City of Greater Geelong, Statutory Planning - Date Received 16/07/2022

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Sustainability Management Plan

Balmoral Quay – Stage 5

Rippleside VIC 3215

Prepared for: Balmoral Quay Pty Ltd

Project No.: VIC200313

Revision No.: E

City of Greater Geelong, Statutory Planning - Date Received 16/07/2022

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REVISIONS

Revision	Date	Purpose	Prepared By	Approved By
A	30.04.2021	For Information	JC	ML
B	06.05.2021	For Town Planning	JC	ML
C	14.07.2022	Updated to council comments	JC	ML
D	15.07.2022	Updated to council comments	JC	ML
E	15.07.2022	Updated to council comments	JC	ML

Review Panel	
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City of Greater Geelong, Statutory Planning - Date Received 16/07/2022

Table of Contents

City of Greater Geelong, Statutory Planning - Date Received 16/07/2022

City of Greater Geelong, Statutory Planning - Date Received 16/07/2022

List of Figures

List of Tables

City of Greater Geelong, Statutory Planning - Date Received 16/07/2022

1 Executive Summary

1.1 Introduction

This report provides an overview of the sustainable design strategy for a proposed mixed use development, which is situated within the municipal boundaries of Greater Geelong City Council. The development consists of commercial tenancies, residential apartments and a basement car park.

1.2 Statutory Context

Planning Applications lodged with City of Greater Geelong for non-residential developments larger than 1000 sqm are required to submit a Sustainable Design Assessment (SMP) demonstrating how sustainability measures have been incorporated into the design. For this development, the key categories to be addressed are:

- Energy performance and Greenhouse Gas Emissions
- Water resources
- Indoor Environment Quality
- Stormwater Management
- Transport
- Waste Management
- Urban Ecology
- Materials

1.3 ESD Objectives & BESS Targets

The objective of the report is to indicate how environmentally sustainable design features are being included in the Balmoral Quay Stage 5 project. The report will highlight specifically the ESD objectives for the development and the proposed initiatives to meet these objectives.

The sustainable design assessment tool identified to be used to evaluate this project is the Built Environment Sustainability Scorecard (BESS) tool which will be used to assess the project against benchmarks over nine environmental categories. These categories include:

- Management
- Energy
- Water
- Stormwater
- IEQ
- Transport
- Waste
- Urban Ecology
- Innovation

The BESS tool rates the project out of 100% whereby a score of 50% or higher is considered to be 'Best Practice', whereas achieving a score of 70% or higher is considered to be 'Excellence'. In order to achieve an overall ‘pass’ for best practice there are four mandatory categories that are required to achieve a minimum pass in their own right. These include:

- Indoor Environment Quality (IEQ)
- Energy
- Water
- Stormwater

A summary of the BESS score outcomes for the current project are provided in Table 1. A copy of the corresponding 'Published' BESS report in provided in Appendix C.

The project currently achieves a BESS score of 77% which is considered to be 'Excellence' performance. It is envisaged that this project could achieve a higher BESS score if proposed innovations points were to be implemented, refer Section 10.

Table 1: BESS Score Summary

Element	Required Score	Project Score	Compliance
Management	0%	100%	-
Water	50%	71%	Yes
Energy	50%	68%	Yes
Stormwater	100%	100%	Yes
Indoor Environment Quality	50%	72%	Yes
Transport	0%	100%	-
Waste	0%	67%	-
Urban Ecology	0%	78%	-
Innovation	0%	50%	-
Total	**50%**	**77%**	**Yes**

In addition to BESS, Green Star Design & As Built v1.3 and One Planet Living guidelines have been used to provide additional information and address other key categories not specifically cover such as Building Materials and Innovation, where applicable.

1.4 Report Outcomes

The aim of this report is to highlight specifically the ESD objectives for the development and to report on project outcomes. This includes detailing what BESS categories have been targeted as well as to give an indicative BESS score. Section J, STORM and Daylighting calculation tools will be employed as part of this assessment to demonstrate compliance where required. In the case where a specific category has not achieved the appropriate score within the BESS assessment tool, guidance has been provided on how it could be achieved.

To ensure all items are addressed and implemented throughout the design, construction and operation stages of the project a summary of the ESD/BESS initiatives and BESS scores as well as identified responsible parties has been provided in Appendix C.

1.5 One Planet Living

One Planet Living is a holistic approach to sustainability, going beyond cutting carbon and energy, but to enhance occupant wellbeing and building better communities and businesses. Geelong Council is a One Planet Council, in the Bioregional Australia's One Planet Council program and has aligned its principles with the Council's Environmental Management Strategy to provide more sustainable buildings.

1.6 ESD Initiatives Summary

The sustainability measures for this project incorporate BESS requirements, Green Star elements and other ESD initiatives as documented in this report.

In alignment with the ten principle headings of One Planet Living, the ESD initiatives have been categorised accordingly as detailed in Table 2.

Table 2: ESD Initiatives

Principles	Project ESD Initiatives
Health and Happiness	▪ Extensive amenity provided to outdoor areas ▪ Incorporating landscape and garden areas ▪ External stairs promoting walkability and wayfinding ▪ Good daylight potential through glazing and skylights ▪ Access to external views ▪ Improvements to pathways and connections with surrounding community, amenity, local parks and beaches ▪ Acoustic comfort to building and particularly rest areas ▪ Paths guide people towards the building, or leads residents out towards local parks and beaches ▪ No upward facing lights causing light pollution
Equity and Local economy	▪ Provide an "Accessible Design" option as part of a suite of incentive packages offered, at no cost to owner. All "Aussie Homes" to be made available with Silver Living Design standard ▪ Affordable homes to be provided through mixed dwelling sizes. ▪ Access to low-cost edible foods through native foraging and local beehives ▪ Local Materials Sourcing
Culture and community	▪ Shaded seating areas throughout public areas and street for community conversations and neighborliness ▪ Open Stairwells to promote a sense of community overlooking courtyards ▪ Curated art installations solely for human delight and the celebration of culture and spirit, following the 'Beauty' Credit in the living building challenge. ▪ Designs and colours chosen are inspired from the environment and integrated in the project design ▪ Building user's guide to occupants in correct and optimal building operation ▪ Including local Aboriginal and Torres Strait Islander communities in the design and its impacts, whilst sharing indigenous knowledge and culture to others. ▪ Implementing and monitoring strategies that are tailored to community health needs and issues that promote health equity.

Land and Nature	▪ Reuse of existing land ▪ Rooftop landscaped areas providing efficient use of site and reducing urban heat island effect ▪ Communal outdoor spaces ▪ Range of natives and productive (edible food) plants to create habitat and biodiversity ▪ Plant trees along street frontages to create privacy barriers for residents
Sustainable water	▪ Water efficient WELS rated fixtures and fittings ▪ Drought tolerant and native planting, where possible ▪ Rainwater harvesting and 40000L storage tank for toilet flushing and irrigation ▪ Reduction in outflows to sewer ▪ Improved stormwater quality
Local and sustainable food	▪ Native edible plants to encourage healthy eating and foraging for communities ▪ Apiary located to increase biodiversity through cross pollination of local flora, whilst also creating byproducts such as beeswax and honey for residents
Travel and transport	▪ Bicycle parking facilities for residents and visitors ▪ Access to public transport and cycle routes ▪ Good neighbourhood walkability and amenity ▪ Electric vehicle charging stations ▪ Electric bike facilities ▪ Shared Car Scheme
Materials and products	▪ Sustainable material selection for PVC, steel and timber ▪ Use of low toxicity material for paints, adhesives, sealants, carpets and engineered wood products ▪ Low VOC sealants and adhesives to air handling systems ▪ Zero ODP refrigerants
Zero waste	▪ Different types of waste streams are provided such as: General waste, Glass, Other recyclables (paper, cardboard, steel and plastics), Green waste, and Food/organic waste ▪ Provide space for the collection of hazardous waste and E-waste ▪ Where possible, construction waste is to be reused or recycled. ▪ Reinvigoration of existing land
Zero carbon energy	▪ High performance building fabric and glazing ▪ Average house energy rating greater than 7.5 stars ▪ Design for climate change, incorporating key attributes to avoid overheating in future climate scenarios ▪ Renewable energy in the form of a 50kW rooftop solar photovoltaic system ▪ Energy efficient building services, appliances, and fixtures ▪ Embedded energy network ▪ Designed for Cross Flow ventilation to reduce the loads on HVAC systems ▪ High quality Services

City of Greater Geelong, Statutory Planning - Date Received 16/07/2022

1.7 Sources of Information

The following sources of information were used in the generation of this report:

- Architectural drawings provided by SJB Architects, Town Planning Issue, dated 30/06/2022
- Greater Geelong planning Scheme, dated 31/07/2018
- Landscape Concept report, provided by Tract, dated 28/04/2021
- Waste Management report provided by Leigh Design dated 08/04/2021
- Section J report provided by ACOR Consultants dated 30/04/2021
- NatHERS report provided by ACOR Consultants dated 30/04/2021
- Development Planning Permit Response provided by City of Greater Geelong, dated 22/09/2021

1.8 Limitations

Computer building simulations, daylight analysis and other calculations, when provided for a project, deliver an estimate of building performance. This estimate is based on a necessarily simplified and idealised version of the building that does not and cannot fully represent all of the intricacies of the building once built. As a result, simulation and calculation results only represent an interpretation of the potential performance of the building. No guarantee or warranty of building performance in practice can be based on these results alone.

City of Greater Geelong, Statutory Planning - Date Received 16/07/2022

2 Management & Construction Practices

2.1 ESD Consultant

BESS Score: 100%

The council seeks to encourage the early involvement of a suitability qualified ESD professional at the preliminary design stage of a new project and has attended a meeting with Council.

The project design team includes a specialist ESD consultant to assist in identifying opportunities and advise on incorporating best practice sustainability measures into the design. The ESD consultant has attended the BESS training course.

2.2 Thermal performance modelling

BESS Score: 100%

This development is considered a non-residential project within the BESS assessment tool and points are awarded where it can be shown, through a preliminary calculation that the design meets or exceeds the Deemed-to-Satisfy requirements of the National Construction Code (NCC) Section J – Energy Efficiency.

This project will not undergo JV3 assessment, however, this development will meet or exceed the requirements of NCC Section J (where appliable), in terms of:

- Building Fabric
- Glazing
- Air conditioning, heating and ventilation
- Lighting power density
- Domestic Heated Water

2.3 Metering & Sub-Metering

BESS Score: 100%

This project will have dedicated meters for the usage of electricity and cold water. Hot water meters will be used to determine the usage of gas consumed to produce hot water and will be billed individually to each tenant, if there is use of gas in this building.

Electrical check meters can be provided to monitor lighting and power energy consumption separately in accordance with BCA Section J8.3.

2.4 Building Users Guide

BESS Score: 100%

Points are awarded in BESS where there is a commitment to develop and provide a Building Users' Guide for the use by occupants and building maintenance. This may be in the form of a simple booklet and/or in conjunction with informational signage throughout the building.

The guide may include information on the following:

- Operating appliances and building services for energy and water efficiency
- Passive features for comfort and energy efficiency
- Local transport including buses, trains, and pedestrian and bike routes
- Waste and recycling
- Building-wide features such as rainwater harvesting

City of Greater Geelong, Statutory Planning - Date Received 16/07/2022

- Selection of sustainable and low toxicity materials
- Links to further and updated information

3 Energy

Incorporating energy efficiency and passive design features into a building assists in reducing the load on the mechanical and electrical systems within the building and is the first step in maximising the sustainable design potential of a building. These features include:

- High levels of thermal insulation
- High performance glazing
- Daylighting
- External shading
- Natural ventilation

In the BESS energy category points are awards where the proposed building delivers energy savings above a benchmark building. This benchmark building is based on minimum standards with the Building Code of Australia.

3.1 Thermal Energy Efficiency

BESS Score: 38%

This project consists of an office tenancy and prospective cafe space on the ground floor which falls under building classification Class 5 and 6 of the National Construction Code (NCC) 2019 and are required to with Section J Energy Efficiency requirements. Currently the building fabric and glazing have been assessed under the Deemed-to-Satisfy (DTS) Provisions for Part J1 Building Fabric and compliance applied to corresponding area of works accordingly.

A copy of the NCC2019 DTS Section J Compliance Report will be provided separately.

3.1.1 NCC Section J Compliance – Non-Residential

3.1.1.1 Thermal Insulation

The building will incorporate insulation within the roof and walls above the deemed-to-satisfy requirements of the NCC Section J in order to minimise heat loss in winter and heat gain in summer. BESS requires the envelope of the floor and roof to have a 10% improvement over normal NCC2019 values.

The building envelope fabric will incorporate added insulation with the following minimum values:

- Roof Areas: R3.5 (>10% improvement)
- Floor Areas: Suspended; R1.0, CSOG; R2.0 (>10% improvement)
- Internal and External walls: to wall-glazing construction under NCC2019

See attached NCC2019 DTS Section J Compliance report for further details.

3.1.1.2 Glazing – Non-Residential

High-performance glazing will be used to control solar gain from direct sunlight and minimise heat gain, heat loss, radiant discomfort, and noise incursion, while maximising daylight opportunities. Glazing is likely to be of double glazed type, with specifications finalised during the detailed design phase as assessed under NCC2019 wall-glazing construction methodology.

