IGS INTEGRATED GROUP SERVICES

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Sustainable Management Plan

173-177 Barkly Avenue
Burnley VIC 3121

Date: 24/03/2026
Project No: 25022

Level 4, 108 Elizabeth Street
Melbourne VIC 3000
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Document Control

Version	Date	Issue	Author		Reviewer	
00	09/10/2025	Issue for Review	Gokul Nisha	GN	Li Huan	LH
01	13/03/2026	Issue for Review – Layout Updates	Gokul Nisha	GN	Li Huan	LH
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05	24/03/2026	Issue for Review – General Updates	Gokul Nisha	GN	Li Huan	LH

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Executive Summary

The proposed Self-Storage Facility development at 173-177 Barkly Avenue, Burnley has been designed to meet City of Yarra Council planning scheme clause 15.01-2L 'Environmentally sustainable development' and National Construction Code (NCC 2022) Section J energy efficiency requirements.

The development has achieved an overall score of above 50% of the following key BESS categories and demonstrates 'Best Practice' sustainable design.

Category	Contributes to overall Score	Project Category Score
Management	4.5%	40%
Integrated Water Management	22.5%	81%
Operational Energy	27.5%	82%
IEQ	16.5%	52%
Transport	9.0%	0%
Waste & Resource Recovery	5.5%	33%
Urban Ecology	5.5%	25%
Innovation	9%	0%
Total Rate	**100%**	**54%**

Based on the level of information available at this stage of the design process, the proposed Self-Storage Facility development at 173-177 Barkly Avenue, Burnley demonstrates 'Best Practice' in BESS and meets the City of Yarra sustainable design objectives.

1. Introduction

The Sustainable Management Plan (SMP) has been prepared to summarise the environmental objectives and initiatives incorporated into the design of the proposed development and demonstrates how these components incorporate environmentally sustainable design initiatives in accordance with the requirements of Clauses 15.01-2S (Building Design), 15.01-2L-01 (Environmentally Sustainable Development), and 53.18 (Stormwater Management) of the City of Yarra Planning Scheme.

The ESD initiatives proposed for this development are based on:

- Architectural Drawing Issued for Coordination dated 19/03/2026 prepared by Gray Puksand; and
- Discussions and correspondence with the project team.

The Site

The proposed 8-storey Self-Storage Facility is located at 173-177 Barkly Avenue, Burnley, convenient access to the gardens, recreational facilities and public transport. The site is walking distance from tram stops and nearby parks include Golden Square Bicentennial Park, Winifred Crescent Reserve and Allan Bain Reserve.

Site Location

The development is located within the City of Yarra and consists of:

- Ground Floor: Office Ancillary, Reception, Car parks, Storage and Services;
- Mezzanine Level: Wine storage, Wine storage common areas, Storage;
- Level 01- 07: Storage; and
- Roof: Plant

2. Summary of key ESD Initiatives

The Sustainable Management Plan (SMP) provides a comprehensive sustainability assessment of the proposed development. It evaluates all key initiatives in line with the BESS sustainable design rating tool, confirming that a holistic Environmentally Sustainable Design (ESD) review has been undertaken during the early design stage. The SMP establishes clear environmental benchmarks supported by quantifiable and measurable performance indicators, which the project is committed to achieving. These indicators serve as evidence that the development is designed to meet 'Best Practice' sustainability standards.

2.1 Incorporation of Environmentally Sustainable Design Objectives

The proposed development aims to incorporate the following Environmentally Sustainable Design initiatives to comply with the Yarra City Council Sustainable Design Assessment in the Planning Process (SDAPP).

2.2 Utilise Energy Efficiently and Sustainably

Mechanical Plant – Energy efficient VRV/VRF system with a load COP of 3.4 are proposed for the whole development.

Domestic Hot Water – Electric instantaneous domestic hot water unit will be proposed near the high DHW intake area and heat on demand within the development.

Energy Efficient Lighting – Lighting power density is designed to be compliant with NCC 2022 Section J7 Table J7D3a lighting power density requirement and LED lighting fittings will be installed as much as practicable throughout the development.

2.3 Utilise Potable Water Use Efficiently and Sustainably

To minimise the amenity water consumption and discharge to the municipal sewerage system, water efficient fixtures with the WELS rating as summarised below are to be used for the development.

- Kitchen Taps - 6 Star WELS Rating;
- Bathroom Taps - 6 Star WELS Rating;
- WCs - 5 Star WELS Rating; and
- Dishwasher - 5 Star WELS Rating (If Proposed).

Alternative Water Sources – At least 4,000 litre rainwater tank(s) will be installed for the whole development. The rainwater is collected and re-used for toilet flushing and landscaping irrigation.

2.4 Minimising Waste Going to Landfill

Construction Waste - the building contractor will be engaged to prepare a Waste Management Plan (WMP) which forms part of a Site Management Plan (SMP) and 70% (by mass) of all demolition & construction waste to be reused or recycled.

Operational Waste – A Waste Consultant has been engaged to implement the operational waste initiatives within the development to ensure the recycling facilities are as convenient for occupants as facilities for general waste.

2.5 Use Sustainable Sourced Materials

Internal paints, adhesives, sealants and flooring are selected with low VOC content and engineered wood is to be selected to have low formaldehyde emissions.

3. BESS Sustainable Assessment

The Built Environment Sustainability Scorecard (BESS) assesses energy and water efficiency, thermal comfort, and overall environmental sustainability performance of the proposed development. It assesses the project against a standard design practice building in nine environmental categories and the percentage contribution of each category varies depending on the scale and typology of the development.

A score of 50% and higher equates to 'Best Practice' via BESS rating. In order to meet BESS 'Best Practice' requirement, the development is targeting an overall score of above 50% and exceed the pass rates on four mandatory categories.

- Integrated Water Management;
- Energy; and
- Indoor Environment Quality (IEQ)

The proposed development achieves an overall score of above 50% and equates to 'Best Practice' sustainable design. BESS assessment report is enclosed as Appendix A for details.

3.1 Management

Best practice for building management means that sustainability is integrated from concept design through the construction process. Early design interventions and decisions will always deliver the maximum benefit for the lowest cost.

For that reason, key credits available in this category are being targeted and incorporated in the design:

- Engage the IGS ESD team to provide BESS advise from schematic design to construction stage;
- Undertake preliminary NCC Section J Façade Assessment;
- Provide separate sub-metering facilities for common area services for all utilities (electricity and water); and
- Produce a Building User's Guide will be provided in which operation and maintenance of installed equipment and building systems to be emphasised and highlighted. This shall cover at a minimum:
  - Energy and Environmental Strategy
  - Monitoring and Targeting
  - Building Services
  - Transport Facilities
  - Materials and Waste Policy
  - Expansion/Re-fit Considerations
  - References and Further Information

3.2 Integrated Water Management

Water will be used efficiently throughout the whole building development with inclusion of efficient fixtures and fittings, collection and reuse of rainwater for toilet flushing.

These water saving initiatives are proposed to ensure the efficient use of water and collection and re-use of stormwater and to minimise the associated water costs.

BESS rating tool is used to assess the overall development water efficiency and demonstrates the design potential to achieve an over 50% improvement compared to an identical size 'reference' project and meet the best practice sustainable design.

3.2.1 Water Efficient Fixtures

To minimise the amenity water consumption and discharge to the municipal sewerage system, water efficient fixtures are to be used for the development.

- Kitchen Taps - 6 Star WELS Rating;
- Bathroom Taps - 6 Star WELS Rating;
- WCs - 5 Star WELS Rating; and
- Dishwasher - 5 Star WELS Rating (If Proposed).

3.2.2 Stormwater Treatment

A minimum of 4kL rainwater tank will be proposed for collecting and re-using rainwater for toilets flushing and landscaping irrigation.

MUSIC modelling is undertaken to demonstrate the development will meet the best practice pollutant reduction levels to the satisfaction of the responsible authority.

3.2.3 Landscape Irrigation

The landscaping will be a combination of native vegetation with no irrigation demand and where landscape irrigation is required, the irrigation system will be connected to rainwater tank.

Water efficient landscaping is provided through the use of drought tolerant plant species. These plant species are predominantly native and adapted to the climate and soil conditions, thus will require less water, maintenance or replacement.

3.3 Energy Performance

The whole development will benchmark BESS Energy Efficiency as followings:

- **Operational Energy 1.1 and 2.1:** Energy efficient building design to deliver the proposed development minimum 10% reduction on energy use and Greenhouse Gas (GHG) Emissions in comparison with NCC2022 Section J reference buildings with reference services;
- **Operational Energy 2.2:** Reduce instantaneous (peak-hour) cooling demand for the development;
- **Operational Energy 2.6:** The development is proposed to be all electric;
- **Operational Energy 2.7:** Reduce annual electricity consumption for the development;
- **Operational Energy 3.2:** Reduce hot water system energy consumption via electric instantaneous domestic hot water unit within one star of the best available near the high DHW intake area and heat on-demand;
- **Operational Energy 3.7:** General lighting power density compliant with NCC 2022 Section J7 Table J7D3a; and
- **Operational Energy 4.2:** At least 10kW-e Solar PV capacity proposed as onsite renewable energy to the Self-Storage facility.

3.3.1 Renewable Energy

A minimum of 10kW solar photovoltaic (PV) panels will be installed on the roof. The generated green power will be directed to the main switchboard, contributing to a portion of the building's overall electrical load.

3.3.2 Operating Energy – NCC 2022 Section J

The double-glazed windows in conjunction with the energy efficient building services design will target to reduce the building services GHG emissions by more than 10% compared to NCC 2022 Section J reference buildings with reference services.

Note: The below building fabric and glazing performance values are nominal and are subject to change during design development/J1V3 modelling in accordance with NCC 2022.

