Winter Sunlight		100%	
1.5 Daylight Access - Minimal Internal Bedrooms		100%	
2.1 Effective Natural Ventilation		100%	

Transport Overall contribution 9.0%

	22%
1.1 Bicycle Parking - Residential	0%
1.2 Bicycle Parking - Residential Visitor	0%
1.3 Bicycle Parking - Convenience Residential	0% ⊘ Disabled
	Credit 1.1 must be achieved first.
2.1 Electric Vehicle Infrastructure	100%
2.2 Car Share Scheme	0%
2.3 Motorbikes / Mopeds	0%

Waste Overall contribution 5.5%

	33%
1.1 - Construction Waste - Building Re-Use	0%
2.1 - Operational Waste - Food & Garden Waste	0%
2.2 - Operational Waste - Convenience of Recycling	100%

Urban Ecology Overall contribution 5.5%

	22%
1.1 Communal Spaces	0%
2.1 Vegetation	50%
2.2 Green Roofs	0%
2.3 Green Walls and Facades	0%
2.4 Private Open Space - Balcony / Courtyard Ecology	0%
3.1 Food Production - Residential	0%

Innovation Overall contribution 9.0%

	0%
1.1 Innovation	0%

Credit breakdown

Management Overall contribution 1%

1.1 Pre-Application Meeting		0%
Score Contribution	This credit contributes 37.5% towards the category score.	
Criteria	Has an ESD professional been engaged to provide sustainability advice from schematic design to construction? AND Has the ESD professional been involved in a pre-application meeting with Council?	
Question	Criteria Achieved ?	
Project	No	

2.2 Thermal Performance Modelling - Multi-Dwelling Residential		0%
Score Contribution	This credit contributes 25.0% towards the category score.	
Criteria	Have preliminary NatHERS ratings been undertaken for all thermally unique dwellings?	
Question	Criteria Achieved ?	
Apartment	-	

3.1 Metering - Residential		100%
Score Contribution	This credit contributes 12.5% towards the category score.	
Criteria	Have utility meters been provided for all individual dwellings?	
Question	Criteria Achieved ?	
Apartment	Yes	

3.3 Metering - Common Areas		100%
Score Contribution	This credit contributes 12.5% towards the category score.	
Criteria	Have all major common area services been separately submetered?	
Question	Criteria Achieved ?	
Apartment	Yes	

4.1 Building Users Guide		0%
Score Contribution	This credit contributes 12.5% towards the category score.	
Criteria	Will a building users guide be produced and issued to occupants?	
Question	Criteria Achieved ?	
Project	No	

Water Overall contribution 4% Minimum required 50%

Water Approach	
What approach do you want to use for Water?:	Use the built in calculation tools
Project Water Profile Question	
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	
Building: All	Main Building
Showerhead: All	4 Star WELS (>= 6.0 but <= 7.5)
Bath: All	Scope out
Kitchen Taps: All	>= 5 Star WELS rating
Bathroom Taps: All	>= 5 Star WELS rating
Dishwashers: All	>= 3 Star WELS rating
WC: All	>= 4 Star WELS rating
Urinals: All	Scope out
Washing Machine Water Efficiency: All	Occupant to Install
Which non-potable water source is the cooling tower connected to?: All	Main tank
Non-potable water source connected to Toilets: All	Yes
Non-potable water source connected to Laundry (Washing machine): All	No
Non-potable water source connected to Hot Water System: All	No
Rainwater Tank	
What is the total roof area connected to the rainwater tank?: Main tank	1,000 m²
Tank Size: Main tank	10,000 Litres
Irrigation area connected to tank: Main tank	50.0 m²
Is connected irrigation area a water efficient garden?: Main tank	Yes
Other external water demand connected to tank?: Main tank	0.0 Litres/Day

1.1 Potable water use reduction		40%
Score Contribution	This credit contributes 83.3% towards the category score.	
Criteria	What is the reduction in total potable water use due to efficient fixtures, appliances, rainwater use and recycled water use? To achieve points in this credit there must be >25% potable water reduction.	
Output	Reference	
Project	1768 kL	
Output	Proposed (excluding rainwater and recycled water use)	
Project	1445 kL	
Output	Proposed (including rainwater and recycled water use)	
Project	1248 kL	
Output	% Reduction in Potable Water Consumption	
Project	29 %	
Output	% of connected demand met by rainwater	
Project	100 %	
Output	How often does the tank overflow?	
Project	Very Often	
Output	Opportunity for additional rainwater connection	
Project	662 kL	
3.1 Water Efficient Landscaping		100%
Score Contribution	This credit contributes 16.7% towards the category score.	
Criteria	Will water efficient landscaping be installed?	
Question	Criteria Achieved ?	
Project	Yes	
4.1 Building Systems Water Use Reduction		N/A ✧ Scoped Out
This credit was scoped out	No chillers or fire safety systems proposed	