3.1.2 NCC Section J Compliance – Residential

The residential apartments are considered Class 2 under the National Construction Code which requires that this development achieve the following performance when modelled in accordance with an approved House Energy Rating Software:

- Collectively an average rating of not less than 6 stars, including not exceeding an average heating load limit of 113 MJ/m2 per annum and average cooling load limit of 47 MJ/m2 per annum.
- A minimum individual rating of not less than 5 stars, including not exceeding an individual heating load limit of 160 MJ/m2 per annum and individual cooling load limit of 48 MJ/m2 per annum.

Preliminary assessments, using FirstRate5 software, have been undertaken to provide an indication of the building fabric and glazing parameters required for the development.

3.1.3 Town Planning Requirements

Under Clause 55.07-1 Energy Efficiency objectives, individual dwellings should not exceed maximum NatHERS annual cooling loads when located in a specific climate zone as detailed in Table 2. According to the NatHERS zone map this project is located in Climate Zone 60 Melbourne and hence the maximum annual cooling load is not to exceed 22 MJ/m^2.

Table 3: NatHERS Annual Cooling Loads

NatHERS Climate Zone	NatHERS Maximum Cooling Load MJ/m^2 per annum
Climate Zone 21 Melbourne	30
Climate Zone 22 East Sale	22
Climate Zone 27 Mildura	69
Climate Zone 60 Tullamarine	**22**
Climate Zone 62 Moorabbin	21
Climate Zone 63 Warrnambool	21
Climate Zone 64 Cape Otway	19
Climate Zone 66 Ballarat	23

3.1.4 Thermal Performance Rating – Residential Preliminary

BESS Score: 50%

Preliminary NatHERS assessments, using FirstRate5 software, have been undertaken to provide an indication of the building fabric and glazing parameters required for the development. Table 4 indicates individual ratings achieved on a 70% sample of the apartments as a preliminary calculation as per the current design and typical assumptions.

The current design indicates that the building will achieve an average NatHERS rating of 7.5 stars. It also shows that the heating and cooling loads for each apartment meet NCC2019 and council requirements.

A copy of the NatHERS report will be provided separately.

Table 4: Apartment NATHERS Star Rating

Glazing Option	DG LowE in Improved Frames Awning: U-Value ≤ 2.91, SHGC = 0.44 Sliding, Fixed: U-Value ≤ 2.9, SHGC = 0.51		
Sole Occupancy Unit	Star Rating	Heating Loads MJ/m²	Cooling Loads MJ/m²
G.02	6.4	112.4	10.1
G.04	6.2	126.5	3.4
G.05	6.2	123.8	4.7
G.07	6.9	91.4	9.1
G.08	7.1	92.7	3.8
G.09	7.4	71.8	10.8
G.10	6.8	97.8	7.6
G.11	6.8	100.9	6.6
G.12	6.2	125.7	6.2
1.01	6.5	108.9	9.0
1.02	6.8	96.8	10.0
1.03	6.4	115.2	3.9
1.04	7.6	74.1	4.7
1.05	7.6	74.1	4.7
1.06	7.8	64.9	5.2
1.07	7.8	63.2	9.1
1.08	7.9	56.3	10.4
1.09	7.8	62	7.6
1.10	8.2	47.9	10.7
1.11	8.5	33.1	12.5
1.12	7.9	55.7	11.7
1.13	7.3	82.2	8.4
2.02	7.5	75.9	4.8
2.03	7.6	74.1	4.7
2.04	7.6	74.1	4.7
2.05	7.8	64.9	5.2

Sole Occupancy Unit	Star Rating	Heating Loads MJ/m^2	Cooling Loads MJ/m^2
2.06	7.2	12.9	9.21
2.07	7.4	68.8	14.5
2.08	7.7	68.1	8.3
2.09	8.2	47.9	10.7
2.10	8.5	33.1	12.5
2.11	7.9	55.7	11.7
2.12	7.4	76.8	7.2
2.13	6.9	92.9	7.4
2.14	6.6	105.2	7.6
2.15	7.0	90.0	9.4
2.17	6.9	91.1	10.9
2.18	6.6	104.6	9.1
2.19	7	92.6	6.1
2.20	7.9	58.1	11.1
3.02	6.4	115.2	3.9
3.03	7.6	74.1	4.7
3.04	7.6	74.1	4.7
3.05	7.0	89.8	9.1
3.08	7.9	55.7	11.7
3.09	7.6	70.4	8.8
3.10	7.9	55.7	11.7
3.11	7.9	55.7	11.7
3.12	8.0	51.6	11.7
3.13	7.7	64.1	11
3.14	7.9	58.1	11.1
3.15	8.2	47.6	8.2
3.16	7.9	58.1	11.1
4.01	7.4	81.3	5.2
4.03	7.6	74.1	4.7
4.04	7.6	67.2	12.8

Sole Occupancy Unit	Star Rating	Heating Loads MJ/m²	Cooling Loads MJ/m²
4.05	8.8	31.9	5.0
4.03	7.9	55.7	11.7
4.04	7.6	70.4	8.8
4.05	8.0	51.6	11.7
4.06	7.7	64.1	11.0
4.07	7.9	58.1	11.1
4.08	8.2	47.6	8.2
4.09	7.9	58.1	11.1
5.02	8.4	47.7	8.9
5.03	7.9	55.7	11.7
5.04	6.6	89.2	12.1
5.05	7.4	71.9	13.1
5.06	7.2	79.2	15.2
5.07	7.4	71.9	13.1
5.08	7.2	79.2	15.2
5.09	7.4	71.9	13.1
Average Rating/Load	7.5	72.8	9.1
Minimum Rating	6.2	126.5	18.3

3.1.4.1 Thermal Insulation - Residential

The building has been designed to incorporate bulk insulation within the floor, roof and walls to minimise the heat loss in winter and heat gain in summer. The proposed insulation levels are shown in Table 5.

Table 5: Insulation Values

Building Element	Added Insulation R-Value
Roof	≥ R5.0
External walls	R2.7
Internal walls to corridors, lifts & stairs	R2.5
Internal party walls to neighbour	R4.0
Floor above carpark or exposed	R2.0

The preliminary assessment shows the development will achieve at a 7.5 star average NatHERS rating demonstrating the high energy efficiency of the building fabric. These levels of insulation will also be used for Class 2 shared common spaces, where applicable, to achieve NCC Section J compliance for building fabric.

3.1.4.2 Glazing – Residential

High-performance double glazing will be used to control solar gain from direct sunlight and minimise heat gain, heat loss, radiant discomfort, and noise incursion. The preliminary NatHERS assessment has been carried out with double glazing with in-frame values as detailed in Table 4 above. The percentage VLT of the selected glazing system is recommended to be 60% or higher.

3.1.5 External Shade

For this project, the methods of external shading include eaves and projecting shading elements. These areas would be taken into account in the NCC2019 Glazing calculator.

3.2 Greenhouse Gas Emissions

BESS Score: 100%

Greenhouse gas emissions are determined by an in-built calculator within the BESS rating tool and points are awarded when greenhouse gas emissions are greater than 10% below the benchmark based on building fabric and building services inputs. This will be demonstrated by providing preliminary facade calculations, heating & cooling system types and CoP/EER, and water heating system details.

This project indicates a 10% reduction in greenhouse gas emissions against the reference building within the BESS calculator.

3.3 Heating / Air-Conditioning Systems

The requirements for heating and air-conditioning have been minimised through passive design; however, active systems may still be desired by occupants to provide a suitable level of comfort during weather extremes.

High efficiency air cooled air conditioning systems with high energy ratings (Coefficient of Performance) will be selected and all systems will either meet or exceed minimum NCC 2019 requirements. Variable Refrigerant Volume (VRV) air conditioning units will be provided for the residential and common areas. The commercial tenancy will also be provided as a cold shell with spatial provisions to connect future VRV air conditioning.

3.4 Energy Consumption and Peak Demand

For this project the sources of energy will be electricity for heating and cooling systems.

3.4.1 Energy Consumption

BESS Score: 100%

In the BESS rating tool points are awarded when the annual electricity consumption ≥ 10% below the benchmark. This project will use an increased level of insulation, improved glazing and shading as well as install efficient mechanical services suitable for the project.

3.4.2 Peak Demand

BESS Score: 100%

Points are awarded when the peak-hour cooling load is reduced by greater than 25%. This project will use an increased level of insulation, improved glazing and shading to assist in reducing peak-hour cooling loads.

3.5 Domestic Hot Water

BESS Score: 100%

Points are awarded when water heating systems within one star of the best available, or 85% or better than the most efficient equivalent capacity unit. There are currently two options that have not been confirmed yet:

- Central gas fired hot water system would be provided with an efficiency rate of greater than 85%
- If the project is to go gas-free, a central electric heat pump hot water system could be adopted

3.6 Lighting

BESS Score: 100%

In terms of lighting, the most energy and greenhouse gas emissions savings can be made using a control system that allows the artificial lighting to be switched off when not in use.

3.6.1 Internal Lighting

Points are awarded when the maximum illumination power density (W/m2) in at least 90% of the relevant Building Class is at least 20% lower than required by current NCC J6 requirements.

For this project the internal lighting design will be in accordance with NCC J6 requirements for residential and non-residential areas.

3.6.2 Luminaires

Poorly designed or controlled lighting systems can use a significant amount of energy. By selecting efficient light fittings, significant energy savings can be achieved. A list of commonly used lamps with typical efficacies (~ lamp efficiency) is shown below:

- T5 Fluorescent 100 lumens/watt
- Metal Halide 100 lumens/watt
- Light Emitting Diodes (LED) 150+ lumens/watt

- Dichroic (Low voltage) 30 lumens/watt
- Incandescent 10 lumens/watt

Efficient LED lighting fittings will be utilised throughout the development dependant on the requirement of the particular rooms. No incandescent or dichroic (halogen downlight) lighting will be used in this project.

3.6.3 Lighting Control Systems

Whilst efficient artificial lighting systems will be used throughout the project the most energy and greenhouse gas emissions savings can be made by implementing a control system that allows the artificial lighting to be switched off when not in use. To minimise the energy consumed by artificial lighting when not required the following control strategies have been implemented in the common areas only:

- Generally internal rooms will be controlled via occupancy sensors in accordance with NCC requirements.
- Each zone within the building will be switched in accordance with NCC requirements.
- External building lighting will be controlled by daylight sensors & timers

3.6.4 Renewable Energy

BESS Score: 100%

Methods for reducing a building's energy consumption and Green House Gas emissions is through the use renewable energy. Investing in renewable energy will also provide long term economic and environmental benefits to building occupants as well as the greater community. Renewable energy options available are:

- GreenPower (offset electricity usage with certified renewable energy)
- Solar
- Wind
- Hydropower
- Bioenergy
- Geothermal

The roof can accommodate 136 solar panels as shown in the figure below. It is currently proposed that a 50kW solar PV system be installed, to be confirmed during the design phase. The roof plan with the panels are shown in Figure 1 below.

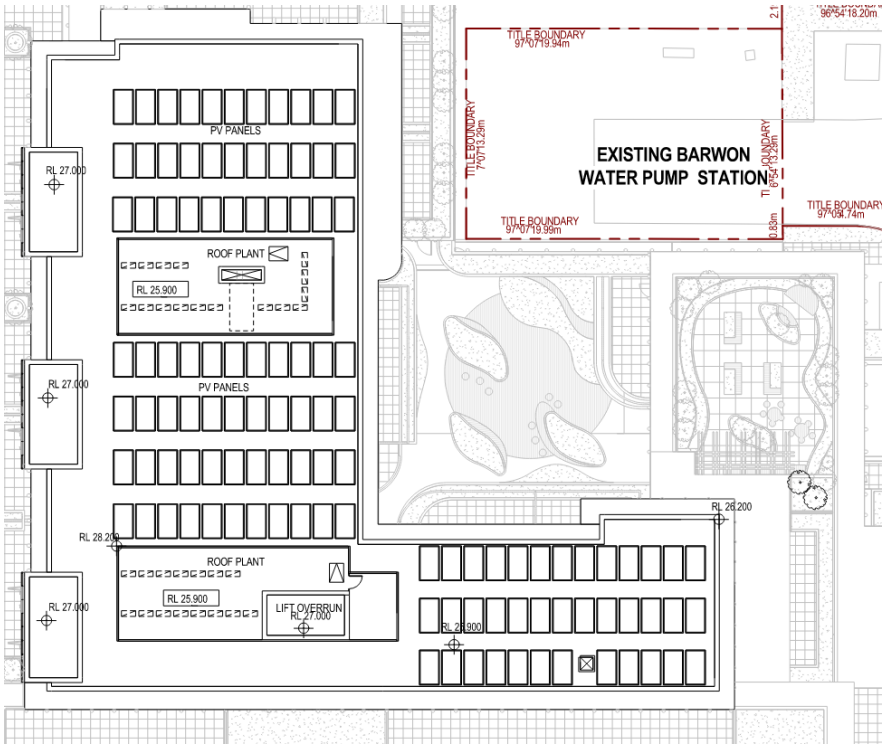

Figure 1: Solar Panel Arrangement

4 Water

Potable water consumption may be minimised through a range of measures including efficient fixtures and fittings, rainwater capture, storage and re-use and through drought tolerant planting and landscaping.