Building Fabric and Windows

i) External and Internal Façade

Total Construction	Overall Thermal Resistance R-value to NCC 2022
External Wall – Insulated External Wall	R value ≥ 2.0
External Wall - Insulated Spandrel Panels	R value ≥ 2.0
Internal Wall between conditioned and unconditioned spaces	R value ≥ 1.4
Internal Wall between conditioned and conditioned spaces	N/A
Floors (Conditioned to unconditioned Spaces or Slab-on-ground)	R value ≥ 2.0

Note: Total system – values with allowance for thermal bridging in accordance with AS/NZS 4859.1 to NCC 2022 Section J4. External wall solar absorptance to not exceed 0.6.

ii) Roof and Ceiling Construction

Total Construction	Overall Thermal Resistance R-value to NCC 2022
Roof and Ceiling Construction	R value ≥ 3.2 with roof upper surface solar absorptance not more than 0.45

Note: Total system – values with allowance for thermal bridging in accordance with AS/NZS 4859.1 to NCC 2022 Section J4.

iii) Window

Window Type	U-Value and SHGCw (Frame + Glass)	Window VLT (%)	Location
Fixed Windows	Uw ≤ 2.5 W/ (m2. K) and SHGCw ≤ 0.25	≥ 30%	Office Ancillary, Reception and Wine storage common area
Glazed Doors	Uw ≤ 3.0 W/ (m2. K) and SHGCw ≤ 0.25	≥ 30%	

Note: Total system – values with allowance for thermal bridging in accordance with AS/NZS 4859.1 to NCC 2022 Section J4.

3.3.3 Energy Efficient System

For the proposed development, energy efficient HVAC, lighting and domestic hot water systems will be designed to minimum operational energy use and greenhouse gas emissions and reduce peak energy demand.

The energy efficient system will include:

- Energy efficient VRV/VRF system with a COP of 3.4 are proposed for the whole development.
- Reduce hot water system energy consumption via electric instantaneous domestic hot water unit within one star of the best available near the high DHW intake area and heat on-demand; and
- Energy efficient LED light fittings with lighting power density compliant with NCC 2022 Section J7 Table J7D3a.

3.3.4 Internal Lighting – Non-Residential

The maximum illumination power density (W/m2) in the regular used areas meet the requirements of Table J7D3a of the NCC 2022 Section J.

3.4 Indoor Environment Quality

The proposed Self-Storage Facility development will enhance indoor environment quality and support the wellbeing of building occupants by incorporating the following features into the design.

- More than 60% of the regularly occupied floor area will achieve a daylight factor of above 2%;
- At least 60% of the office ancillary and reception areas are effectively naturally ventilated;
- At least 100% of the storage facility areas is effectively naturally ventilated with full height fixed louvers to the corridors;
- 100% of east, north and west glazing to regular use areas are effectively shaded; and
- Low Volatile Organic Compound (VOC) paints, adhesive and sealant and engineered wood with low formaldehyde emissions to be used in the development.

Internal Paints, Adhesive and Sealant VOC Limits

Product Type Category	Max TVOC Content (g/l of ready-to-use product)
General purpose adhesives	50
Design & As Built wall and ceiling paint, all sheen levels	16
Trim, varnishes and wood stains	75
Primers, sealers and prep coats	65
One and two pack performance coatings for floors	140
Acoustic sealants, architectural sealant, waterproofing membranes and sealant, fire retardant sealants and adhesives	250
Structural glazing adhesive, wood flooring and laminate adhesives and sealants	100

Carpets VOC Limits

Test protocol	Limit
ASTM D5116 – Total VOC limit	0.5mg/m²/h per hour
ASTM D5116 – 4 – PC (4-Phenylcyclohexene)	0.5mg/m²/h per hour
ISO 16000/EN 13419 – TVOC at three days	0.5mg/m²/h per hour
ISO 10580/ISO/TC 219 (Document N238) – TVOC at 24 hours	0.5mg/m²/h per hour

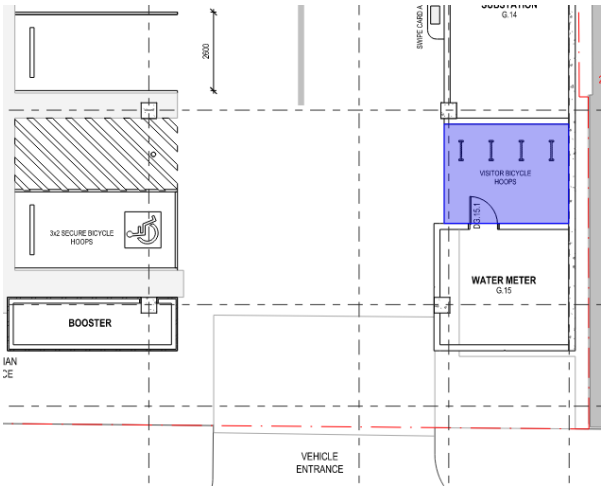
Engineered Wood Formaldehyde Emission Limits

Test protocol	Emission limit/ Unit of Measurement
AS/NZS 2269:2004, testing procedure AS/NZS 2098.11:2005 method 10 for Plywood	≤1.0mg/L
AS/NZS 1859.1:2004 – Particle Board, with use of testing procedure AS/NZS 4266.16:2004 method 16	≤1.5mg/L
AS/NZS 1859.2:2004 – MDF, with use of testing procedure AS/NZS 4266.16:2004 method 16	≤1.0mg/L
AS/NZS 4357.4 – Laminated Veneer Lumber (LVL)	≤1.0mg/L
Japanese Agricultural Standard MAFF Notification NO.701 Appendix Clause 3 (11) - LVL	≤1.0mg/L
JIS A 5908:2003 – Particle Board and Plywood, with use of testing procedure JISA 1460	≤1.0mg/L
JIS A 5905:2003 – MDF, with use of testing procedure JIS A 1460	≤1.0mg/L
JIS A1901 (not applicable to Plywood, applicable to high pressure laminates and compact laminates)	≤0.1mg/m²hr
ASTM D5116 (applicable to high pressure laminated and compact laminates	≤0.1mg/m²hr
ISO 16000 part 9, 10 and 11 (also known as EN 13419), applicable to high pressure laminates and compact laminates	≤0.1mg/m²hr (at 3 days)
ASTM D6007	≤0.12mg/m³
ASTM E1333	≤0.12mg/m³
EN 717-1 (also known as DIN EN 717-1)	≤0.12mg/m³
EN 717-2 (also known as DIN EN 717-2)	≤3.5mg/m³hr

3.5 Transport

3.5.1 Bicycle Parking – Non-Residential

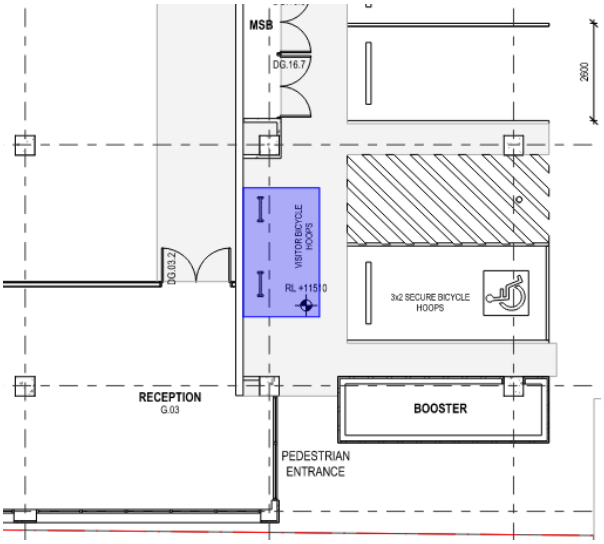
At least 6 bicycle parking spaces are provided on the Ground Floor for building users.



Bike Parking on Ground Floor

3.5.2 Bicycle Parking – Non-Residential Visitor

At least 4 bicycle parking spaces are provided on the Ground Floor for visitors.



Visitor Bike Parking on Ground Floor

3.6 Waste Management

BESS rating tool has been used to assess the overall development waste collection and reuse and demonstrate the project has the design potential to achieve the best practice design for the Waste Management.

3.6.1 Construction Waste Management Plan

Building Contractor must provide Construction Site Management Plan prior to any construction work.

As part of the Construction Site Management Plan, a Construction Waste Management Plan must be prepared to encourage waste avoidance, reuse and recycling during the construction and at least 70% of construction and demolition waste are to be reused or recycled.

3.6.2 Construction Phase Stormwater Pollution Reduction

The Building Contractor will implement an Environmental Management Plan (EMP) to include the site management procedures to reduce the stormwater pollution during construction phase.

3.6.3 Operational Waste – Convenience of Recycling

The recycling facilities are proposed as convenient for building users as facilities for general waste.

3.7 Urban Ecology

3.7.1 Vegetation

At least 5% of total site area will be vegetation. Planter boxes are to be located at ground floor, Level 1 and Level 4 roofs. Landscaped areas are to be located on north site boundary of ground floor.

3.7.2 Green Roofs

The development will incorporate green roofs. Green roofs will be located on Level 1 and Level 4.

3.7.3 Reduction of Urban Heat Island Effect

Terrace planter box landscaping, specification of light-coloured materials throughout the project, as well as the extent of solar photovoltaics at roof level, will all assist in reducing the urban heat island effect.

Roofs are proposed to have a three-year SRI of minimum 60. Unshaded hard-scaping elements are to have a three-year SRI of minimum 40.

3.8 Innovation

N/A

4. Overall BESS Scores Aiming to Target

With inclusion of all ESD initiatives summarised above, the proposed design is estimated to be able to achieve an overall score of above 50% of nine key BESS categories and demonstrating 'Best Practice' sustainable design.

Category	Contributes to overall Score	Project Category Score
Management	4.5%	40%
Integrated Water Management	22.5%	81%
Operational Energy	27.5%	82%
IEQ	16.5%	52%
Transport	9.0%	0%
Waste & Resource Recovery	5.5%	33%
Urban Ecology	5.5%	25%
Innovation	9%	0%
Total Rate	**100%**	**54%**

5. Conclusion

This SMP provides a summary of sustainable design features integrated into the proposed Self Storage Facility development at 173-177 Barkly Avenue, Burnley, to demonstrate 'Best Practice' in sustainable design and align with Yarra City Council's sustainability objectives.