Energy

Overall contribution 18% Minimum required 50%

Dwellings Energy Approach	
What approach do you want to use for Energy?:	Use the built in calculation tools
Project Energy Profile Question	
Are you installing any solar photovoltaic (PV) system(s)?:	Yes
Are you installing any other renewable energy system(s)?:	No
Gas supplied into building:	No gas connection
Dwelling Energy Profiles	
Building: All	Main Building

Below the floor is:
Ground or Carpark
Apartment 1
Apartment 2
Apartment 3
Apartment 4
Another Occupancy
Apartment 5
Apartment 6
Apartment 7
Apartment 8
Apartment 9
Apartment 10
Apartment 11
Apartment 12
Apartment 13
Apartment 14
Apartment 15

Above the ceiling is:	
Another Occupancy	Apartment 1
	Apartment 2
	Apartment 3
	Apartment 4
	Apartment 5
	Apartment 6
	Apartment 7
	Apartment 8
	Apartment 9
	Apartment 10
	Apartment 11
	Apartment 12
Outside	Apartment 13
	Apartment 14
	Apartment 15

Exposed sides: All 2

NatHERS Annual Energy Loads - Heat:	
Apartment 1	70.9 MJ/sqm
Apartment 2	57.2 MJ/sqm
Apartment 3	75.1 MJ/sqm
Apartment 4	77.7 MJ/sqm
Apartment 5	41.7 MJ/sqm
Apartment 6	31.7 MJ/sqm
Apartment 7	43.5 MJ/sqm
Apartment 8	56.6 MJ/sqm
Apartment 9	55.0 MJ/sqm
Apartment 10	50.0 MJ/sqm
Apartment 11	54.8 MJ/sqm
Apartment 12	68.1 MJ/sqm
Apartment 13	60.6 MJ/sqm
Apartment 14	80.8 MJ/sqm
Apartment 15	88.2 MJ/sqm
NatHERS Annual Energy Loads - Cool:	
Apartment 1	23.5 MJ/sqm
Apartment 2	22.2 MJ/sqm
Apartment 3	12.1 MJ/sqm
Apartment 4	14.8 MJ/sqm
Apartment 5	24.3 MJ/sqm
Apartment 6	23.6 MJ/sqm
Apartment 7	13.2 MJ/sqm
Apartment 8	15.2 MJ/sqm
Apartment 9	23.2 MJ/sqm
Apartment 10	25.8 MJ/sqm
Apartment 11	13.8 MJ/sqm
Apartment 12	15.7 MJ/sqm
Apartment 13	17.9 MJ/sqm
Apartment 14	16.7 MJ/sqm
Apartment 15	12.9 MJ/sqm

NatHERS star rating:
6.9 Apartment 1
Apartment 4
7.4 Apartment 2
Apartment 10
Apartment 13
7.1Apartment 3
7.7 Apartment 5
Apartment 11
8.1Apartment 6
8.0Apartment 7
7.6Apartment 8
7.3Apartment 9
7.2Apartment 12
6.8Apartment 14
6.7Apartment 15

Type of Heating System: All	D Reverse cycle space
Heating System Efficiency: All	4 Star
Type of Cooling System: All	Refrigerative space
Cooling System Efficiency: All	4 Stars
Type of Hot Water System: All	C Electric Heat Pump
% Contribution from solar hot water system: All	0 %
Is the hot water system shared by multiple dwellings?: All	Yes
Clothes Line: All	A No drying facilities
Clothes Dryer: All	Occupant to Install

Solar Photovoltaic system		
System Size (lesser of inverter and panel capacity):	PV system	15.0 kW peak
Orientation (which way is the system facing)?:	PV system	North
Inclination (angle from horizontal):	PV system	20.0 Angle (degrees)

1.2 Thermal Performance Rating - Residential		50%
Score Contribution	This credit contributes 35.3% towards the category score.	
Criteria	What is the average NatHERS rating?	
Output	Average NATHERS Rating (Weighted)	
Apartment	7.3 Stars	