4.1 Water Efficient Fixtures

BESS Score: 60%

To minimise the water consumed by the development, water fittings and fixtures will be selected to achieve high water efficiency ratings as follows:

- Kitchen taps: 5 Star WELS rating
- Basins taps: 5 Star WELS rating
- Dishwashers: 5 Star WELS rating
- Washing Machines: 5 Star WELS rating
- Toilets: 5 Star WELS rating
- Showers: 4 Star WELS rating (>= 4.5 but <=6.0)

4.2 Minimise Dead Legs

Water wastage will be reduced through careful design by reducing heated water outlet piping length (dead leg) to reduce water consumption before full temperature water delivery.

4.3 Water Efficient Landscaping

BESS Score: 100%

To minimise future water consumption due to landscape irrigation, the landscaping design would use species that are indigenous to warm regions of Australia, or otherwise drought-tolerant.

4.4 Stormwater & Rainwater Collection

BESS Score: 100%

The collection and storage of rainwater from roof areas for non-potable water uses is the most economic and practically manageable water efficiency approach, following demand management strategies.

A Melbourne Water STORM assessment has been completed to determine the rainwater tank size and amenities flushing required to achieve a minimum 100% stormwater treatment (Figure 2). Rainwater runoff will be collected from a total 1500m² roof area and stored in a 45,000-litre rainwater tank (Figure 3). Captured rainwater in these tanks will be used for toilet flushing, landscaping irrigation, and bin wash facilities.

Appendix B shows a markup of all impervious areas used in this assessment.

Melbourne Water

STORM Rating Report

TransactionID: 1410214
Municipality: GREATER GEELONG
Rainfall Station: GREATER GEELONG
Address: Liverpool Street

Rippleside
VIC 3215
Assessor: ACOR
Development Type: Residential - Mixed Use
Allotment Site (m2): 3,996.00
STORM Rating %: 100

Description	Impervious Area (m2)	Treatment Type	Treatment Area/Volume (m2 or L)	Occupants / Number Of Bedrooms	Treatment %	Tank Water Supply Reliability (%)
Roof 1	635.00	Rainwater Tank	20,000.00	60	163.20	78.00
Roof 2	635.00	Rainwater Tank	20,000.00	60	163.20	78.00
Impervious areas	934.00	None	0.00	0	0.00	0.00
Rain garden area	89.00	Raingarden 100mm	2.00	0	131.00	0.00
Roof 3	158.00	Rainwater Tank	5,000.00	20	163.30	78.00

Figure 2: Storm Assessment

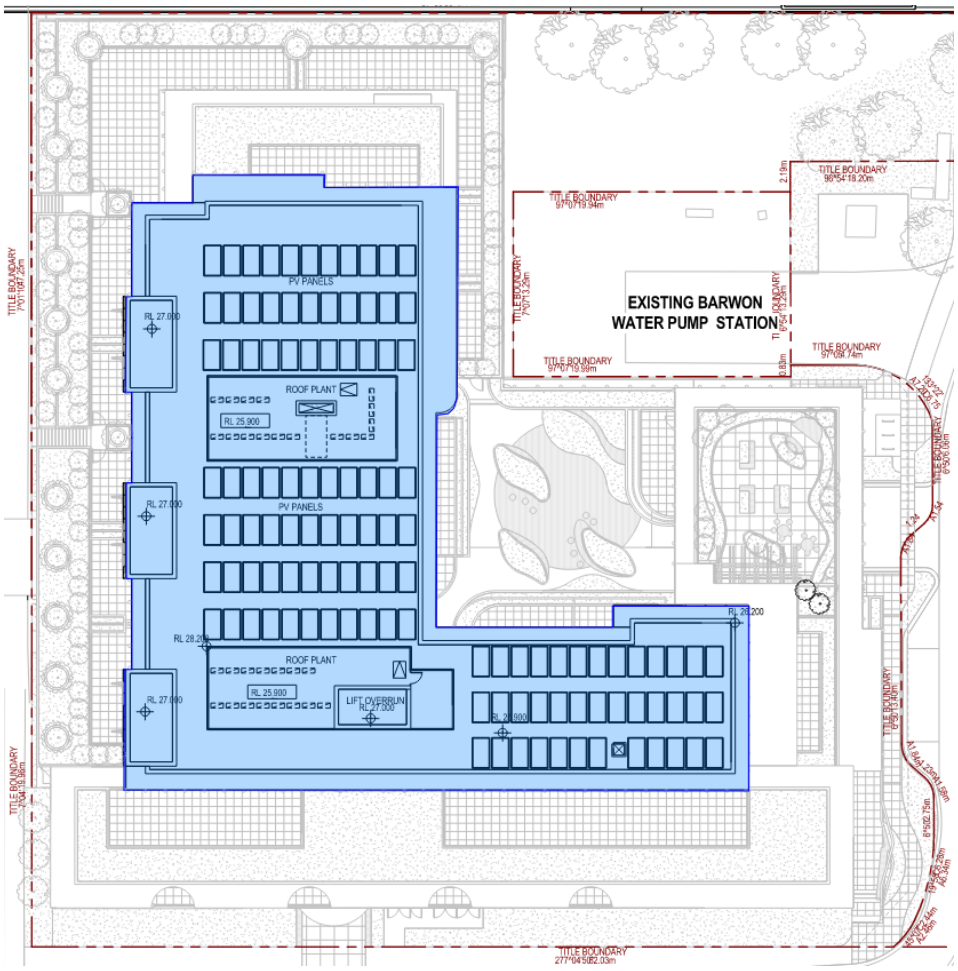

Figure 3: Rainwater Collection Area

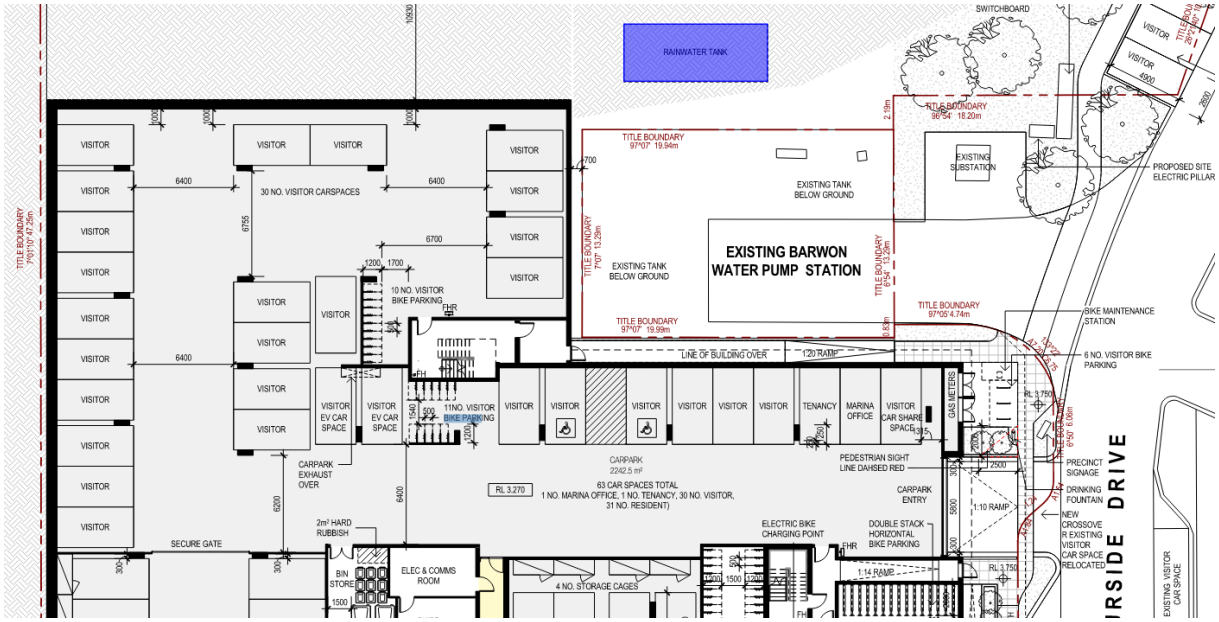

Figure 4: Rainwater Tank Location

4.5 Building Systems Water Use Reduction

BESS Score: 100%

Ensure the efficient use of water, to reduce total operating potable water use and to encourage the appropriate use of alternative water sources for cooling and fire testing systems.

Measures will be taken in the project to reduce potable water by greater than 80% in relation to the buildings air-cooling systems and testing fire safety systems, where applicable.

5 Indoor Environment Quality

Indoor Environment Quality is based on providing a comfortable space for occupants with good air quality, adequate daylight and ventilation.

5.1 Daylighting - Residential

BESS Score: 100%

To maximise the indoor environment quality and reduce artificial lighting energy use it is recommended that all occupied spaces achieve a high level of natural lighting. All living areas and bedrooms within this development have access to an external door or window.

The inbuilt calculator was used to determine the daylight access to all living spaces (including kitchen) and bedrooms. Living and bedroom spaces may achieve an auto-pass if they meet the all the Deemed to Satisfy Criteria as follows:

- Living areas and bedrooms are less than 8m deep (5m if south facing)
- Living areas and bedrooms have a floor-to-ceiling height of at least 2.7m
- All glazing to living areas achieve at least 60% Visible Light Transmittance (VLT)
- All living areas have an external facing window (not into a courtyard, light well or other major obstruction)
- The building complies with all of the requirements of the building separation tables as provided in BESS

For living spaces and bedrooms that do not meet the auto-pass criteria then additional information is required to be entered for further calculation. Floor plan layouts have been provided in Appendix A which show the category, auto-pass or calculation, for each individual living space or bedroom.

Table 6 is a summary of the number of living and bedrooms that auto-pass or require calculation for each level. For this project all apartments achieve an auto-pass.

Table 6: Daylight Room Summary

Building Level	Auto-Pass Living	Auto-Pass Bedrooms	Calculations Living	Calculations Bedrooms
Total	**74**	**156**	16	0

BESS points are awarded where at least 80% of the total number of living rooms (including kitchen) achieve a daylight factor greater than 1% to 90% of the floor area and bedrooms achieve a factor greater than 0.5% to 90% of the floor area with additional points are awarded where 100% of dwellings comply.

In this development 82% of living spaces and 100% of bedrooms achieve the required daylight factor. Points have also been awarded as all bedrooms have an external window.

5.2 Winter Sunlight – Residential

BESS Score: 0%

Points are awarded in BESS when is can be demonstrated that 70% of dwellings receive at least 3 hours of direct sunlight in all living areas between 9am and 3pm in mid-winter.

Not targeted.

5.3 Natural Ventilation - Residential

Buildings with effective natural ventilation allow air conditioning systems to be switched off and also have the advantage of improved indoor environment quality. This development supports the use of natural ventilation by providing large sliding doors to balconies and private open spaces, as well as openable windows to other areas such as bedrooms.

Points are awarded in BESS when at least 60% of dwellings are effectively naturally ventilated based on the following:

Effective cross flow ventilation:

- A breeze path between 2 ventilation openings either within the room or from one room to another
- The breeze path length must be <15m measured between ventilation openings and around internal walls, obstructions & partitions
- Ventilation openings are located either in opposite or adjacent external walls or an external wall and an operable skylight
- Openings must be 1m^2 or 2% of dwelling area (effective window openings derived as percentage)

Effective single sided ventilation:

• Maximum permissible depth of room 5m

Based on the criteria for effective natural ventilation the results for this development are provided in Table 7.

Table 7: Natural Ventilation Results

Building Level	Number of Dwellings	No. Effective Nat-Vent
Total	**84**	**84**
	Percentage	**100%**

In addition to natural ventilation exhaust fans to kitchens and bathrooms/toilets will be installed to assist with removing indoor air pollutants and excess moisture, as well as providing an additional air path for fresh air passing through the open facade which will help in reducing mould growth.

Window openable areas will be provided in compliance with AS1668.4: Natural Ventilation of Buildings. Opening areas must be at least 5% of the area of the room they are serving in order to provide sufficient fresh air for health.

The natural ventilation zones and openings for typical apartments are shown in Figures 5 – 7 below.

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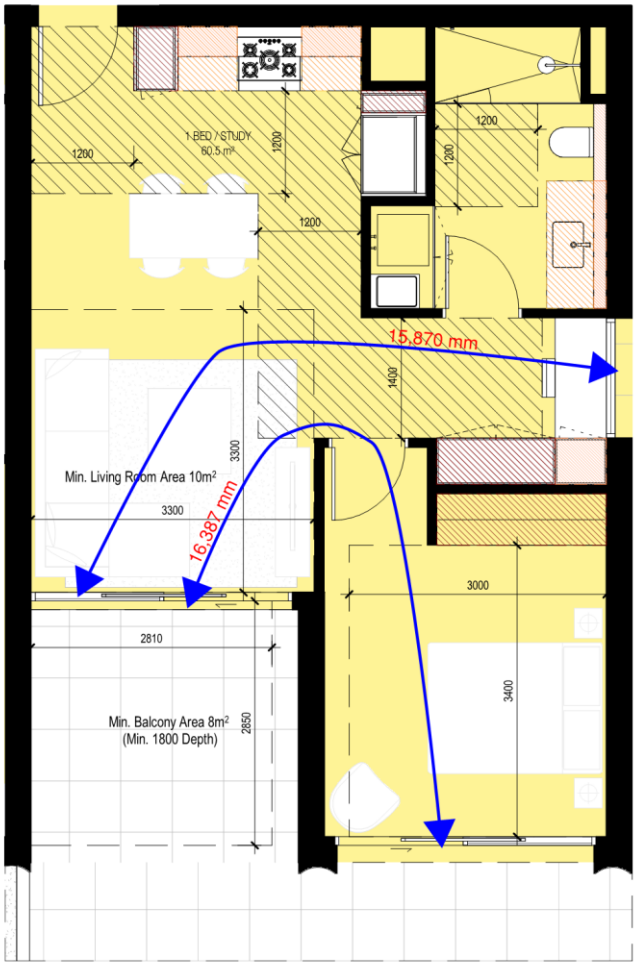


Figure 5: Natural Ventilation 1 Bed Apartment

Figure 6: Natural Ventilation 2 Bed Apartment

Figure 7: Natural Ventilation 3 Bed Apartment

5.4 Glare

BESS Score: N/A

External shading to the new sections of the building will assist in the reducing the incidents of glare.