In terms of the building performance, the proposed development will be designed to incorporate the followings:

- Energy efficient VRV/VRF system with a COP of 3.4 are proposed for the whole development;
- Building Services energy consumption reduced by 10% compared to NCC 2022 Section J;
- At least 10kW solar photovoltaic (PV) panels will be installed on the roof;
- At least 4kL rainwater tank will be proposed on site for toilets flushing and landscaping irrigation;
- Water efficient fixtures and fittings with minimum WELS rating specified;
- Improved stormwater quality via rainwater harvesting system and water efficient landscaping design;
- Introduce a high level of natural light into the regularly occupied spaces;
- Lighting power density is designed to be compliant with NCC 2022 Section J7 Table J7D3a lighting power density requirement;
- A construction Waste Management Plan (WMP) to be prepared and implemented and a minimum 70% of all demolition and construction waste to be reused or recycled;
- Meet Best Practice Sustainable Design using BESS rating tool; and
- Provision of a Building User's Guide for occupants to optimise the building's environmental performance.

Therefore, the proposed development has been designed to meet the Yarra City Council's Sustainable Design Assessment objectives and the relevant planning scheme requirements.

The project team will ensure that all performance outcomes outlined in this Sustainable Management Plan are implemented prior to occupancy, at no cost to Yarra City Council and to the satisfaction of the Responsible Authority.

Appendix A – BESS Report

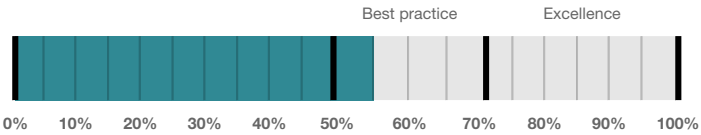
BESS Report

Built Environment Sustainability Scorecard

This BESS report outlines the sustainable design commitments of the proposed development at 173-177 Barkly Ave Burnley Victoria 3121. 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 Yarra 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

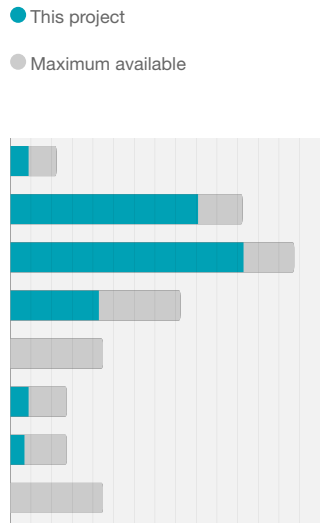


54%

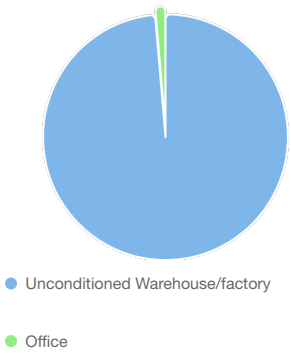
Project details

Name	Storhub Burnley
Address	173-177 Barkly Ave Burnley Victoria 3121
Project ID	7CF72140-R5
BESS Version	BESS-9
Date	20 March 2026
Software version	2.3.0-B.647
Site type	Non-residential development
Account	li.huan@igs.com.au
Application no.	
Site area	2,944 m²
Building floor area	17,509 m²

Performance by category



Project composition



Buildings

Name	Height	Footprint	% of total footprint
Storage Building	8	2,195 m²	100%

Dwellings & Non Res Spaces

Non-Res Spaces

Name	Quantity	Area	Building	% of total area
Office				
Office Ancillary and Reception	1	207 m²	Storage Building	1%
Wine storage common area	1	32.0 m²	Storage Building	< 1%
Total	**2**	**239 m²**	**1%**	
Unconditioned Warehouse/factory				
Storage	1	17,270 m²	Storage Building	98%
Total	**1**	**17,270 m²**	**98%**	

Supporting Evidence

Shown on Floor Plans

Credit	Requirement	Response	Status
Management 3.3	Annotation: Sub-meters to be provided to all major common area services (list each)		-
Integrated Water Management 2.1	Location of any stormwater management systems (rainwater tanks, raingardens, buffer strips)		-
Integrated Water Management 3.1	Annotation: Water efficient garden details		-
Operational Energy 4.2	Location and size of solar photovoltaic system		-
Transport 1.4	Location of non-residential bicycle parking spaces		-
Transport 1.5	Location of non-residential visitor bicycle parking spaces		-
Waste & Resource Recovery 2.2	Location of recycling facilities		-
Urban Ecology 2.1	Location and size of vegetated areas		-
Urban Ecology 2.2	Location and size of green roof		-

Supporting Documentation

Credit	Requirement	Response	Status
Management 2.3a	Section J glazing assessment		-
Integrated Water Management 2.1	STORM report or MUSIC model		-
Operational Energy 1.1	Energy Report showing calculations of reference case and proposed buildings		-
Operational Energy 3.7	Average lighting power density and lighting type to be used		-
Operational Energy 4.2	Specifications of the solar photovoltaic system(s)		-
Indoor Environment Quality 1.4	A short report detailing assumptions used and results achieved		-

Credit summary

Management Overall contribution 4.5%

40%

1.1 Pre-Application Meeting	0%
2.3 Thermal Performance Modelling - Non-Residential	50%
3.2 Metering - Non-Residential	N/A Scoped Out
	The building will have only one tenant
3.3 Metering - Common Areas	100%
4.1 Building Users Guide	100%

IWM Overall contribution 22.5%

	81%	✔ Pass
1.1 Potable Water Use	60%	✔ Achieved
2.1 Stormwater Treatment	100%	✔ Achieved
3.1 Water Efficient Landscaping	100%	
4.1 Building Systems Water Use	0%	

Operational Energy Overall contribution 27.5%

	Minimum required 50% 82%	✔ Pass
1.1 Thermal Performance Rating - Non-Residential	37%	
2.1 Greenhouse Gas Emissions	100%	
2.2 Peak Demand	100%	
2.6 Electrification	100%	
2.7 Energy consumption	100%	
3.1 Carpark Ventilation	0%	
3.2 Hot Water - Non-Residential	100%	
3.7 Internal Lighting - Non-Residential	100%	
4.1 Combined Heat and Power (cogeneration / trigeneration)	N/A	✣ Scoped Out
No cogeneration or trigeneration system in use.		
4.2 Renewable Energy Systems - Solar	40%	
4.4 Renewable Energy Systems - Other	N/A	✣ Scoped Out
No other (non-solar PV) renewable energy is in use.		

IEQ Overall contribution 16.5%

	Minimum required 50% 52%	✔ Pass
1.4 Daylight Access - Non-Residential	33%	✔ Achieved
2.3 Ventilation - Non-Residential	49%	✔ Achieved
3.4 Thermal comfort - Shading - Non-Residential	100%	
3.5 Thermal Comfort - Ceiling Fans - Non-Residential	0%	
4.1 Air Quality - Non-Residential	100%	

Transport Overall contribution 9.0%

	0%
1.4 Bicycle Parking - Non-Residential	1%
1.5 Bicycle Parking - Non-Residential Visitor	1%
1.6 End of Trip Facilities - Non-Residential	0% ⊘ Disabled
	Credit 1.4 must be complete first.
2.1 Electric Vehicle Infrastructure	0%
2.2 Car Share Scheme	0%
2.3 Motorbikes / Mopeds	0%

Waste & Resource Recovery Overall contribution 5.5%

	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%

	25%
1.1 Communal Spaces	0%
2.1 Vegetation	25%
2.2 Green Roofs	100%
2.3 Green Walls and Facades	0%
3.2 Food Production - Non-Residential	0%

Innovation Overall contribution 9.0%

	0%
1.1 Innovation	0%

Credit breakdown

Management Overall contribution 4.5%

40%

1.1 Pre-Application Meeting	0%
Score Contribution	This credit contributes 54.4% towards the category score.
Criteria	Has an ESD professional been engaged to provide sustainability advice from schematic design to construction? AND Has the ESD professional been involved in a pre-application meeting with Council?
Question	Criteria Achieved ?
Project	No
2.3 Thermal Performance Modelling - Non-Residential	50%
Score Contribution	This credit contributes 9.3% towards the category score.
Criteria	Has a preliminary facade assessment been undertaken in accordance with NCC2022 Section J4D6?
Question	Criteria Achieved ?
Office	Yes
Criteria	Has a preliminary energy model been undertaken in accordance with either NCC2022 Section J5 Energy Efficiency or BASIX to 7 Star?
Question	Criteria Achieved ?
Office	Yes
3.2 Metering - Non-Residential	N/A ◇ Scoped Out
This credit was scoped out	The building will have only one tenant
3.3 Metering - Common Areas	100%
Score Contribution	This credit contributes 18.1% towards the category score.
Criteria	Have all major common area services been separately submetered?
Question	Criteria Achieved ?
Office	Yes
Unconditioned Warehouse/factory	Yes
4.1 Building Users Guide	100%
Score Contribution	This credit contributes 18.1% towards the category score.
Criteria	Will a building users guide be produced and issued to occupants?
Question	Criteria Achieved ?
Project	Yes

IWM Overall contribution 22.5%

81% ✔ Pass

Do you have a reticulated third pipe or an on-site water recycling system?:	No
Are you installing a swimming pool?:	No

Stormwater profile

Which stormwater modelling software are you using?:	Melbourne Water STORM tool
STORM score achieved:	100
Flow:	-
Total Suspended Solids:	-
Total Phosphorus:	-
Total Nitrogen:	-

Rainwater tank profile

What is the total roof area connected to the rainwater tank?:	
Rainwater Tank 1	2,497 m²
	-
Tank Size:	
Rainwater Tank 1	4,000 Litres
	-
Irrigation area connected to tank:	
Rainwater Tank 1	
Is connected irrigation area a water efficient garden?:	
Rainwater Tank 1	No
	-
Other external water demand connected to tank?:	
Rainwater Tank 1	-
	-

Fixtures, fittings & connections profile

Building: All	Storage Building
Showerhead: All	Scope out
Bath: All	Scope out
Kitchen Taps: All	>= 6 Star WELS rating
Bathroom Taps: All	>= 6 Star WELS rating
Dishwashers:	
Office Ancillary and Reception	>= 5 Star WELS rating
Storage Wine storage common area	Scope out
WC: All	>= 5 Star WELS rating
Urinals: All	Scope out
Washing Machine Water Efficiency: All	Scope out

Which non-potable water source is the dwelling/space connected to?:	
Office Ancillary and Reception	Rainwater Tank 1
Storage Wine storage common area	-
Non-potable water source connected to Toilets:	
Office Ancillary and Reception Wine storage common area	No
Storage	Yes
Non-potable water source connected to Laundry (washing machine): All	No
Non-potable water source connected to Hot Water System: All	No