2.1 Greenhouse Gas Emissions		100%
Score Contribution	This credit contributes 11.8% towards the category score.	
Criteria	What is the % reduction in annual greenhouse gas emissions against the benchmark?	
Output	Reference Building with Reference Services (BCA only)	
Apartment	94,672 kg CO2	
Output	Proposed Building with Proposed Services (Actual Building)	
Apartment	34,729 kg CO2	
Output	% Reduction in GHG Emissions	
Apartment	63 %	

2.2 Peak Demand		0%
Score Contribution	This credit contributes 0.0% towards the category score.	
Criteria	What is the % reduction in the instantaneous (peak-hour) demand against the benchmark?	
Output	Peak Thermal Cooling Load - Baseline	
Apartment	177 kW	
Output	Peak Thermal Cooling Load - Proposed	
Apartment	164 kW	
Output	Peak Thermal Cooling Load - % Reduction	
Apartment	7 %	

2.3 Electricity Consumption		100%
Score Contribution	This credit contributes 11.8% towards the category score.	
Criteria	What is the % reduction in annual electricity consumption against the benchmark?	
Output	Reference	
Apartment	92,815 kWh	
Output	Proposed	
Apartment	34,049 kWh	
Output	Improvement	
Apartment	63 %	

2.4 Gas Consumption		N/A ◈ Scoped Out
This credit was scoped out	No gas connection in use	

3.1 Carpark Ventilation		N/A	Scoped Out
This credit was scoped out	Carpark open		
3.2 Hot Water		100%	
Score Contribution	This credit contributes 5.9% towards the category score.		
Criteria	What is the % reduction in annual energy consumption (gas and electricity) of the hot water system against the benchmark?		
Output	Reference		
Apartment	40,122 kWh		
Output	Proposed		
Apartment	16,956 kWh		
Output	Improvement		
Apartment	57 %		
3.4 Clothes Drying		0%	
Score Contribution	This credit contributes 5.9% towards the category score.		
Criteria	What is the % reduction in annual energy consumption (gas and electricity) from a combination of clothes lines and efficient driers against the benchmark?		
Output	Reference		
Apartment	6,846 kWh		
Output	Proposed		
Apartment	6,846 kWh		
Output	Improvement		
Apartment	0 %		
3.6 Internal Lighting - Residential Multiple Dwellings		100%	
Score Contribution	This credit contributes 11.8% towards the category score.		
Criteria	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)?		
Question	Criteria Achieved ?		
Apartment	Yes		
4.2 Renewable Energy Systems - Solar		100%	
Score Contribution	This credit contributes 5.9% towards the category score.		
Criteria	What % of the estimated energy consumption of the building class it supplies does the solar power system provide?		
Output	Solar Power - Energy Generation per year		
Apartment	19,155 kWh		
Output	% of Building's Energy		
Apartment	56 %		
4.4 Renewable Energy Systems - Other		0%	Disabled
This credit is disabled	No other (non-solar PV) renewable energy is in use.		

Stormwater

Overall contribution 14% Minimum required 100%

Which stormwater modelling are you using?:	Melbourne Water STORM tool
1.1 Stormwater Treatment	100%
Score Contribution	This credit contributes 100.0% towards the category score.
Criteria	Has best practice stormwater management been demonstrated?
Question	STORM score achieved
Project	100
Output	Min STORM Score
Project	100

IEQ

Overall contribution 16% Minimum required 50%

IEQ DTS	
Use the BESS Deemed to Satisfy (DtS) method for IEQ?:	Yes
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?:	Yes
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

Dwellings IEQ Approach	
What approach do you want to use for dwellings?:	-

1.1 Daylight Access - Living Areas		100%
Score Contribution	This credit contributes 27.3% towards the category score.	
Criteria	What % of living areas achieve a daylight factor greater than 1%	
Output	Calculated percentage	
Apartment	100 %	

1.2 Daylight Access - Bedrooms		100%
Score Contribution	This credit contributes 27.3% towards the category score.	
Criteria	What % of bedrooms achieve a daylight factor greater than 0.5%	
Output	Calculated percentage	
Apartment	100 %	

1.3 Winter Sunlight		100%
Score Contribution	This credit contributes 9.1% towards the category score.	
Criteria	Do 70% of dwellings receive at least 3 hours of direct sunlight in all Living areas between 9am and 3pm in mid-winter?	
Question	Criteria Achieved ?	
Apartment	Yes	

1.5 Daylight Access - Minimal Internal Bedrooms		100%
Score Contribution	This credit contributes 9.1% towards the category score.	
Criteria	Do at least 90% of dwellings have an external window in all bedrooms?	
Question	Criteria Achieved ?	
Apartment	Yes	