5.5 Low-Toxicity Materials

BESS Score: N/A

Materials containing Volatile Organic Compounds (VOCs) emit fumes at room temperatures and have been linked to a variety of health problems including respiratory disorders and eye, nose and throat irritation.

They are commonly found in products such as paints, sealants, adhesives, and wall, ceiling and floor coverings. When selecting these items, Table 8 through Table 11 are recommended to be followed.

Table 8: Total VOC Limits for Paints and Varnishes

Product Type	Max TVOC Content (g/l of ready-to-use product)
Walls and ceilings – interior semi gloss	16
Walls and ceilings – interior low sheen	16
Walls and ceilings – interior flat washable	16
Ceilings – interior flat	14
Trim – gloss, semi gloss, satin, varnishes and woodstains	75
Timber and binding primers	30
Latex primer for galvanized iron and zincalume	60
Interior latex undercoat	65
Interior sealer	65
One and two pack performance coatings for floors	140
Any solvent-based coatings whose purpose is not covered in table	200

Table 9: Max TVOC Content Limits for Adhesives and Sealants

Product Type	Max TVOC Content (g/l of product)
Indoor carpet adhesive	50
Carpet pad adhesive	50
Wood flooring and Laminate adhesive	100
Rubber flooring adhesive	60
Sub-floor adhesive	50
Ceramic tile adhesive	65
Cove base adhesive	50
Dry Wall and Panel adhesive	50
Multipurpose construction adhesive	70
Structural glazing adhesive	100
Architectural sealants	250

Table 10: Carpet TVOC Emissions Limits

Carpet	Max TVOC Emission Limit (mg/m² per hour)
Total VOC Limit	0.5
4-PC (4-Phenylcyclohexene)	0.05

Table 11: Wall, Floor and Ceiling Covering TVOC Emissions Limits

Coverings other than carpets	Max TVOC Emission Limit (mg/m² per hour)
TVOC at 3 days	5
TVOC at 28 days	0.5

The development will only use paints, adhesives and sealants, wall and ceiling coverings, and flooring materials that have low TVOC levels.

5.6 Formaldehyde Minimisation

BESS Score: N/A

Any engineered timber products used within the project will have low or no formaldehyde content. Products containing formaldehyde must comply with E0 or E1 standards, or equivalent.

5.7 Thermal Comfort and Control

BESS Score: N/A

Thermally comfortable indoor environments depend on two over-arching design strategies:

- Moderation of outdoor extremes using passive design
- Control of the indoor environment via manually controlled adaptive devices, such as air conditioners, heaters and fans

These are both provided by the design. As detailed in Section 3, there is a significant improvement on the building fabric and glazing when compared to the minimum requirements of the National Construction Code, which appropriately moderates the external environment and helps to reduce reliance on active heating and cooling. In addition, control is also provided by efficient air conditioning systems.

5.8 Mechanical Ventilation

BESS Score: N/A

Dedicated mechanical extraction will be provided for all bathrooms and kitchens. This ensures the air quality within the apartment remains high and helps avoid mould and condensation problems. All other habitable spaces will have access to operable windows for natural ventilation, thus saving on fan, heating and cooling energy when possible.

The car park ventilation system will include variable speed drives (VSDs) on the fans and will be controlled by CO sensors to minimise unnecessary energy use. The car park is located partially above natural ground level to some facades. Where located above ground, openings on the facades will be provided to allow for natural ventilation of the car park minimising the reliance on the mechanical ventilation system.

5.9 Noise

BESS Score: N/A

The building will include design measures to minimise environmental and building services noise to Australian Standard levels, ensuring that indoor spaces are comfortable and amenable.

6 Building Materials

BESS Score: N/A

As building materials are not covered under BESS, building materials within the development should be selected to minimise environmental impact by following Green Star Design & As Built v1.3 guidelines, where possible within the scope of this project. As such the following information has been provided.

6.1 Material Selection

The building primarily consists of a concrete structure which signifies a considerable initial investment of embodied energy but also means the structure will have a long life span. This structure will provide significant thermal mass to reduce the fluctuation of temperature in the spaces thereby improving the thermal performance of the building.

The following performance criteria will be considered for specified materials:

- Materials that reduce material use (e.g. recycled materials) and which have low impact disposal;
- Low embodied energy materials (to be assessed on a life cycle basis);
- Materials that are durable and fit for purpose;
- Materials from sustainable sources;
- Materials will be selected with a preference given to local over imported materials, due to the transportation emissions associated with imported materials.

Resources to assist in environmentally friendly material selections and certifications include:

- Ecospecifier (http://www.ecospecifier.com.au)
- Good Environment Choice Australia GECA (http://www.geca.eco)
- Third Party Certification http://new.gbca.org.au/product-certification-schemes/

6.2 Concrete

At least 40% of course aggregate or 25% of fine aggregate (sand) inputs in the concrete are to be manufactured sand or alternative materials (measured by mass across all concrete mixes in the project).

The mix water for all concrete used in the project will contain at least 50% captured or reclaimed water (measured by mass across all concrete mixes in the project).

6.3 Steel

Where 95% of steel for the development will be sourced from a Responsible Steel Maker and all reinforcing steel used within the building shall be produced using energy-reducing processes in its manufacture.

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

6.4 Timber

At least 95% (by cost) of the timber used in the construction of the building will be certified by a forest certification scheme or will be a reused material.

Acceptable certification schemes include Forest Stewardship Council (FSC), Australian Forestry Standard (AFS) and the Program for Endorsement of Forest Certification (PEFC).

6.5 Cables, pipes, floors and blinds

Cables, pipes, flooring and blinds sourced for the development will either contain no PVC or be sourced from an ISO 14001 certified supplier.

6.6 Internal Fitout

Recycled materials, recycled content in products and/or sustainably sourced:

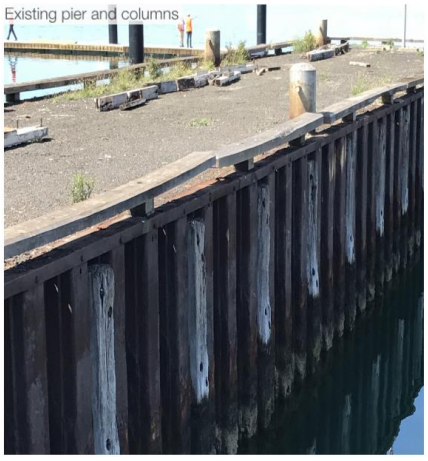
- Furniture
- Shelving
- Floor covering

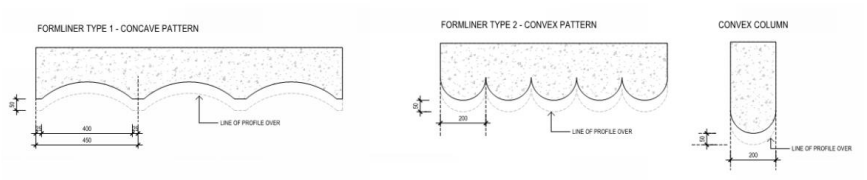
6.7 Thermal Insulation

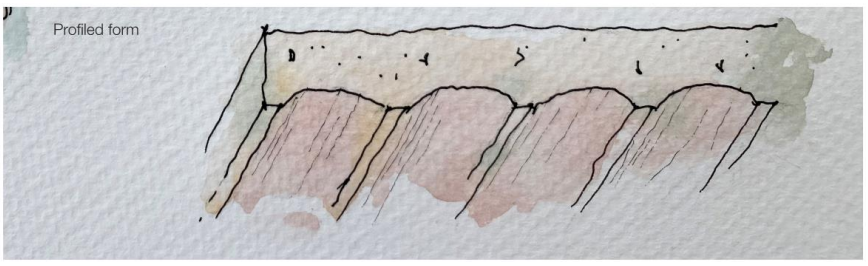
All thermal insulation materials will have zero Ozone Depletion Potential (ODP).

6.8 Material and Colour Selection

The hues of native plants and the natural environment are integrated into the project design. A mix of warm colours such as terracotta and sand create a more natural and inviting colour scheme which take inspiration from the hues of the trees, colour of the bark, and tone and texture of the earth. Circular concave, convex and columns are used in the design to mirror the piers by the nearby marina, creating a dynamic pattern appealing to the eye whilst tying the design to the local landscape.







7 Transport

In an aim to reduce emissions through the use of cars it is important to consider other alternatives in the design of a project such as walking, cycling, public transport car sharing and lower emissions vehicles. Sustainable transport has environmental, health and economic benefits for the community and residents such as a reduction in fuel costs and greenhouse gas emissions, less congestion, and improved health of residents.

7.1 Walking and Public Transport

BESS Score: N/A

The project site has access to public transport as shown in Figure 9. The site is a 8-minute walk to North Geelong Station for greater access to bus and train routes.

Figure 8: Public Transport Routes

7.2 Walkability

Walkscore.com measures the walkability of any address worldwide by assessing proximity to nearby amenities such as schools, groceries, shopping, parks, errands and entertainment. Amenities within a 5-minute walk are given maximum points, decreasing to a maximum walk distance of 30 minutes. The score out of 100 corresponds with a rating as shown in Figures 10 and 11 below.

Walk Score measures the walkability of any address based on the distance to nearby places and pedestrian friendliness.

90–100	**Walker's Paradise** Daily errands do not require a car
70–89	**Very Walkable** Most errands can be accomplished on foot
50–69	**Somewhat Walkable** Some errands can be accomplished on foot
25–49	**Car-Dependent** Most errands require a car
0–24	**Car-Dependent** Almost all errands require a car

Figure 9: Walk Score Rating System

The development is rated as a 'Somewhat Walkable' with a walk score of 53, as shown in Figure 11 meaning some daily errands may be accomplished on foot. The average walk score for Geelong is 53.

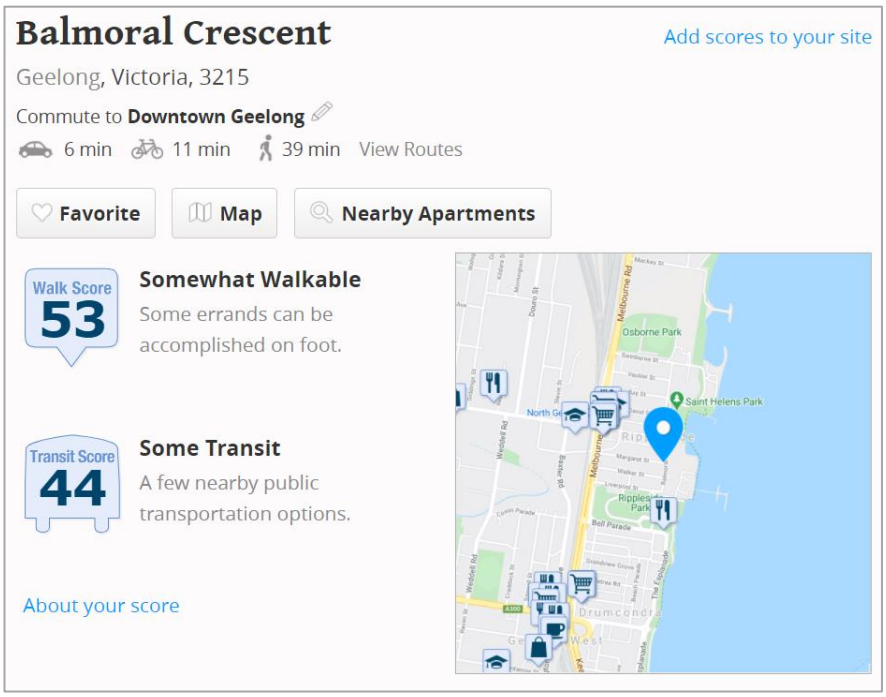


Figure 10: Walkability Score

Reducing the need to travel by car for basic living necessities and enjoyment, this development is located within a short walk to Melbourne Rd where there is access to supermarkets, banks, cafes and restaurants as well as speciality shops.

The site is also located to nearby parks such as Rippleside Park and Saint Helens Park offering recreational facilities and walking paths alongside the ocean.

7.3 Wellness

BESS Score: N/A

Different design elements promote healthy living and incidental exercise to residents. Stairs are located along the façade open to communal spaces to encourage mobility, walk-ability and social interaction, and paths guide visitors to the main building, or encourage residents to walk to surrounding beaches and parks. Outdoor areas are located around the building in the form of communal courtyards and generous terrace/balcony areas which have views outlooking to courtyards, Rippleside park and waterfront views.