1.1 Potable Water Use — 60% ✔ Achieved

Score Contribution	This credit contributes 31.2% 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	6271 kL
Output	Proposed (including rainwater and/or recycled water use)
Project	3758 kL
Output	Proposed (including rainwater and/or recycled water use)
Project	3758 kL
Output	% Reduction in Potable Water Consumption
Project	40 %
Output	% of connected demand met by rainwater
Project	0 %
Output	How often does the tank overflow?
Project	Very Often
Output	Opportunity for additional rainwater connection
Project	2468 kL

2.1 Stormwater Treatment — 100% ✔ Achieved

Score Contribution	This credit contributes 56.2% towards the category score.
Criteria	Has best practice stormwater management been demonstrated?
Output	Min STORM Score
Project	100
Output	STORM Score
Project	100

3.1 Water Efficient Landscaping — 100%

Score Contribution	This credit contributes 6.2% towards the category score.
Criteria	Will water efficient landscaping be installed?
Question	Criteria Achieved ?
Project	Yes

4.1 Building Systems Water Use	0%

Score Contribution	This credit contributes 6.2% towards the category score.
Criteria	Where applicable, have measures been taken to reduce potable water consumption by >80% in the buildings air-conditioning chillers and when testing fire safety systems?
Question	Criteria Achieved ?
Project	No

Operational Energy Overall contribution 27.5%

	Minimum required 50%	82%	✔ Pass

Project profile	
Use the BESS Deem to Satisfy (DtS) method for Non-residential spaces?:	Yes
Are you installing any renewable energy system(s) (other than solar photovoltaic)?:	No
Energy Supply:	All-electric
Solar Photovoltaic system profile	
System Size (lesser of inverter and panel capacity): Solar PV	10.0 kW peak
Orientation (which way is the system facing)?: Solar PV	North
Inclination (angle from horizontal): Solar PV	10.0 Angle (degrees)
Which Building Class does this apply to?: Solar PV	Office
Non-residential Deemed-to-Satisfy profile	
Do all exposed floors and ceilings (forming part of the envelope) demonstrate meeting the required NCC2022 insulation levels (total R-value upwards and downwards)?:	Yes
Does all wall and glazing demonstrate meeting the required NCC2022 facade calculator (or better than the total allowance)?:	Yes
Are heating and cooling systems within one star of the most efficient equivalent capacity unit available? Coefficient of Performance (CoP) & Energy Efficiency Ratios (EER) not less than 85% of the CoP & EER of the most efficient equivalent capacity unit available?:	Yes
Are water heating systems within one star of the best available, or 85% or better than the most efficient equivalent capacity unit?:	Yes

1.1 Thermal Performance Rating - Non-Residential	37%
Score Contribution	This credit contributes 12.6% towards the category score.
Criteria	What is the % reduction in heating and cooling energy consumption against the reference case (NCC2022 Section J)?
2.1 Greenhouse Gas Emissions	100%
Score Contribution	This credit contributes 12.3% towards the category score.
Criteria	What is the % reduction in annual greenhouse gas emissions against the benchmark?
2.2 Peak Demand	100%
Score Contribution	This credit contributes 1.6% towards the category score.
Criteria	What is the % reduction in the instantaneous (peak-hour) demand against the benchmark?
2.6 Electrification	100%

Score Contribution	This credit contributes 18.4% towards the category score.
Criteria	Is the development all-electric?
Question	Criteria Achieved?
Project	Yes

2.7 Energy consumption 100%

Score Contribution	This credit contributes 24.5% towards the category score.
Criteria	What is the % reduction in annual energy consumption against the benchmark?

3.1 Carpark Ventilation 0%

Score Contribution	This credit contributes 6.1% towards the category score.
Criteria	If you have an enclosed carpark, is it: (a) fully naturally ventilated (no mechanical ventilation system) or (b) 40 car spaces or less with Carbon Monoxide monitoring to control the operation and speed of the ventilation fans?
Question	Criteria Achieved ?
Project	No

3.2 Hot Water - Non-Residential 100%

Score Contribution	This credit contributes 6.1% towards the category score.
Criteria	What is the % reduction in annual energy consumption (gas and electricity) of the hot water system against the benchmark?

3.7 Internal Lighting - Non-Residential 100%

Score Contribution	This credit contributes 12.3% towards the category score.
Criteria	Does the lighting power density exceed [illegible] W/m2) in at least 90% of the area of the [illegible] Table J7D3a of the NCC 2022 Vol 1?
Question	Criteria Achieved?
Office	Yes
Unconditioned Warehouse/factory	Yes

4.1 Combined Heat and Power (cogeneration / trigeneration) N/A Scoped Out

No cogeneration or trigeneration system in use.

This credit was scoped out	No cogeneration or trigeneration system in use.

4.2 Renewable Energy Systems - Solar 40%

Score Contribution	This credit contributes 6.1% 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
Office	12,118 kWh
Output	% of Building's Energy
Office	163 %

4.4 Renewable Energy Systems - Other N/A Scoped Out

No other (non-solar PV) renewable energy is in use.

This credit was scoped out	No other (non-solar PV) renewable energy is in use.

IEQ Overall contribution 16.5%

	Minimum required 50%	52%	✔ Pass

1.4 Daylight Access - Non-Residential		33%	✔ Achieved
Score Contribution	This credit contributes 35.3% towards the category score.		
Criteria	What % of the nominated floor area has at least 2% daylight factor?		
Question	Percentage Achieved?		
Office	60 %		
Unconditioned Warehouse/factory	33 %		
2.3 Ventilation - Non-Residential		49%	✔ Achieved
Score Contribution	This credit contributes 35.3% towards the category score.		
Criteria	What % of the regular use areas are effectively naturally ventilated?		
Question	Percentage Achieved?		
Office	60 %		
Unconditioned Warehouse/factory	100 %		
Criteria	What increase in outdoor air is available to regular use areas compared to the minimum required by AS 1668.2-2012?		
Question	Percentage Achieved?		
Office	0 %		
Unconditioned Warehouse/factory	0 %		
Criteria	What CO2 concentrations are the ventilation systems designed to achieve, to monitor and to maintain?		
Question	Value		
Office	0 ppm		
Unconditioned Warehouse/factory	0 ppm		
3.4 Thermal comfort - Shading - Non-Residential		100%	
Score Contribution	This credit contributes 17.6% towards the category score.		
Criteria	What percentage of east, north and west glazing to regular use areas is effectively shaded?		
Question	Percentage Achieved?		
Office	100 %		
Unconditioned Warehouse/factory	100 %		
3.5 Thermal Comfort - Ceiling Fans - Non-Residential		0%	

Score Contribution	This credit contributes 5.9% towards the category score.
Criteria	What percentage of regular use areas in tenancies have ceiling fans?
Question	Percentage Achieved?
Office	0 %
Unconditioned Warehouse/factory	0 %

4.1 Air Quality - Non-Residential 100%

Score Contribution	This credit contributes 5.9% towards the category score.

Criteria	Do all paints, sealants and adhesives meet the maximum total indoor pollutant emission limits?
Question	Criteria Achieved ?
Office	Yes
Unconditioned Warehouse/factory	Yes

Criteria	Does all carpet meet the maximum total indoor pollutant emission limits?
Question	Criteria Achieved ?
Office	Yes
Unconditioned Warehouse/factory	Yes

Criteria	Does all engineered wood meet the maximum total indoor pollutant emission limits?
Question	Criteria Achieved ?
Office	Yes
Unconditioned Warehouse/factory	Yes

Transport Overall contribution 9.0%

	0%

1.4 Bicycle Parking - Non-Residential		1%
Score Contribution	This credit contributes 25% towards the category score.	
Criteria	Have the planning scheme requirements for employee bicycle parking been exceeded by at least 50% (or a minimum of 2 where there is no planning scheme requirement)?	
Question	Criteria Achieved ?	
Office	Yes	
Unconditioned Warehouse/factory	No	
Question	Bicycle Spaces Provided ?	
Office	6	
Unconditioned Warehouse/factory	0	
1.5 Bicycle Parking - Non-Residential Visitor		1%
Score Contribution	This credit contributes 12.5% towards the category score.	
Criteria	Have the planning scheme requirements for visitor bicycle parking been exceeded by at least 50% (or a minimum of 1 where there is no planning scheme requirement)?	
Question	Criteria Achieved ?	
Office	Yes	
Unconditioned Warehouse/factory	No	
Question	Bicycle Spaces Provided ?	
Office	4	
Unconditioned Warehouse/factory	0	
1.6 End of Trip Facilities - Non-Residential		0% ⊘ Disabled
		Credit 1.4 must be complete first.
This credit is disabled	Credit 1.4 must be complete first.	
2.1 Electric Vehicle Infrastructure		0%
Score Contribution	This credit contributes 25% towards the category score.	
Criteria	Are facilities provided for the charging of electric vehicles?	
Question	Criteria Achieved ?	
Project	No	
2.2 Car Share Scheme		0%
Score Contribution	This credit contributes 12.5% 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 12.5% towards the category score.
Criteria	Are a minimum of 5% of vehicle parking spaces designed and labelled for motorbikes (must be at least 5 motorbike spaces)?
Question	Criteria Achieved ?
Project	No

Waste & Resource Recovery **Overall contribution 5.5%**

33%

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 5.5%

25%

1.1 Communal Spaces	0%
Score Contribution	This credit contributes 12.5% towards the category score.
Criteria	Is there at least the following amount of common space measured in square meters : * 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
Office	0.0 m²
Unconditioned Warehouse/factory	0.0 m²
Output	Minimum Common Space Required
Office	19 m²
Unconditioned Warehouse/factory	223 m²

2.1 Vegetation	25%
Score Contribution	This credit contributes 50% towards the category score.
Criteria	How much of the site is covered with vegetation, expressed as a percentage of the total site area?
Question	Percentage Achieved ?
Project	5 %

2.2 Green Roofs	100%
Score Contribution	This credit contributes 50% towards the category score.
Criteria	Does the development incorporate a green roof?
Question	Criteria Achieved ?
Project	Yes