2.1 Effective Natural Ventilation		100%
Score Contribution	This credit contributes 27.3% towards the category score.	
Criteria	What % of dwellings are effectively naturally ventilated?	
Question	Percentage Achieved?	
Apartment	100 %	

Transport Overall contribution 2%

1.1 Bicycle Parking - Residential		0%
Score Contribution	This credit contributes 22.2% towards the category score.	
Criteria	How many secure and undercover bicycle spaces are there per dwelling for residents?	
Question	Bicycle Spaces Provided ?	
Apartment	4	
Output	Min Bicycle Spaces Required	
Apartment	15	

1.2 Bicycle Parking - Residential Visitor		0%
Score Contribution	This credit contributes 22.2% towards the category score.	
Criteria	How many secure bicycle spaces are there per 5 dwellings for visitors?	
Question	Visitor Bicycle Spaces Provided ?	
Apartment	0	

1.3 Bicycle Parking - Convenience Residential		0% ⊘ Disabled
This credit is disabled	Credit is disabled in this version.	

2.1 Electric Vehicle Infrastructure		100%
Score Contribution	This credit contributes 22.2% towards the category score.	
Criteria	Are facilities provided for the charging of electric vehicles?	
Question	Criteria Achieved ?	
Project	Yes	

2.2 Car Share Scheme		0%
Score Contribution	This credit contributes 11.1% towards the category score.	
Criteria	Has a formal car sharing scheme been integrated into the development?	
Question	Criteria Achieved ?	
Project	No	

2.3 Motorbikes / Mopeds		0%
Score Contribution	This credit contributes 11.1% towards the category score.	
Criteria	Are a minimum of 5% of vehicle parking spaces designed and labelled for motorbikes (must be at least 5 motorbike spaces)?	
Question	Criteria Achieved ?	
Project	No	

Waste Overall contribution 2%

1.1 - Construction Waste - Building Re-Use	0%
Score Contribution	This credit contributes 33.3% towards the category score.
Criteria	If the development is on a site that has been previously developed, has at least 30% of the existing building been re-used?
Question	Criteria Achieved ?
Project	No

2.1 - Operational Waste - Food & Garden Waste	0%
Score Contribution	This credit contributes 33.3% towards the category score.
Criteria	Are facilities provided for on-site management of food and garden waste?
Question	Criteria Achieved ?
Project	No

2.2 - Operational Waste - Convenience of Recycling	100%
Score Contribution	This credit contributes 33.3% towards the category score.
Criteria	Are the recycling facilities at least as convenient for occupants as facilities for general waste?
Question	Criteria Achieved ?
Project	Yes

Urban Ecology Overall contribution 1%

1.1 Communal Spaces	0%
Score Contribution	This credit contributes 11.1% towards the category score.
Criteria	Is there at least the following amount of common space measured in square meters : * 1m² for each of the first 50 occupants * Additional 0.5m² for each occupant between 51 and 250 * Additional 0.25m² for each occupant above 251?
Question	Common space provided
Apartment	0.0 m²
Output	Minimum Common Space Required
Apartment	29 m²
2.1 Vegetation	50%
Score Contribution	This credit contributes 44.4% towards the category score.
Criteria	How much of the site is covered with vegetation, expressed as a percentage of the total site area?
Question	Percentage Achieved ?
Project	16 %
2.2 Green Roofs	0%
Score Contribution	This credit contributes 11.1% towards the category score.
Criteria	Does the development incorporate a green roof?
Question	Criteria Achieved ?
Project	No
2.3 Green Walls and Facades	0%
Score Contribution	This credit contributes 11.1% towards the category score.
Criteria	Does the development incorporate a green wall or green façade?
Question	Criteria Achieved ?
Project	No
2.4 Private Open Space - Balcony / Courtyard Ecology	0%
Score Contribution	This credit contributes 11.1% towards the category score.
Criteria	Is there a tap and floor waste on every balcony / in every courtyard?
Question	Criteria Achieved ?
Apartment	No
3.1 Food Production - Residential	0%
Score Contribution	This credit contributes 11.1% towards the category score.
Criteria	What area of space per resident is dedicated to food production?
Question	Food Production Area
Apartment	0.0 m²
Output	Min Food Production Area
Apartment	8 m²

Innovation Overall contribution 0%

1.1 Innovation		0%
Score Contribution	This credit contributes 100.0% towards the category score.	
Criteria	What percentage of the Innovation points have been claimed (10 points maximum)?	

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