7.4 Bicycle Parking – Non-residential & Visitor

BESS Score: 100%

In this category points are awarded where planning scheme requirements for employee and visitor bicycle parking have been exceeded by at least 50%, or a minimum of 2 for employees, and 1 for visitors. where there is no planning scheme requirement. Greater Geelong City council has a requirement of 1 bike space per 4 employees, and 1 per 200sqm of area for visitors for commercial areas. For the residential areas, BESS requires 1 bicycle spot per dwelling, and 1 visitor park per 5 dwellings located at ground level. There are currently 84 Residential bicycle spaces, and 31 bicycle spaces for visitors and staff.

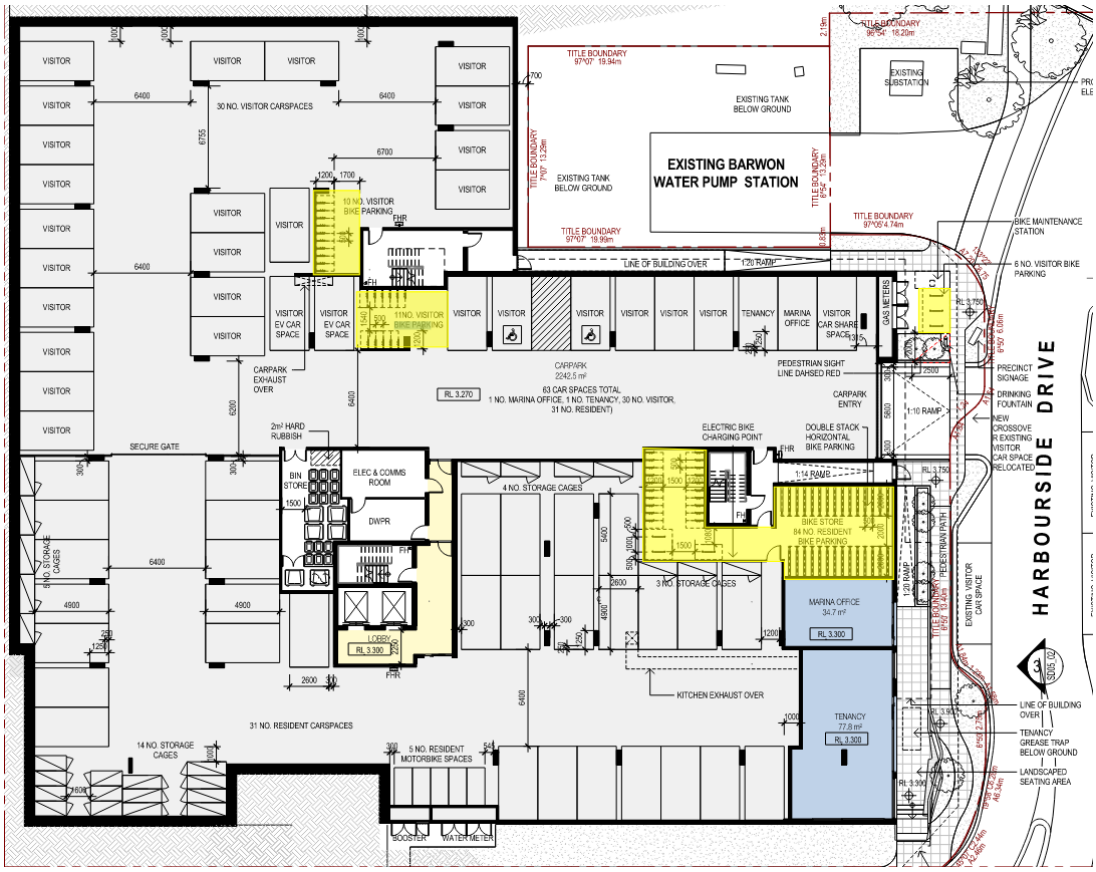


Figure 11: Location of Bike Parks – Basement

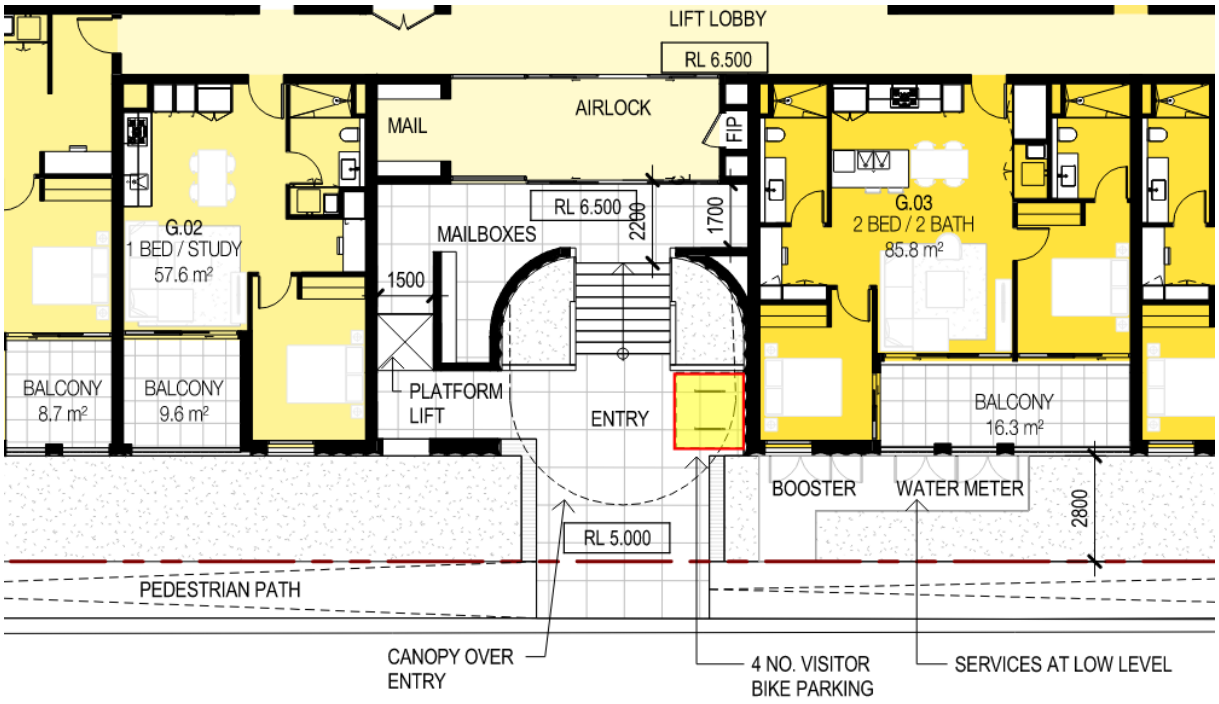


Figure 12: Location of Bike Parks – Level 1

7.5 Electric Share Bikes

BESS Score: N/A

A bike sharing system gives an enjoyable, safe and healthy opportunity for residents, locals, and tourists to use the services provided by this building as a part of an integrated approach with the community. As the batteries are rechargeable, they provide a low-cost, energy efficient and emission-free method of transportation and exercise. It has been noted that electric bikes use is more inclusive to people of all ages or those recovering from injuries and has shown to improve mental health in users.

In addition to resident bike facilities, this facility would open up greater connection with the wider community allowing people to easily access the surrounding beachfront neighbourhood and town centre.

7.6 End of Trip Facilities - Non-Residential

BESS Score: 0%

There will be no showers or lockers provided in this project.

7.7 Electric Vehicles

In this category, at least one parking space should be nominated for EV charging, with the appropriate signage and infrastructure installed. There are two parking areas provided for electric vehicles and more infrastructure could be installed in the future. The location of the carpark is shown below.

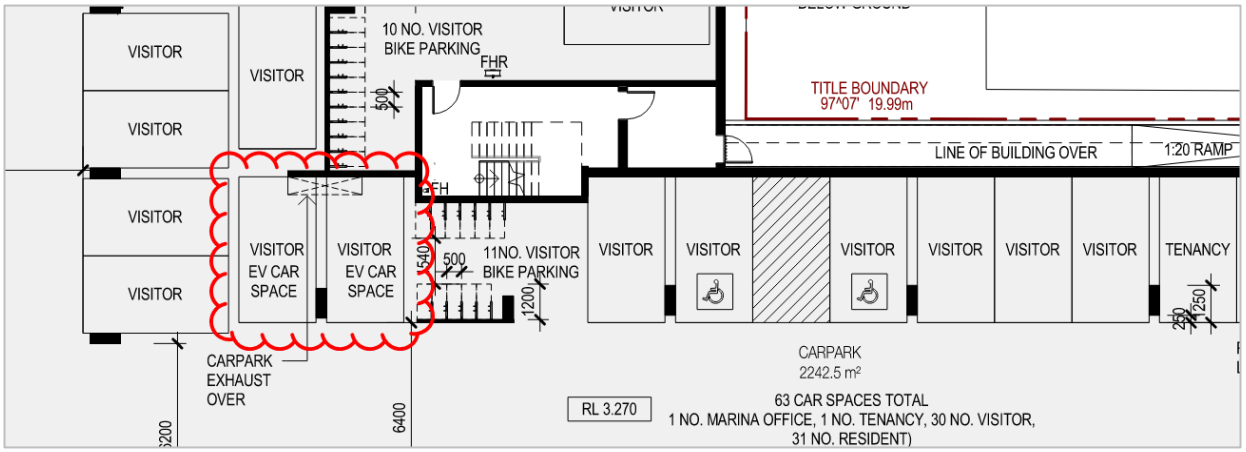


Figure 13: Location EV Space

7.8 Car Share Scheme

BESS Score: 100%

A Car share scheme is currently in place, where 1 carpark provided is for the share car shown in Figure 13 below.

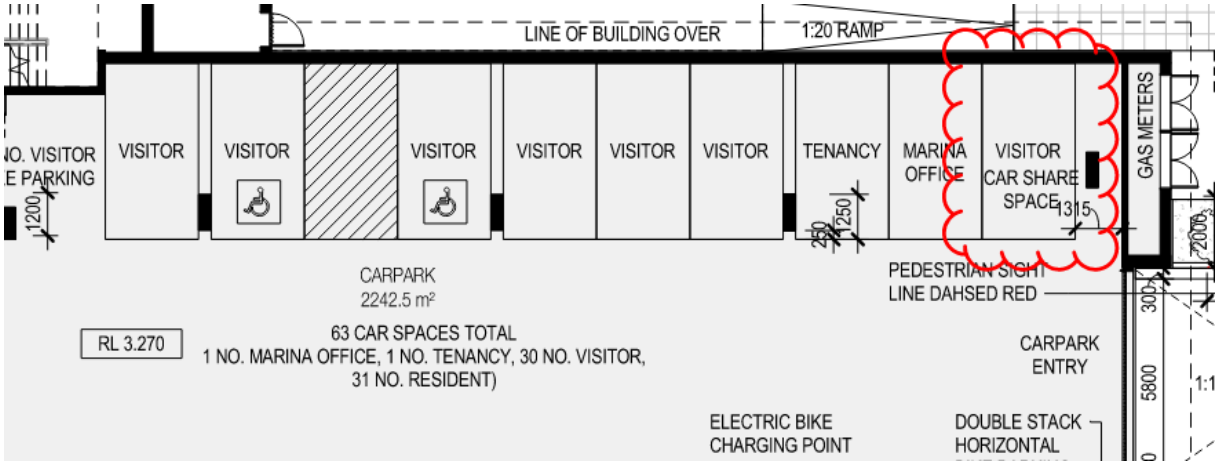


Figure 14: Location of Shared car park

7.9 Motorbikes / Mopeds

BESS Score: 100%

In this category, 5% or more of the available parking spaces, with a minimum of 5, must be allowed for motorbikes or mopeds. This project currently has allowance for 5 spaces for Motorbikes/Mopeds.

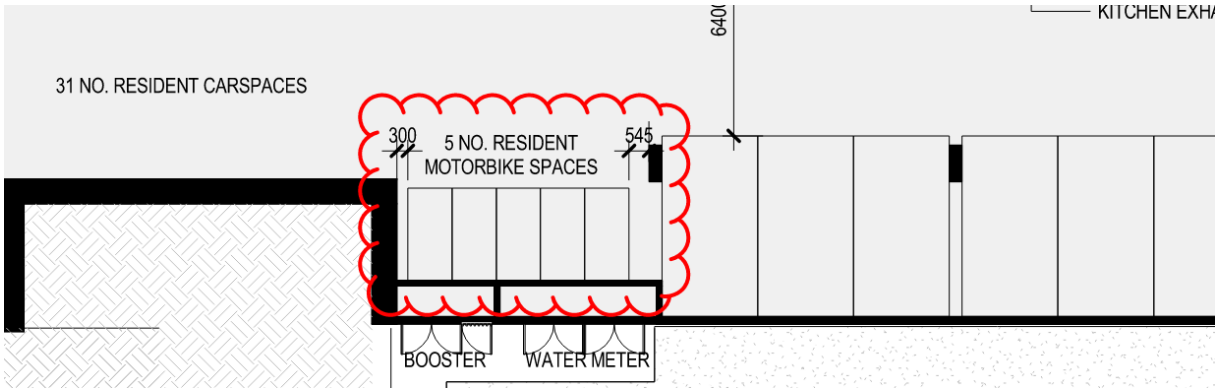


Figure 15: Location of Motorbike/Moped parks - Basement

8 Waste Management

8.1 Construction Waste - Building Re-Use

BESS Score: 0%

This project is not reusing part of the existing building.

8.2 Operational Waste - Food & Garden Waste

BESS Score: 100%

Food and Garden waste are to be included in this project. Highlighted in yellow are the 10 240L Organic bins that are provided on the ground floor.