2.3 Green Walls and Facades	0%
Score Contribution	This credit contributes 12.5% towards the category score.
Criteria	Does the development incorporate a green wall or green façade?
Question	Criteria Achieved ?
Project	No

3.2 Food Production - Non-Residential	0%
Score Contribution	This credit contributes 12.5% towards the category score.
Criteria	What area of space per occupant is dedicated to food production?
Question	Food Production Area
Office	0.0 m²
Unconditioned Warehouse/factory	0.0 m²
Output	Min Food Production Area
Office	5 m²
Unconditioned Warehouse/factory	87 m²

Innovation Overall contribution 9.0%

	0%

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

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Appendix B – Daylight Report

IGS INTEGRATED GROUP SERVICES

Value | Innovation | Trust

Daylight Access Modelling Report

173-177 Barkly Avenue
Burnley VIC 3121

Date: 24/03/2026
Project No: 25022

Level 4, 108 Elizabeth Street
Melbourne VIC 3000
Web: www.igs.com.au

Document Control

Version	Date	Issue	Author		Reviewer	
00	19/03/2026	Issue for Review	Gokul Nisha	GN	Li Huan	LH
01	20/03/2026	Issue for Review	Gokul Nisha	GN	Li Huan	LH
02	24/03/2026	Issue for Review – General Updates	Gokul Nisha	GN	Li Huan	LH

TABLE OF CONTENTS

1. Executive Summary

IGS was engaged to undertake a daylight simulation on the proposed self-storage facility at 173-177 Barkly Avenue, Burnley to identify the BESS Indoor Environment Quality (IEQ) Daylight Access for the office ancillary, reception and wine storage common areas component daylight availability compliances.

The daylight availability simulation has been undertaken 700 mm above the finished floor for the development under the Uniform Cloudy Sky. A Uniform Cloudy Sky represents a sky with a constant value of luminance. The values are derived from a statistical analysis of outdoor illuminance levels. They represent a horizontal illuminance level that exceeds 85% of the time between the hours of 9am and 5pm throughout the year. They also represent that the building has been designed to meet the modelled daylight levels for at least 85% of the daytime annually.

BESS IEQ category requires a minimum 33% of the floor area achieves at least 2% daylight factor for the regularly occupied spaces of the development.

The daylight modelling results indicate the office ancillary, reception and wine storage common area component will achieve at least 2% of daylight factor to minimum 33% of the floor area through appropriate window sizing and selection.

2. Introduction

2.1 Key Assumptions

The proposed external windows visible light transmissions (VLTs) are recommended to be:

- All External windows (Office Ancillary and Reception): VLT ≥ 30%

Finishes Reflectance Values

The following default reflectance values are used for the building finishes daylight availability modelling.

- Floor covering reflectance = 0.3
- External Walls reflectance = 0.4
- Internal Partition reflectance = 0.7
- Ceiling reflectance = 0.8
- Surrounding Buildings reflectance = 0.3

2.2 Sky Model

The Uniform Cloudy Sky of horizontal external illuminance of 10,000 Lux is used for daylight availability simulation. A Uniform Cloudy Sky represents a sky with a constant value of luminance. The values are derived from a statistical analysis of outdoor illuminance levels. They represent a horizontal illuminance level that exceeds 85% of the time between the hours of 9am and 5pm throughout the year. Thus, they also represent that the building has been designed to meet the modelled daylight levels for at least 85% of the daytime annually.

2.3 Building Shape

The building physical shape is modelled in accordance with Architectural Drawings Package Rev A dated 19.03.2026.

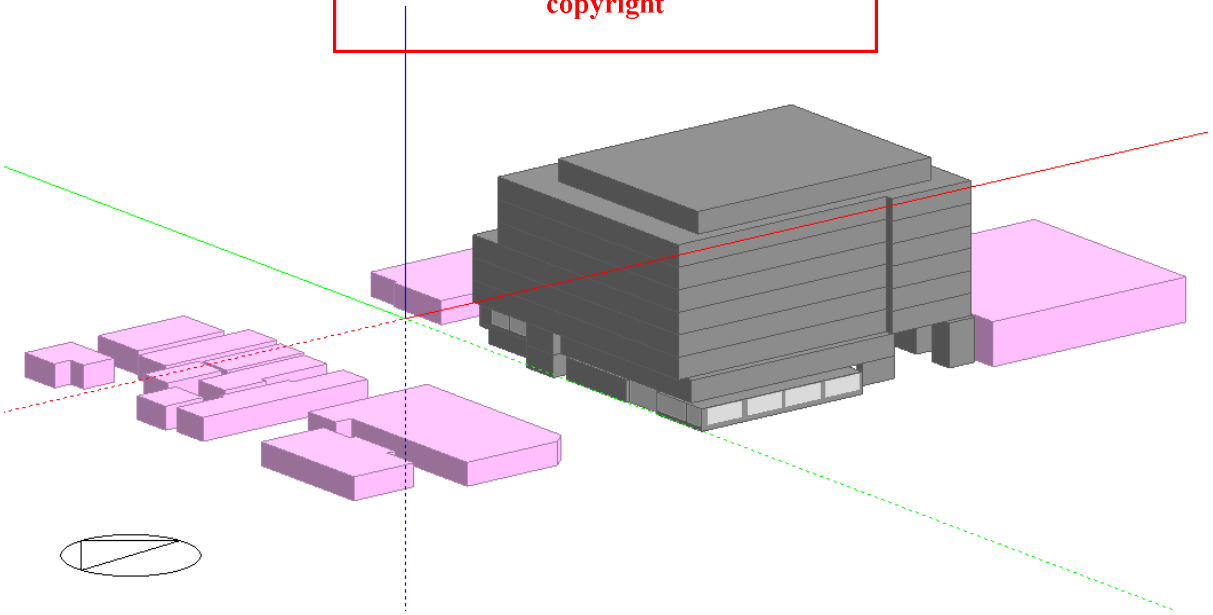


Figure 1 – Building Model of the site

3. BESS IEQ Daylight Assessment

3.1 Daylight Result

BESS Indoor Environment Quality (IEQ) category requires the daylight modelling to be undertaken to demonstrate more than 33% of the nominated area achieves a daylight factor of at least 2% assuming a uniform design sky for all regularly occupied areas.

3.1.1 Ground Floor

Below is the daylight contour plot extracted from Design Builder daylight modelling result showing daylight availability across the Ground Floor Office Ancillary and Reception area.

Figure 2 – Ground Floor Daylight Contour Plot

3.1.2 Mezzanine Level

Below is the daylight contour plot extracted from Design Builder daylight modelling result showing daylight availability across the Mezzanine level wine storage common area.

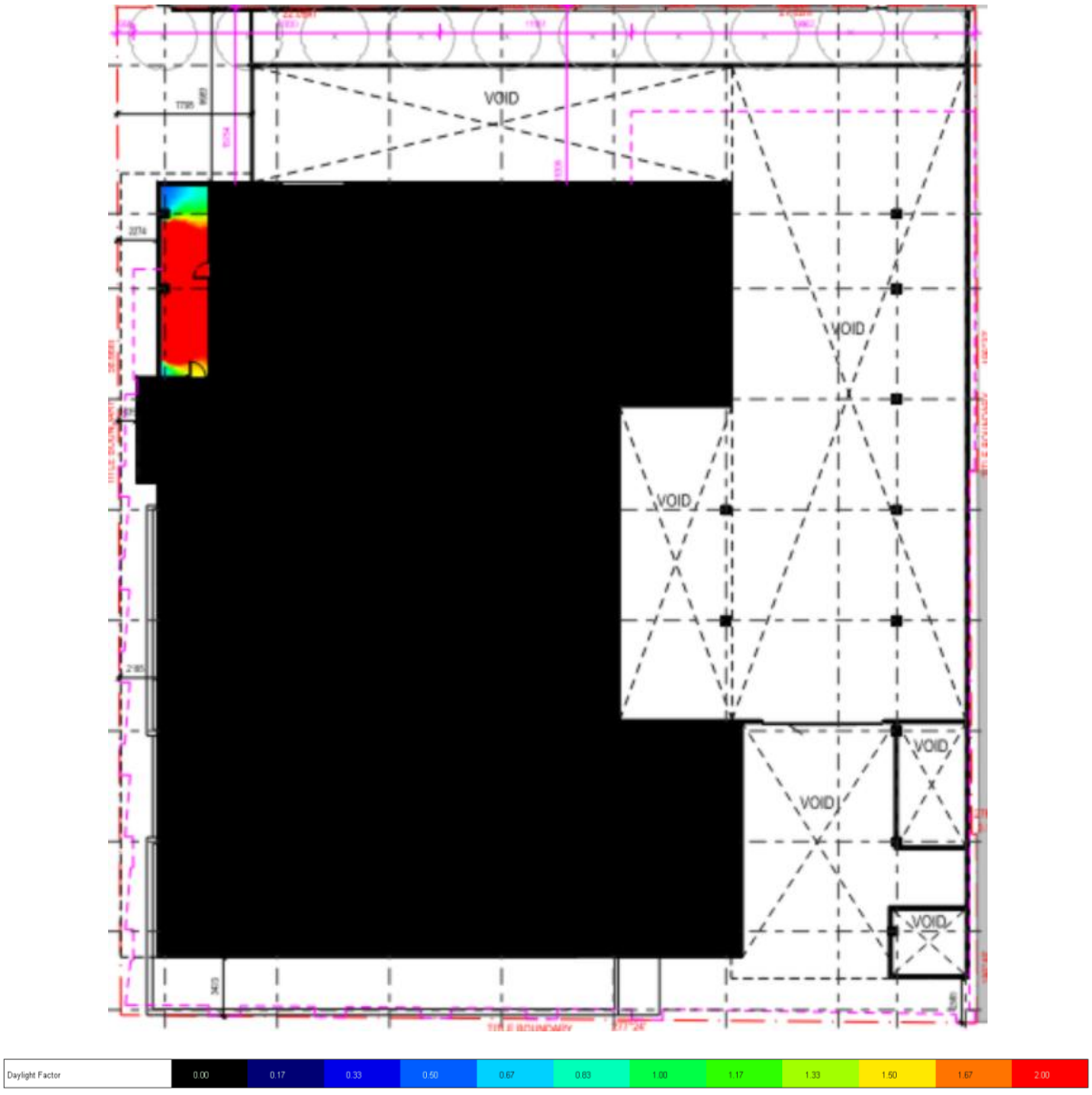


Figure 3 – Mezzanine Level Daylight Contour Plot

3.1.3 Daylight Result – Summary Table

Daylight availability output of the regularly occupied spaces is tabulated below:

Block	Zone	Floor area (m^2)	Floor Area above Threshold (m^2)	Floor Area above Threshold (%)
Ground Floor	Office Ancillary and Reception	202.5	171.2	84.5%
Mezzanine Level	Wine storage common area	32.0	22.5	70.5%

Overall Total Area (m^2)	234.5
Overall Total Compliant Area (m^2)	193.7
Overall Total Compliant Area (%)	82.6%

4. Conclusion

BESS IEQ category requires at least 33% of total regularly occupied space floor area to achieve 2% DF to meet the minimum BESS requirements for daylight availability.

The daylight modelling results indicated that more than 33% of the office ancillary, reception and wine storage common area component's floor area achieves at least 2% DF, satisfying the BESS daylight requirements. Overall, the result confirm that the development meets the BESS IEQ daylight access requirement.

Appendix C – NCC Façade Calculation Report

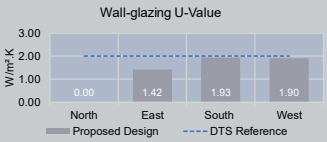
Façade

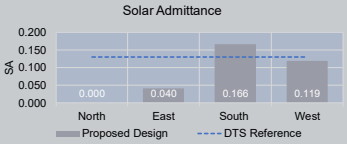
Wall Glazing Areas + Results

User Input | Active Row - All Inputs Required | User Dropdown | Calculator

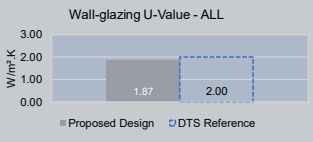
Results | **Class 5 - office building** | **Climate Zone 6 - Mild temperate**

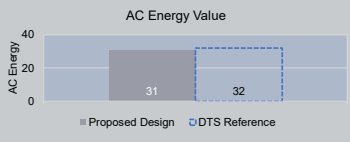
Method 1





Method 2





Wall Glazing Area

Compliant Solution =
Non-Compliant Solution =

North	Glazing Reference	Height (m)	Width (m)	Glazing Area (m²)	Shading Reference	Wall Reference	Wall Area (m²)	Total Area (m²)	Internal
1									
2									
3									
4									
5									
6									

	Result	Target				
Wall-glazing U-Value (W/m².K)			Glazing Area (m²)		Average Glazing U-Value (W/m².K)	
Solar Admittance			Wall Area (m²)		Average Glazing SHGC	
			Glazing to Façade Ratio		Average Wall R-Value (m².K/W)	

East	Glazing Reference	Height (m)	Width (m)	Glazing Area (m²)	Shading Reference	Wall Reference	Wall Area (m²)	Total Area (m²)	Internal
1	IGS_Glazing_G1			8.25	Device	IGS-Spandrel R2.0	9.65	17.90	
2									
3									
4									
5									
6									

	Result	Target				
Wall-glazing U-Value (W/m².K)	1.42	2.00	Glazing Area (m²)	8.25	Average Glazing U-Value (W/m².K)	2.50
Solar Admittance	0.040	0.130	Wall Area (m²)	9.65	Average Glazing SHGC	0.25
			Glazing to Façade Ratio	46%	Average Wall R-Value (m².K/W)	2.00

South	Glazing Reference	Height (m)	Width (m)	Glazing Area (m²)	Shading Reference	Wall Reference	Wall Area (m²)	Total Area (m²)	Internal
1	IGS_Glazing_G1			57.6	0.25P X 2.4H	IGS-Spandrel R2.0	23	80.60	
2									
3									
4									
5									
6									

	Result	Target				
Wall-glazing U-Value (W/m².K)	1.93	2.00	Glazing Area (m²)	57.6	Average Glazing U-Value (W/m².K)	2.50
Solar Admittance	0.166	0.130	Wall Area (m²)	23	Average Glazing SHGC	0.25
			Glazing to Façade Ratio	71%	Average Wall R-Value (m².K/W)	2.00

West	Glazing Reference	Height (m)	Width (m)	Glazing Area (m²)	Shading Reference	Wall Reference	Wall Area (m²)	Total Area (m²)	Internal
1	IGS_Glazing_G1			20.49	0.25P X 2.4H	IGS-Spandrel R2.0	26.02	46.51	
2	IGS_Glazing_G2			10.56	0.8P X 3H			10.56	
3	IGS_Glazing_GL1			7.2	0.8P X 3H			7.20	
4	IGS_Glazing_G3			16.83	2.1P X 2.6H			16.83	
5									
6									

	Result	Target				
Wall-glazing U-Value (W/m².K)	1.90	2.00	Glazing Area (m²)	55.08	Average Glazing U-Value (W/m².K)	2.57
Solar Admittance	0.119	0.130	Wall Area (m²)	26.02	Average Glazing SHGC	0.25
			Glazing to Façade Ratio	68%	Average Wall R-Value (m².K/W)	2.00

Reference Building

Include shading?

	Glazing to Façade Ratio	Method 1 Wall U-Value (W/m².K)	Method 1 Glazing U-Value (W/m².K)	Shading Multiplier	Method 1 SHGC	Method 2 Wall U-Value (W/m².K)	Method 2 Glazing U-Value (W/m².K)	Method 2 SHGC
North		0.00		0.000		0.50	2.73	0.00
East	46%	0.50	3.75	0.350	0.81			
South	71%	0.50	2.60	0.928	0.20			
West	68%	0.50	2.71	0.699	0.27			

Façade

Report

Calculator

Project Summary

Date
19/03/2026

Name
IGS ESD

Company
Integrated Group Services

Position
IGS ESD Team

Building Name / Address
Storhub Burnley
Melborune

Building State

VIC

Climate Zone
Climate Zone 6 - Mild temperate

Building Classification

Class 5 - office building

Storeys Above Ground
7

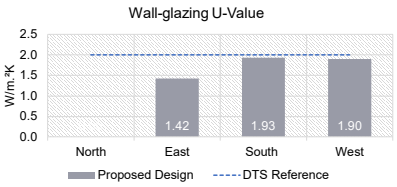
Tool Version
1.5 (May 2024)

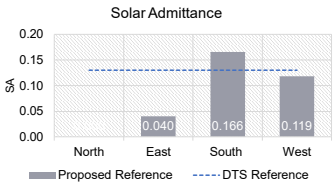
The summary below provides an overview of where compliance has been achieved for Specification S37 - Calculation of U-Value and solar admittance - Method 1 (Single Aspect) and Method 2 (Multiple Apects).

Compliant Solution =
Non-Compliant Solution =

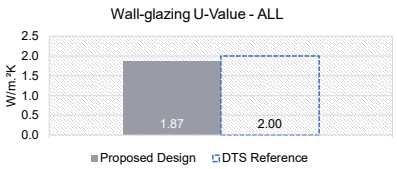
	Method 1				Method 2
	North	East	South	West	All
Wall-glazing U-Value (W/m².K)		1.42	1.93	1.90	1.87
Solar Admittance		0.04	0.17	0.12	
AC Energy Value					31

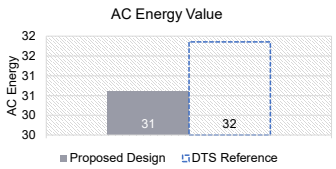
Method 1





Method 2





Project Details

	North	East	South	West
Glazing Area (m²)		8.25	57.6	55.08
Glazing to Façade Ratio		46%	71%	68%
Glazing References		IGS_Glazing_G1	IGS_Glazing_G1	IGS_Glazing_G1 IGS_Glazing_G2 IGS_Glazing_GL1 IGS_Glazing_G3
Glazing System Types		Fixed	Fixed	Fixed Sliding Door
Glass Types		IGS Glazing - Type 1	IGS Glazing - Type 1	IGS Glazing - Type 1 IGS Glazing - Type 2 IGS Glazing - Type 3
Frame Types		Aluminium	Aluminium	Aluminium
Average Glazing U-Value (W/m².K)		2.50	2.50	2.57
Average Glazing SHGC	0.00	0.25	0.25	0.25
Shading Systems	Horizontal Device	Horizontal Device	Horizontal Device	Horizontal Device
Wall Area (m²)		9.65	23	26.02
Wall Types		Spandrel	Spandrel	Spandrel
Methodology	Wall			
Wall Construction		IGS - Spandrel R2.0	IGS - Spandrel R2.0	IGS - Spandrel R2.0
Wall Thickness		80	80	80
Average Wall R-value (m².K/W)		2.00	2.00	2.00
Solar Absorptance	0.6	0.6	0.6	0.6

Appendix D – Stormwater Management Plan

IGS INTEGRATED GROUP SERVICES

Value | Innovation | Trust

Stormwater Management Plan

173-177 Barkly Avenue
Burnley VIC 3121

Date: 19/03/2026
Project No: 25022

Level 4, 108 Elizabeth Street,
Melbourne VIC 3000
Web: www.igs.com.au

Document Control

Version	Date	Issue	Author		Reviewer	
00	09/10/2025	Issue for Review	Gokul Nisha	GN	Li Huan	LH
02	19/03/2026	Issue for Review – Layout Updates	Gokul Nisha	GN	Li Huan	LH

TABLE OF CONTENTS

1 Executive Summary

Integrated Group Services (IGS) has been commissioned to prepare a Stormwater Management Plan (SWMP) for the proposed self-storage development located at 173-177 Barkly Avenue, Burnley.

The modelling results (see **Table 1**) indicate the Best Practice Environmental Management (BPEMG) stormwater pollutants reduction target 70%, 80%, 45% and 45% for Gross Pollutants (GP), Total Suspended Solids (TSS), Total Phosphorus (TP) and Total Nitrogen (TN) respectively can be achieved.