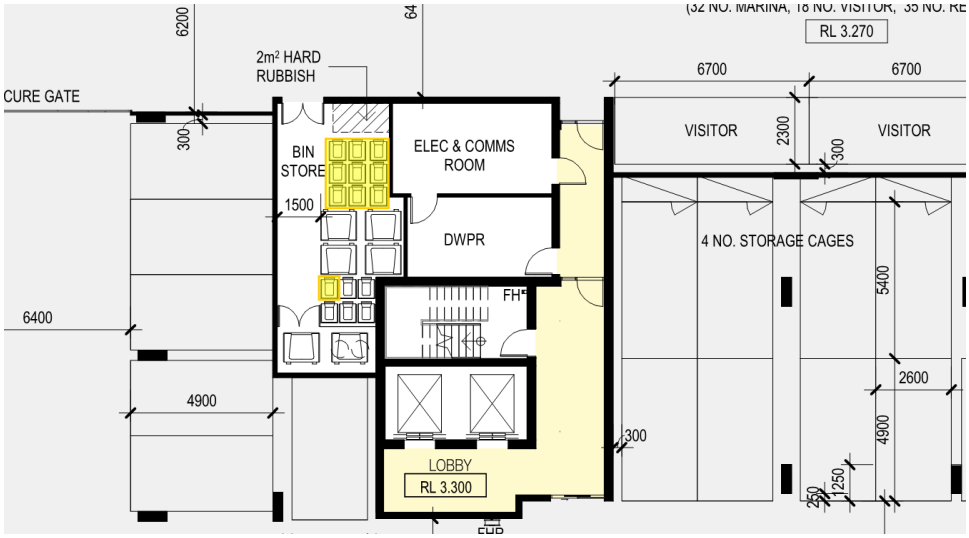


Figure 16: Location of Organic Bins

8.3 General Waste Management/Recycling

BESS Score: 100%

Recyclable materials entering the general waste stream may be minimised from the development by providing dedicated waste and recycling facilities located within and close to the residential area.

To encourage recycling, is it recommended that recycling bins together with general waste bins are provided at all points of waste disposal.

9 Urban Ecology

In design of project it is important to consider green spaces which allow for access to open spaces, outside air, flora and fauna in order to maintain a connection with the environment.

9.1 Reuse of land

This development is on a site that has been previously developed, and components of the existing building have been used.

9.2 Communal Spaces

BESS Score: 100%

This building is currently a community type building with all spaces inside and out, with the exception of staff designated areas, deemed as 'communal' by providing services to the wider community.

9.3 Vegetation

BESS Score: 100%

This development has some existing landscaping but will incorporate some new landscaping as per Council's landscaping guidelines included as parts of the scope of works as shown in Figure 17 below.

In BESS, this credit is based on the percentage of vegetated ground area to overall site area. The planting landscape areas totals to approximately 1363m² or 30% of the overall project site.

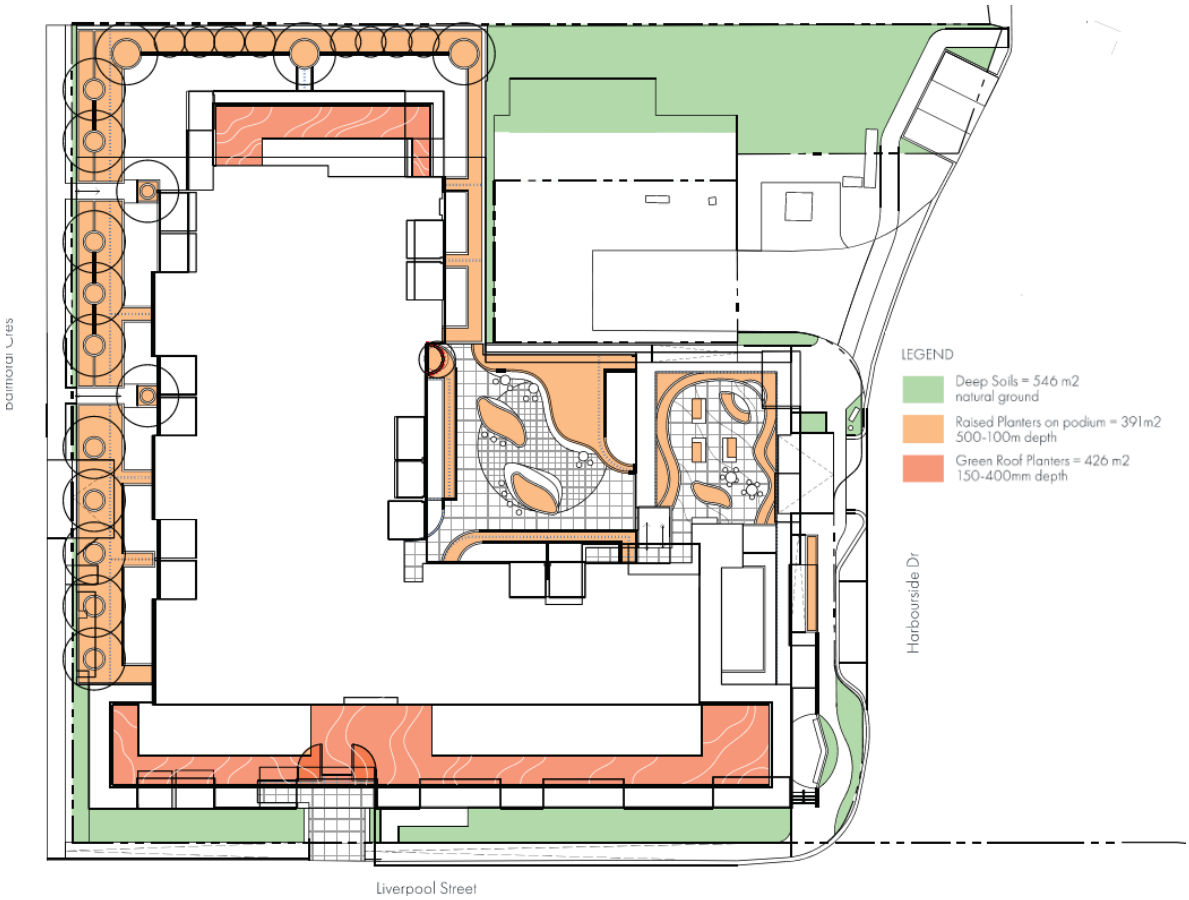


Figure 17: Planned Landscape Areas

A courtyard space and climber plants to show an extension of the landscape and the parkland opposite the building. Different areas of landscaped terraces and courtyards provide an opportunity for community collaboration with and privacy from the public. Native vegetations will be used on all areas, such as large and small canopy trees to reduce the bulk and scale of the building and reinforce links to Rippleside park and provide shade in communal areas. Indigenous or native low growing drought species will be low maintenance and soften the overall look of the building.

Figure 18: Example of Climbing plants

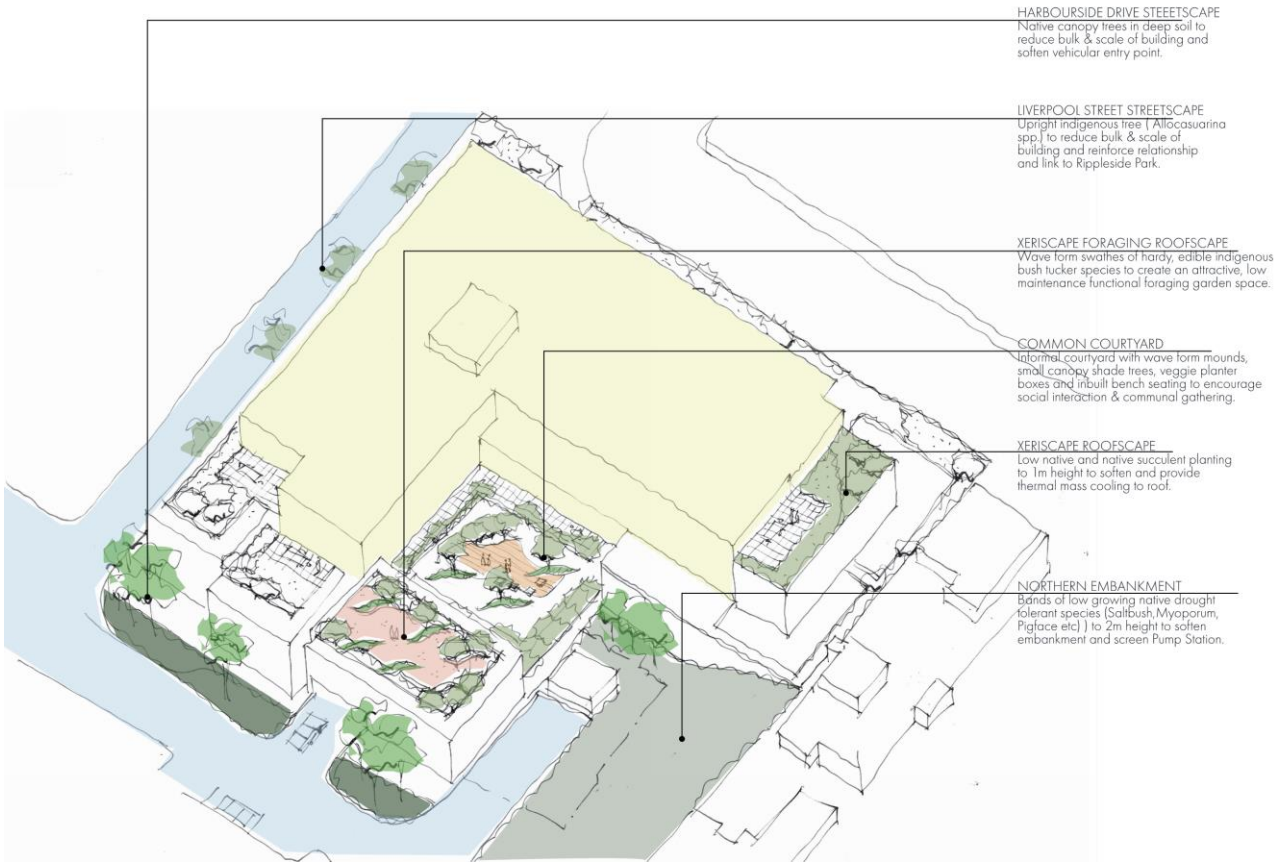


Figure 19: Landscaping Design Brainstorm

9.4 Green Wall or Façade

BESS Score: 100%

This credit is achieved through a green wall or facade. Green roofs may also include communal areas for residents / other building users such as productive garden areas, bbq facilities etc. There is a proposed communal roof area in this project, and some green roof areas highlighted in light green, however there are no green walls proposed in this project.

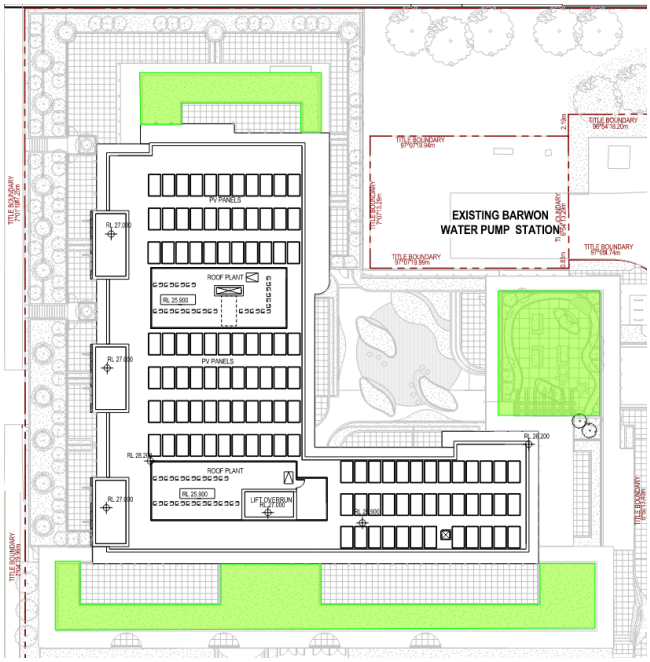


Figure 20: Planned Green Roof areas

9.5 Food Production

BESS Score: 100%

This credit is achieved by including an area for food production. There is a provision for edible native plants to promote foraging and low-cost healthy eating. An apiary is also located on the roof that will provide honey for residents. There is an allowance of 47m^2 for food production spread around the project on the ground, third and roof levels of the project.

9.6 Heat Island Effect

BESS Score: N/A

Urban heat island effect is a phenomenon where temperatures in urban areas are warmer than the surrounding rural areas, most obviously during evening and night, due to differences in rate of cooling. This is caused by the layout of urban areas, urban canyons, thermally massive building materials such as concrete, lack of vegetation, removal of water and generation of heat by vehicles and buildings. In Melbourne, the effect ranges from 2 to 4 °C up to a peak of 7°C.

Measures to assist in minimising the impact on urban heat island effect, include the following:

- Retention of existing street trees during construction where possible.
- Roof materials, including shading structures having a three year SRI>64.
- Unshaded hard-scaping elements with a three year SRI>34 or an initial SRI>39.

City of Greater Geelong, Statutory Planning - Date Received 16/07/2022

10 Innovation

To encourage design features and technologies that go well beyond the best practice standard in BESS, are not recognised in BESS or are specifically new to Victoria.