Pollutant	Sources	Residual Load	Reduction Achieved (%)	Reduction Target (%)
Flow (ML/yr)	1.588	1.371	13.6	0
Total Suspended Solids	193.7	25.11	87.0	80
Total Phosphorus	0.4676	0.1957	58.1	45
Total Nitrogen	4.036	1.673	58.5	45
Gross Pollutants	56.24	0	100	70

Table 1: Treatment Train Effectiveness

Stormwater management for the site is achieved using the following devices:

- One (1) x 4kL Rainwater Tank collecting Rainwater from non-trafficked roofs.
- One (1) x Raingarden(s) (20m² of area)

The development meets the water quality performance objectives as set out in the Urban Stormwater Best Practice Environmental Management Guidelines (CSIRO) or as amended.

2 Overview

2.1 Introduction

This report has been prepared by Integrated Group Services (IGS) to form part of the Sustainable Management Plan for the proposed self-storage development located at 173-177 Barkly Avenue, Burnley. The site is located within the City of Yarra.

Figure 1: Site Location

2.2 Site Layout

The proposed development is presented on **Figure 2**.

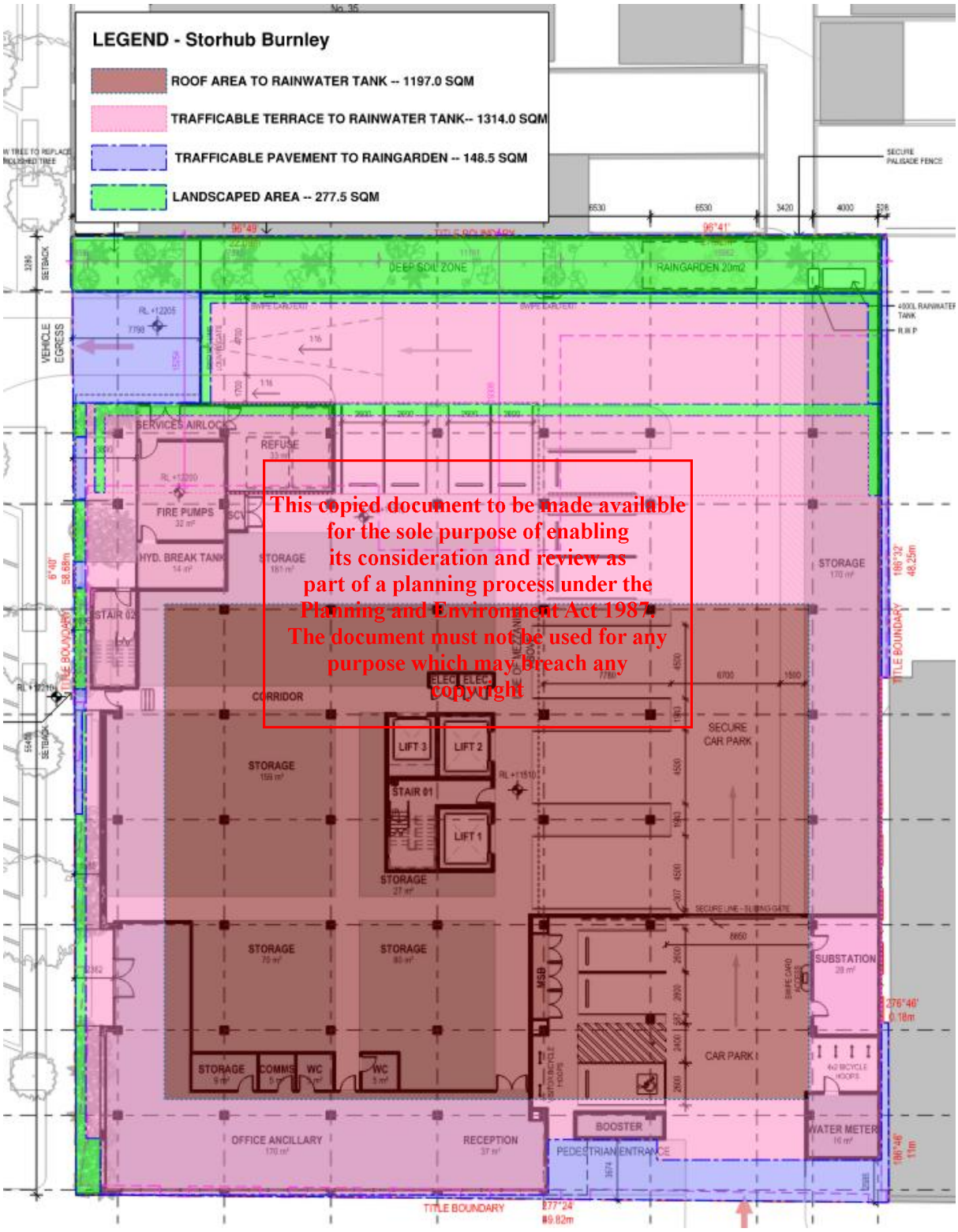


Figure 2: Proposed Site Layout

3 Stormwater Management – Operational Controls

3.1 Water Quality Objectives

Melbourne Water (2018) requires treatment of stormwater so that annual pollutant loads achieve targets set out in the Best Practice Environmental Management Guidelines (BPEMG). These are:

- 80% reduction in Total Suspended Solids (TSS) from typical urban loads.
- 45% reduction in Total Nitrogen (TN) from typical urban loads.
- 45% reduction in Total Phosphorus (TP) from typical urban loads; and
- 70% reduction in Gross Pollutants (GP) from typical urban loads.

3.2 Treatment Train

Based on the site characteristics and the range of available Stormwater Quality Improvement Devices (SQIDs), this study has developed an overall concept that will satisfy the requirements of downstream environmental protection. **Figure 3** shows a schematic representation of the proposed treatment train elements.

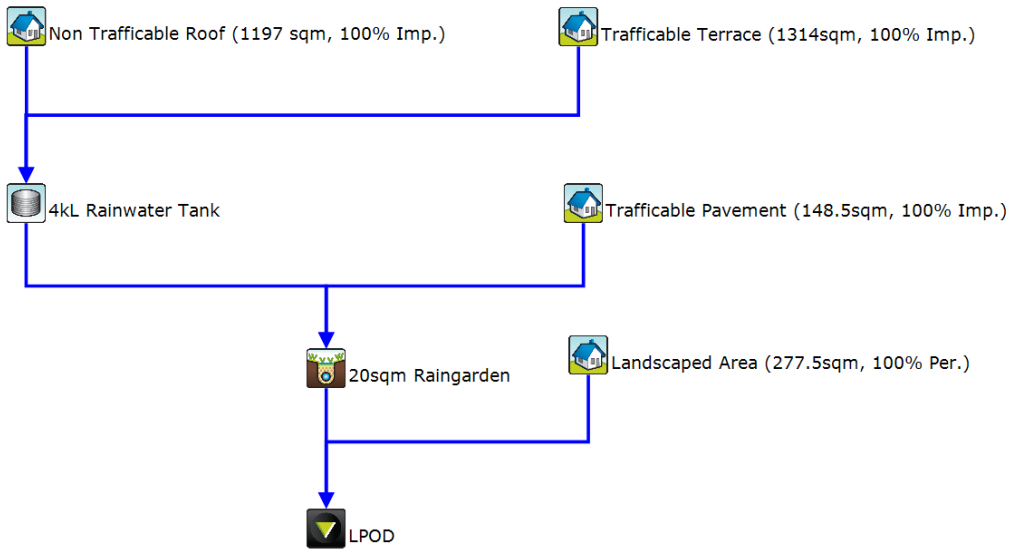


Figure 3: Treatment Train Schematic

3.3 Rainwater Tank

Rainwater tanks can reduce the harm to Stormwater waterways caused by too much stormwater. Tank water can be reused for toilet flushing, laundry washing, gardens and lawn irrigation and cars wash, this will significantly be reducing the potable / drinking cold water consumption. For this development, the rainwater collected will be used for toilet flushing and for landscape irrigation.

Rainwater tanks collect stormwater run-off from impervious surfaces such as roofs, the tank will be fitted with an overflow outlet that in the event of tank full capacity the excessive pour down will be redirected or fall into the stormwater drainage system.

Rainwater tanks are generally used for watering gardens are much less efficient than tanks used for flushing toilets.

Advantages of rainwater tanks are that they:

- minimise water usage when used in the toilet, laundry or garden.
- reduce strain on the stormwater drainage system.
- retain water close to source.
- reduce site run-off and flood peaks.

To maximise the use of roof rainwater runoff it will be best to increase the tank capacity and ensure the design allows for maximum catchment. A rainwater harvesting system will be installed comprising:

- Rainwater harvesting from non-trafficked roofs and store within the 4kL rainwater tank for toilet flushing and for landscape irrigation.

3.4 Rain Gardens

Raingardens are specially designed garden beds that filter stormwater runoff from surrounding areas or stormwater pipes. Raingardens are also called bioretention systems because they use soil, plants, and microbes to biologically treat stormwater.

Although they may look similar to a normal garden, raingardens are designed to stop stormwater run-off from polluting stormwater waterways with nutrients, rubbish and other sediments, the system operates as follows.

- Water collects and settles on the garden surface.
- Water soaks through the plants and filter media, trapping rubbish and sediment on the surface.
- Plants use the nutrients in the stormwater, and toxins stick to the soil; and
- The soil and plant roots work together to naturally filter the water and remove pollutants.

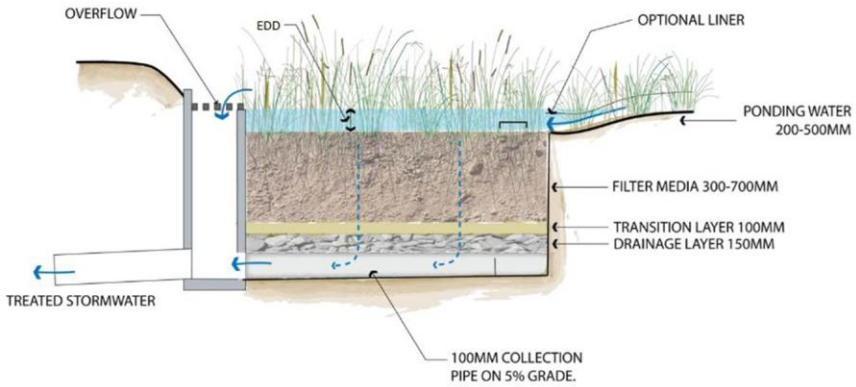


Figure 4: Typical Raingarden Section for illustration purpose

4 Stormwater Analysis – MUSIC

Storm Water modelling has been undertaken of the post-development (mitigated) scenario using the Model for Urban Stormwater Improvement Conceptualisation (MUSIC) software to demonstrate the load-based reduction targets are achieved. A stormwater treatment train has been developed and modelled to determine the effectiveness of the proposed system in achieving the relevant storm water objectives.