10.1 Potential Initiatives

The following are potential innovation initiatives and possible target points, the project could consider implementing. BESS has a maximum allowance of 10 Innovation points, however more could be achieved.

Table 12: Potential ESD Initiatives

Name	Description	Points Targeted
Water Fountains	Drinking stations encourage occupants to have more active lifestyles and a more community feel to the project.	1
Paints, adhesives, Sealants and Carpets*	At least 95% of all internally applied paints, adhesives, sealants and carpets meet stipulated 'Total VOC Limits', or, where no paints, adhesives, sealants or carpets are used as per Green Star v1.3 Guidelines	2
Ultra-Low VOC Paints*	Where over 50% of paints (by volume) specified in the building is to have a maximum TVOC content of 5g/L as per Green Star v1.3 Guidelines	
Engineered Wood products*	Where at least 95% of all engineered wood products meet stipulated formaldehyde limits or no new engineered wood products are used as per Green Star v1.3 Guidelines	
Responsible Building Materials*	Concrete – Refer to Section 6.2 for details	2
	Steel – Refer to Section 6.3 for details	
	Timber – Refer to Section 6.4 for details	

Employing these initiatives would add a further 4% to the overall BESS score, increasing it from the current project score of 73% to a new overall project score of 77%. Initiatives to be incorporated in the project will be confirmed as the project design is further developed.

*These items are not covered in BESS and under Green Star would be awarded points, hence these additional points have accounted for under Innovation.

11 Results & Conclusion

11.1 Results

Using the inputs from the above nine categories above, below is a preliminary snapshot of the results summary obtained out of the BESS assessment tool provided in Figure 21. Please note that the score with innovation points included is subject to change based on which initiatives are targeted.

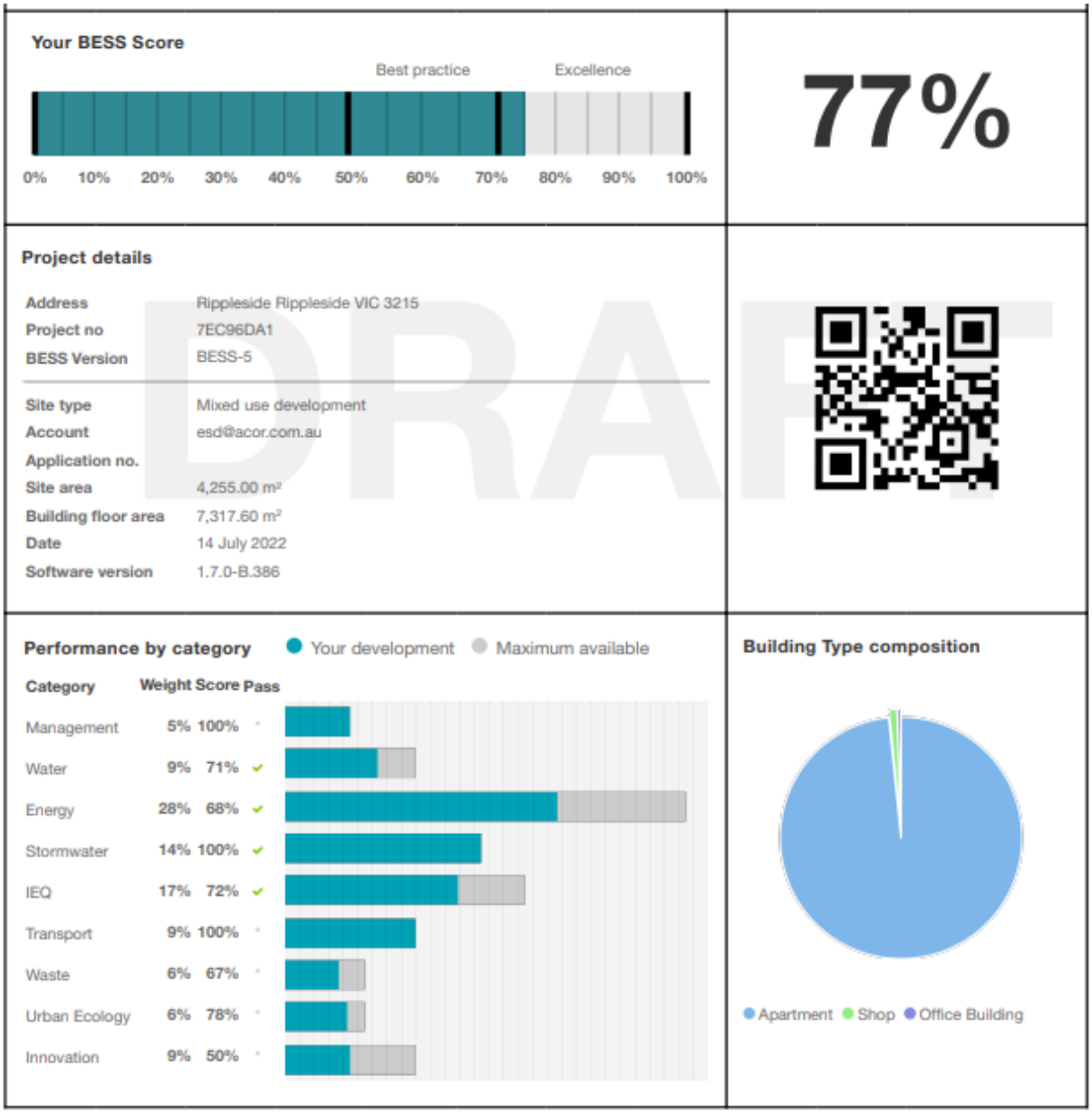


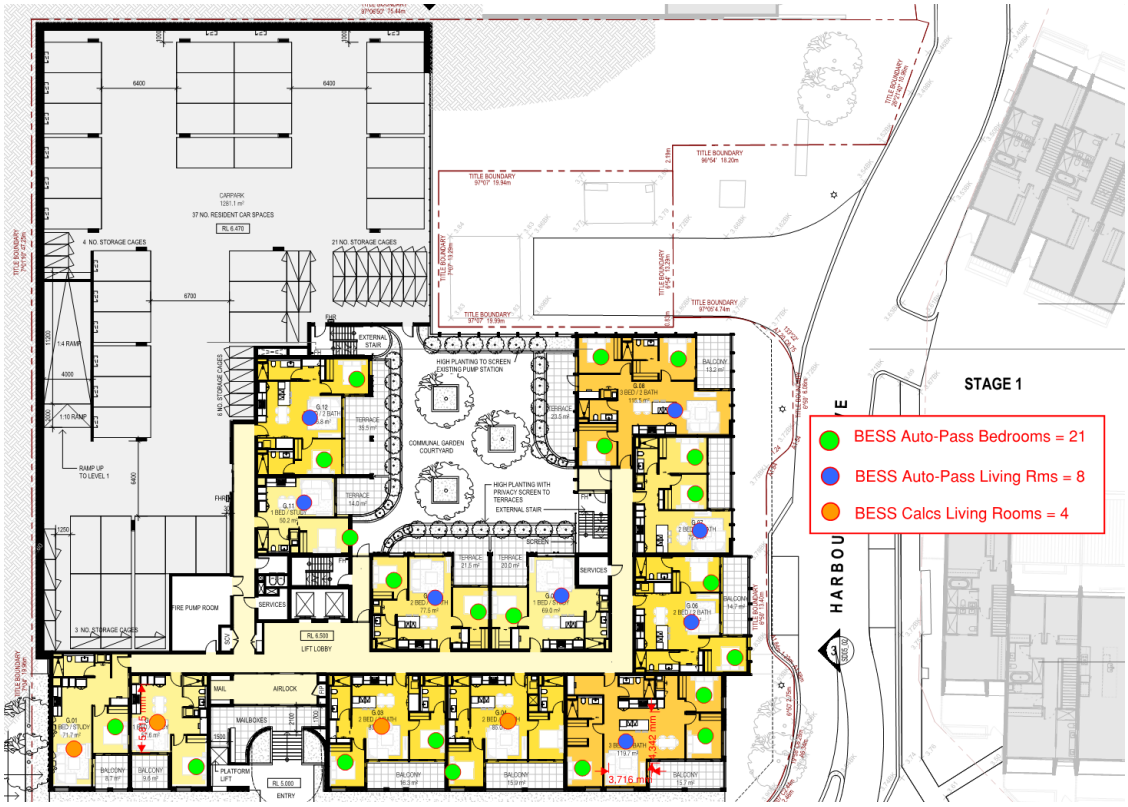
Figure 21: BESS Results Summary

11.2 Conclusion

This project currently achieves an overall BESS score of 77% which falls into the 'Excellence' classification in BESS. The project also achieves a pass in the four mandatory categories of Water, Energy, Indoor Environment Quality and Stormwater. A copy of the 'Published' BESS is provided in Appendix C.

Appendix A - BESS Daylight Analysis

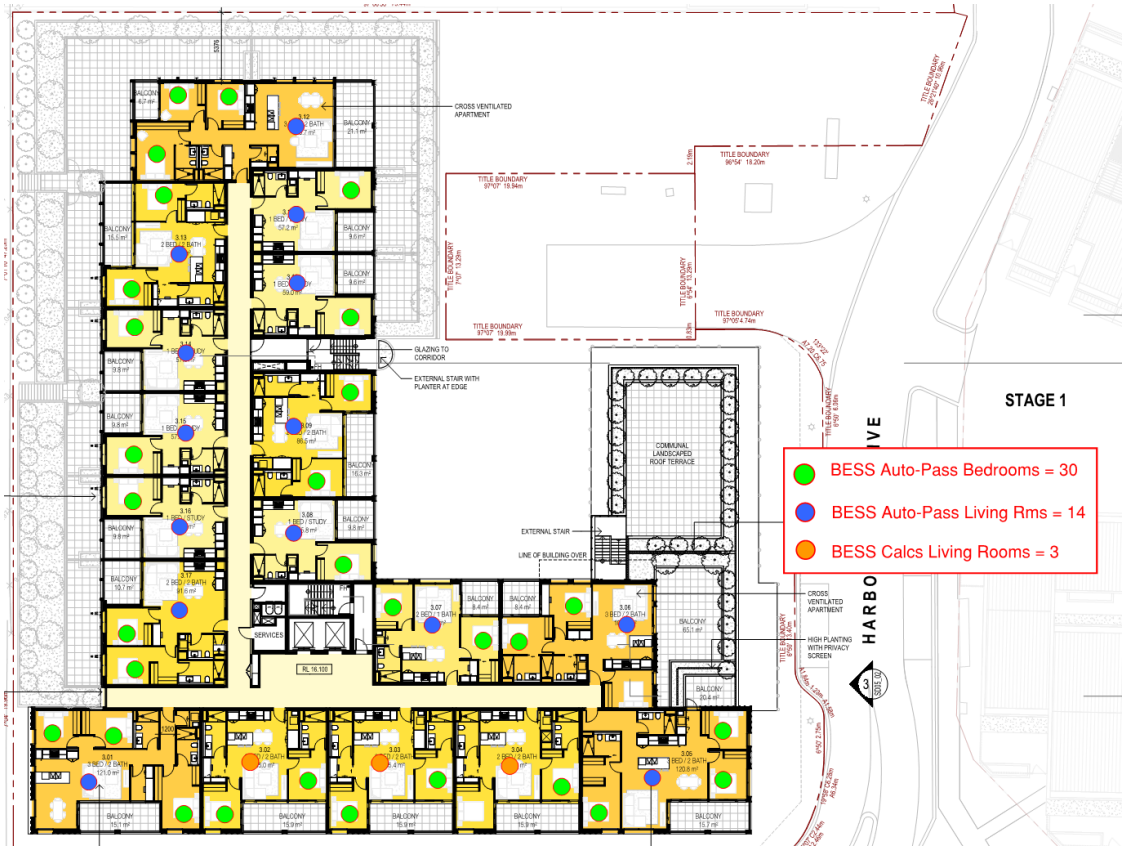
Ground



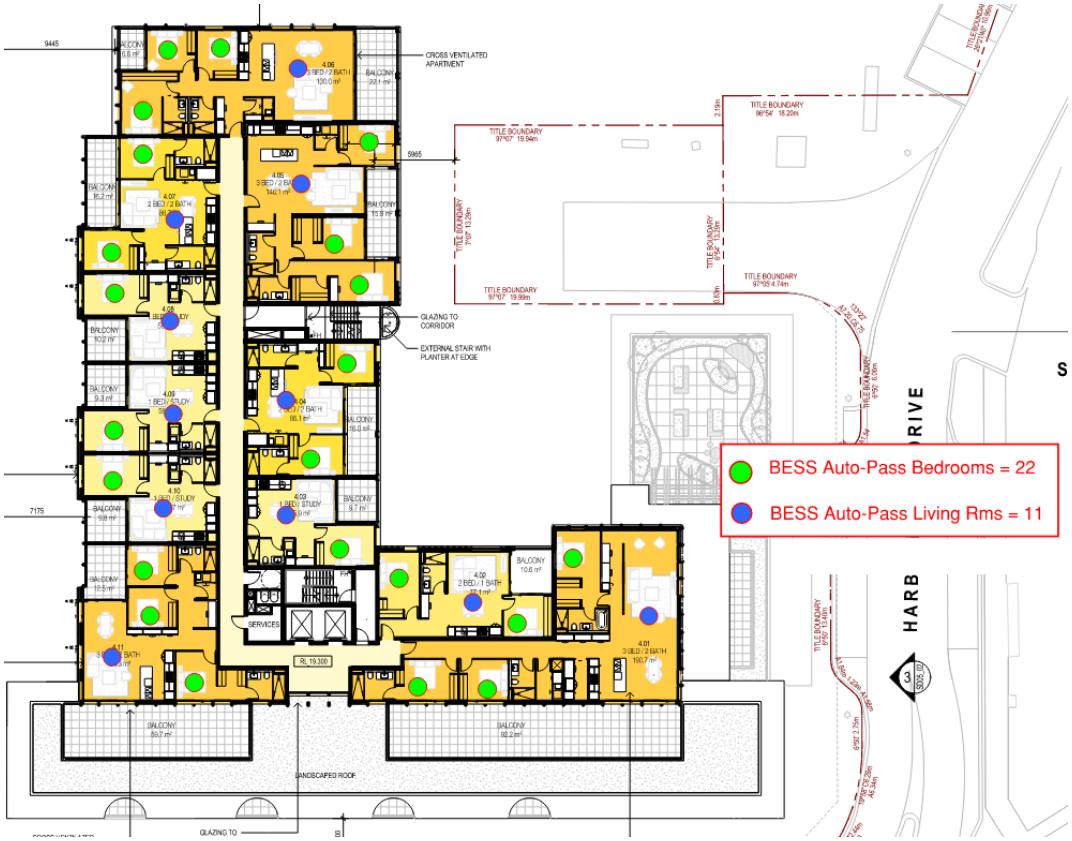
Level 1

Level 2

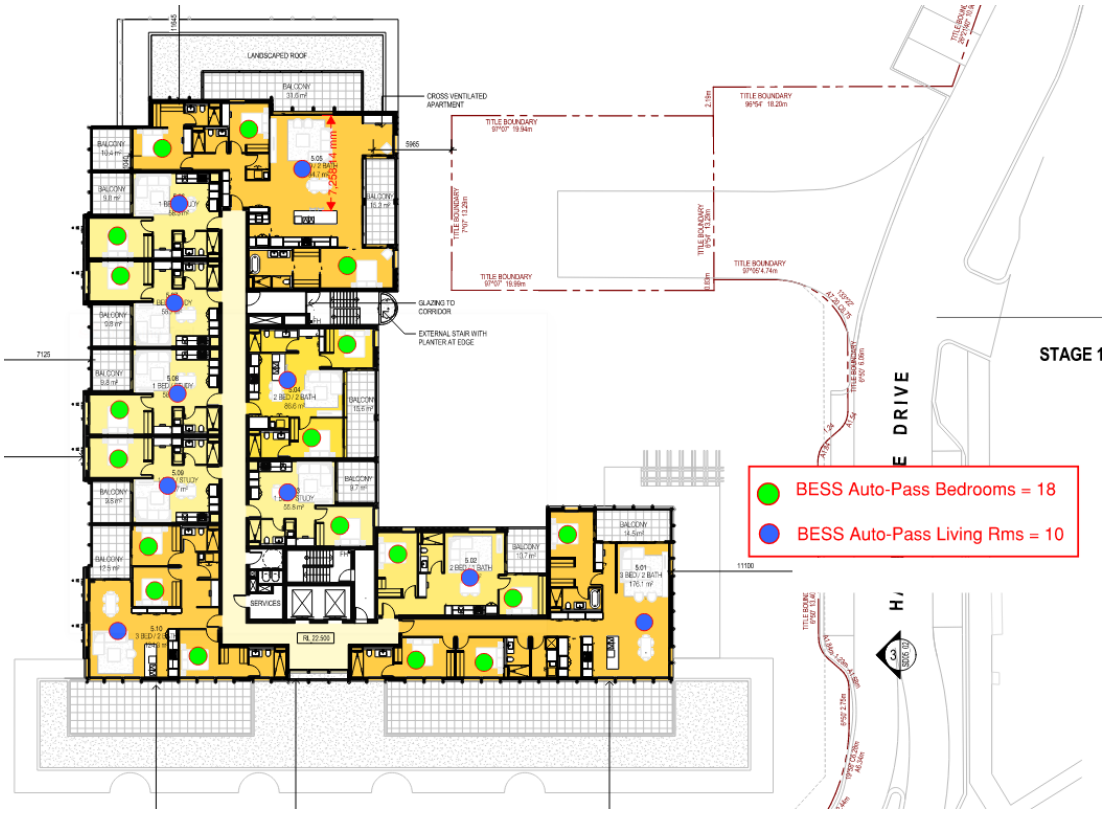
Level 3



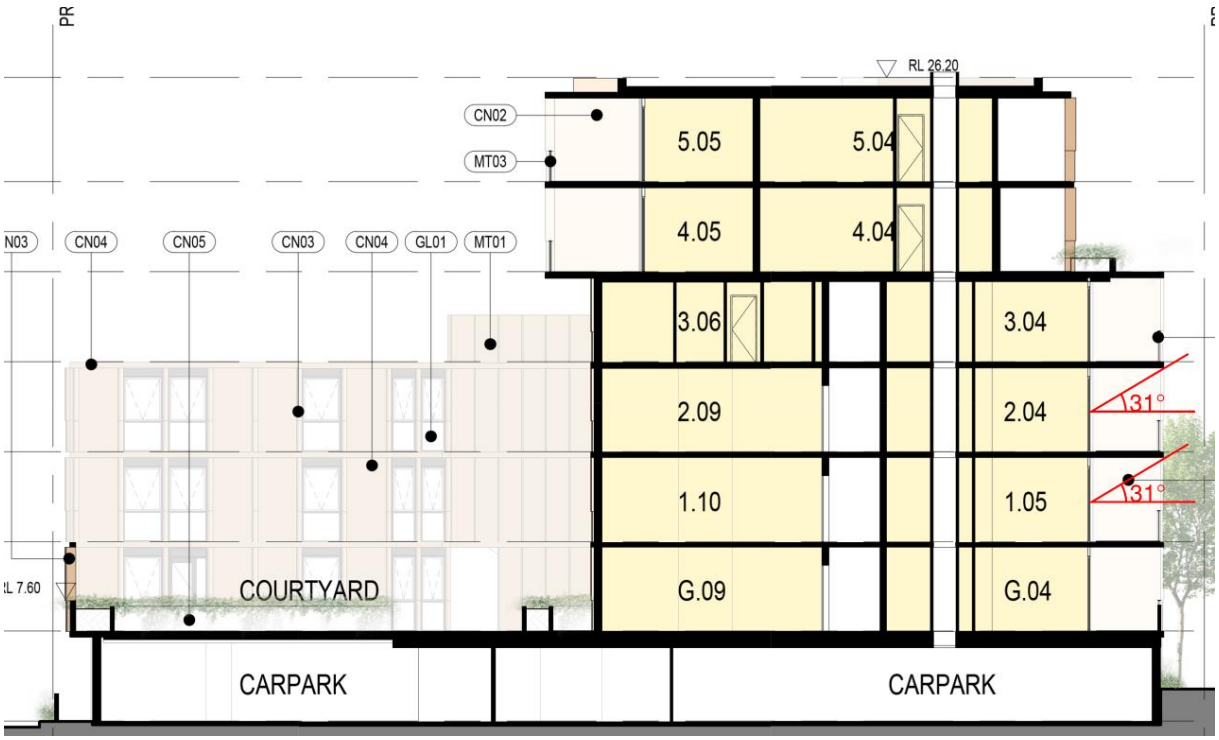
Level 4

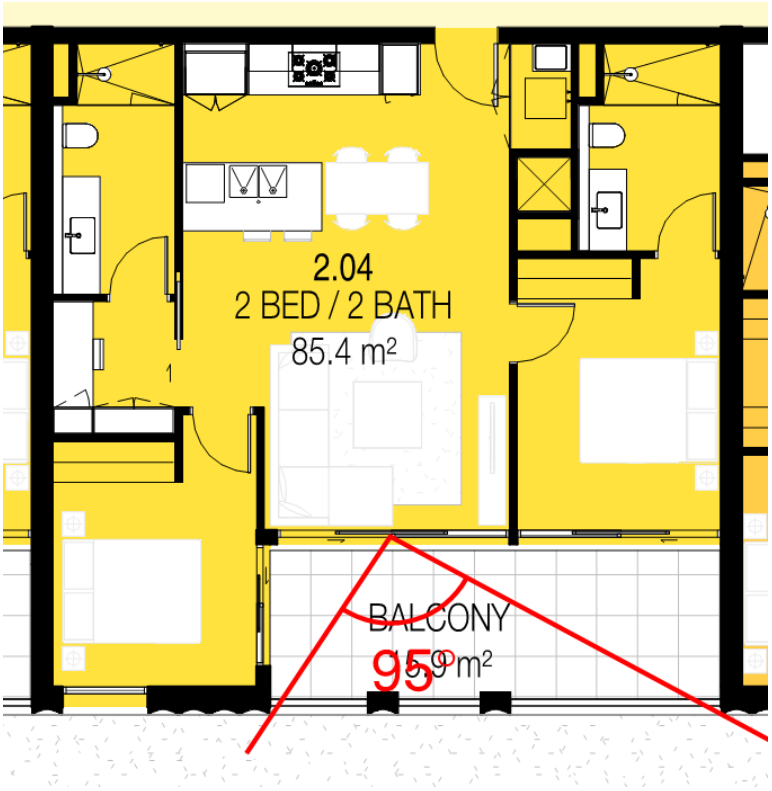


Level 5

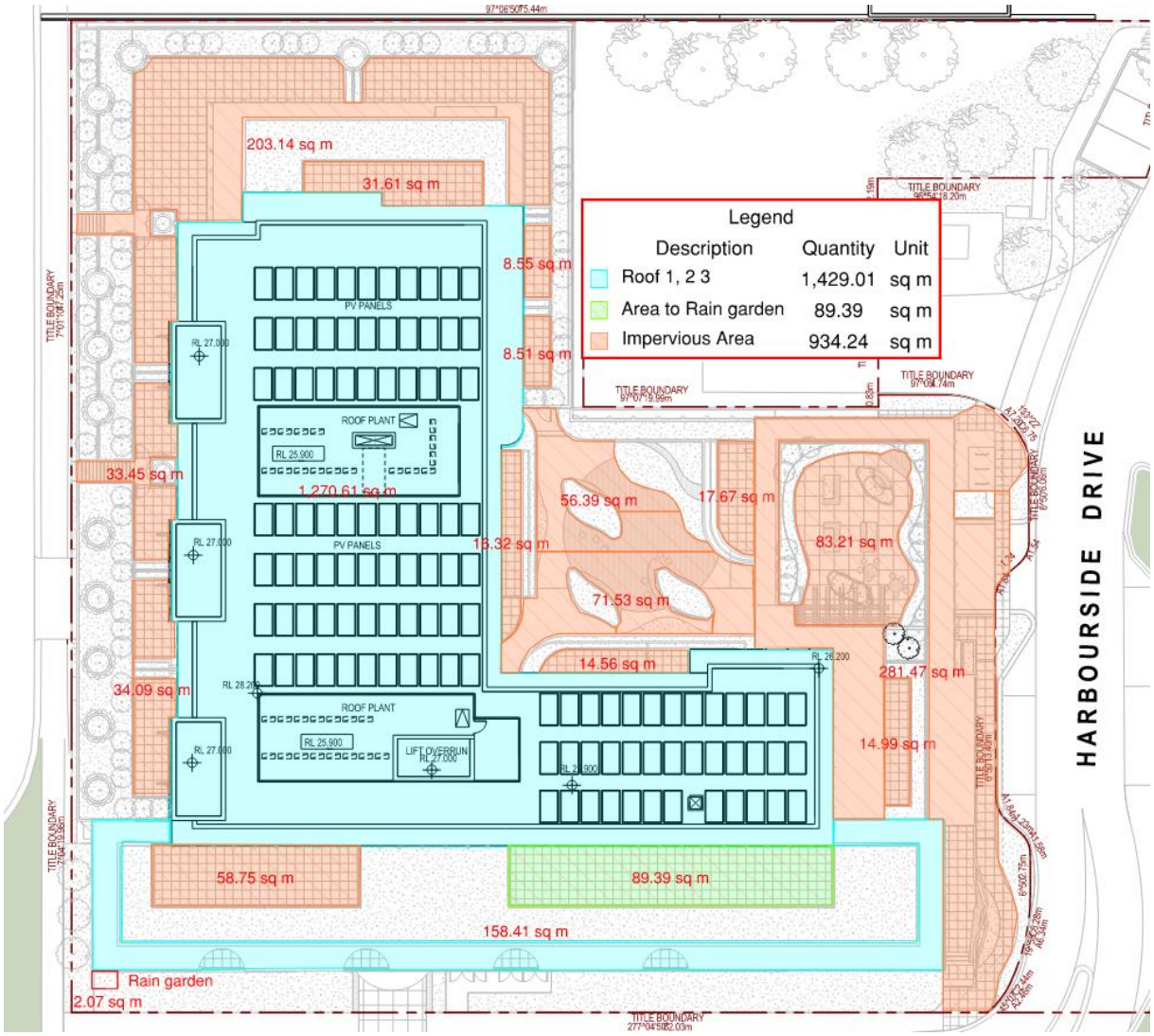


BESS hand calculations





Appendix B – Impervious Area Markup



City of Greater Geelong, Statutory Planning - Date Received 16/07/2022

Appendix C – 'Published' BESS Report

Issued as a separate document.