4.1 Rainfall and Evapotranspiration Parameters

The meteorological and rainfall-runoff data used in the MUSIC model is summarized below.

Parameter	Value
Rainfall station	86071 – Melbourne Regional
Time step	6 minutes
Modelling period	January 1952 – December 1961
Mean annual rainfall	708 mm
Mean annual Evapo-Transpiration	995 mm

Table 3: Meteorological and Rainfall Runoff Data

4.2 Catchment Parameters

Based on the proposed land uses within the development, the subject site has been modelled as an urban source node. The rainfall-runoff parameters and pollutant generation parameters are based on parameters recommended by Melbourne Water (2024) **(Tables 4 and 5).**

Parameter	All Nodes
Rainfall threshold (mm)	1.0
Soil storage capacity (mm)	120
Initial storage (% capacity)	25
Field capacity (mm)	50
Infiltration capacity coefficient a	200
Infiltration capacity exponent b	1
Initial depth (mm)	10
Daily recharge rate (%)	25
Daily base flow rate (%)	5
Daily deep seepage rate (%)	0

Table 4: Rainfall Runoff Parameters

Catchment ID		Total Suspended Solids [log (mm/L)]		Total Phosphorous [log (mm/L)]		Total Nitrogen [log (mm/L)]	
		Mean	Std. Deviation	Mean	Std. Deviation	Mean	Std. Deviation
Landscape	Storm Flow Concentration	1.882	0.333	-0.680	0.242	-0.224	0.205
	Base Flow Concentration	0.96	0.401	-0.731	0.360	-0.346	0.309
Hardstand	Storm Flow Concentration	2.431	0.333	-0.301	0.242	0.343	0.205
	Base Flow Concentration	0	0	0	0	0	0
Roof	Storm Flow Concentration	1.301	0.333	-0.886	0.242	0.301	0.205
	Base Flow Concentration	0	0	0	0	0	0

Table 5: Pollutant Export Parameters for Urban Sites

4.3 Stormwater Demand

Stormwater volume reduction is achieved through the reuse of harvested rainwater for toilet flushing and landscape irrigation. The estimated daily water demand used for the MUSIC modelling is based on the following demand:

- **Total Reuse demand**: 0.8kL/day

4.4 MUSIC Results

Results of the MUSIC modelling for the treatment train effectiveness are summarised in **Table 6**. The results indicate the 80%, 45%, 45% and 70% reduction target for TSS, TP, TN and Gross Pollutants respectively are achieved. A screen capture of the MUSIC modelling results is included as **Figure 5**.

Pollutant	Sources	Residual Load	Reduction Achieved (%)	Reduction Target (%)
Flow (ML/yr)	1.588	1.371	13.6	0
Total Suspended Solids	193.7	25.11	87.0	80
Total Phosphorus	0.4676	0.1957	58.1	45
Total Nitrogen	4.036	1.673	58.5	45
Gross Pollutants	56.24	0	100	70

Table 6: Treatment Train Effectiveness

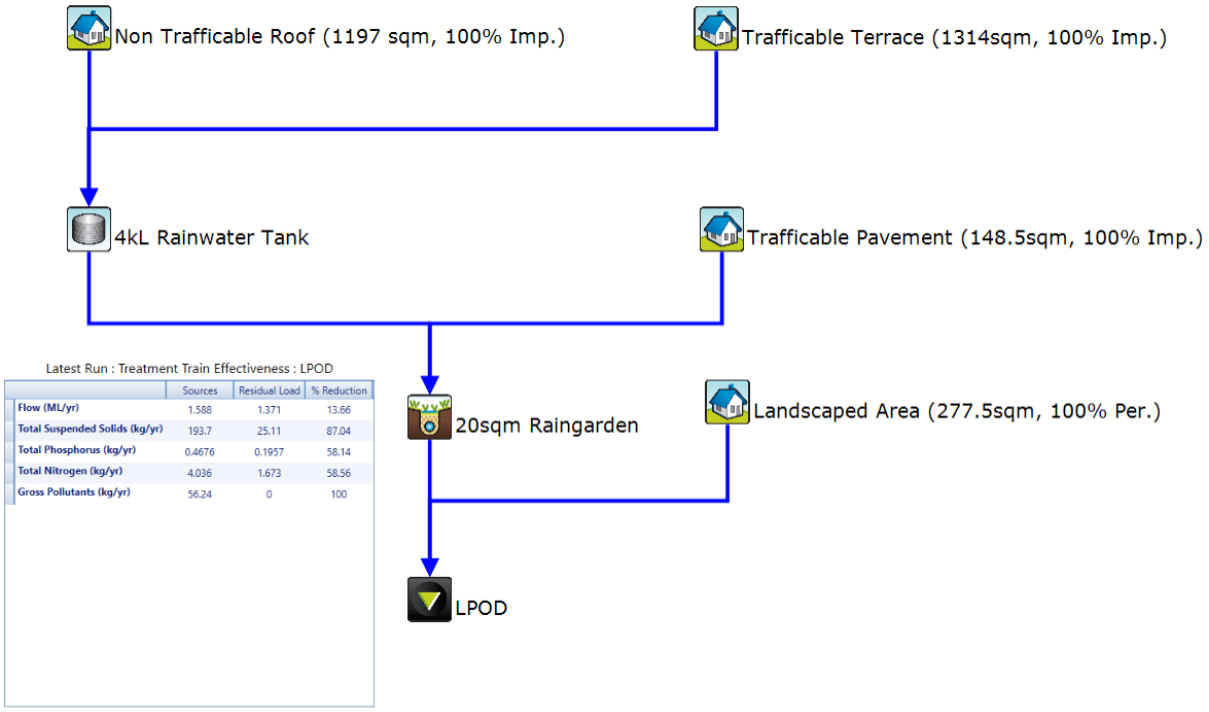


Figure 05: Treatment Train Music Model Screen Capture

5 Summary

Based on the water quality assessment using the MUSIC software, it is found that the pollutant reduction targets can be achieved by adopting the SQIDs as specified in **Table 7.**

Stormwater Quality Improvement Device	Quantity
Minimum RWT collection and reuse for toilet flushing and landscaping irrigation (4kL)	1
Raingarden(s) (20m² of area)	1

Table 7: Recommended Stormwater Quality Improvement Devices

6 Recommendation

6.1 Stormwater Quality Improvement Device

6.1.1 Rainwater Tank

Rainwater tanks can reduce the harm to stormwater waterways caused by too much stormwater. Tank water can be reused for toilet flushing, laundry washing, gardens and lawn irrigation and car wash, this will significantly reduce the potable / drinking cold water consumption. For this project, the rainwater collected will be used for toilet flushing and landscaping irrigation.

6.1.2 Rain Gardens

The recommended raingardens are designed to capture stormwater at the downstream end of the drainage network and treat the runoff prior to discharging into the local waterway. The pollutant reduction targets achieved (as modelled in MUSIC) are summarised in **Table 8**.

Pollutant	Sources	Residual Load	Reduction Achieved (%)	Reduction Target (%)
Flow (ML/yr)	1.588	1.371	13.6	0
Total Suspended Solids	193.7	25.11	87.0	80
Total Phosphorus	0.4676	0.1957	58.1	45
Total Nitrogen	4.036	1.673	58.5	45
Gross Pollutants	56.24	0	100	70

Table 8: MUSIC Modelling Results

7 Site Managements Plan During Construction

The stormwater management strategy will adopt the following procedures during construction:

- Ground water seepage shall be managed and treated prior to discharge to council's LPD by builder / contractor during construction. To protect drainage infrastructure and receiving waters from sedimentation and contamination.
- To protect the site and surrounding area from environmental degradation prior to and during construction of subdivision works.
- An application should describe how the site will be managed prior and during the construction period and may set out requirements for managing:

    - Erosion and sediment.
    - Stormwater.
    - Litter, concrete, and other construction wastes; and
    - Chemical contamination.

8 Maintenance

The maintenance procedure shall be in conjunction with the building maintenance and specification and shall Comply with relevant / applicable authority design guidelines and codes of practice requirements. The stormwater management strategy shall adopt the following maintenance procedures.

- Quarterly routine maintenance procedure to thoroughly maintain raingarden free of debris and general clean-up process by building management as part of building maintenance programme.
- Annually / 6-month drain and flushing of rainwater tank cleaning tank internally from debris and sediment collection captured from roof surface by building management as part of building maintenance programme.
- Quarterly inspection of gutters to ensure they are free of debris and clean as required.
- Quarterly inspection of stormwater downpipes and grates to ensure no water leakage, they are free of debris and clean as required.
- Yearly inspections of rainwater tanks and supports to ensure no leakage, inspect joints, and clean as required.
- Water storage tanks should be inspected, cleaned, and disinfected in accordance with AS 3500.
- Bi-annual inspection of pumps to ensure correct operation, no leakage and clean as required.
- Service items and equipment in conformance with the maintenance schedules as per the operation and maintenance manuals.

    - Carry out the manufacturers' recommended maintenance instruction.
    - Attend to reported defects and complaints.
    - Check for and repair corrosion.
    - Check for and rectify any unsafe conditions.
    - Replace faulty or damaged parts and consumable components.
    - connections, for deterioration and for freedom of movement of assembly.
    - Identification of pipes, conduits, and ducts maintenance: To AS 1345.
    - Safety signs maintenance: To AS 1319.
    - Remove waste and clean all parts of the installation.
    - Remove temporary protective coatings, packaging, and labels.
    - Clean screens and strainer baskets.

9 References

The report has used the following references:

- Melbourne Water (2024) MUSIC Guidelines – Input Parameters and Modelling approaches for MUSIC user in Melbourne Water's services area 2024.
- Urban Stormwater Best Practice Environmental Management Guidelines.