



cap your footprint



ESD Response: 56-74 Station Street, Nunawading

Proposed development plan at 56-74 Station Street, Nunawading (Stage 2)

Prepared for: Nash Management

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The content of this document represents the entirety of work output or recommendations offered by LID Consulting for this particular project. This content supersedes all other verbal discussions undertaken by LID Consulting representatives in relation to this project.

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 LID acknowledges and pays respect to the Australian Aboriginal and Torres Strait Islander people, to their ancestors and elders, past, present and emerging, as the traditional custodians of the lands upon which we work and live. We recognise Aboriginal and Torres Strait Islander people's deep cultural and spiritual relationships to the water, land and sea, and their rich contribution to society.

ESD Response

Stage 2 (mixed use development) of the proposed development at 56-74 Station Street will meet the Environmentally Sustainable Design (ESD) requirements of the City of Whitehorse Development Plan Overlay Schedule 7 (DPO7) and planning scheme clauses by committing to the measures identified in this report.

This report has been prepared on the Warren and Mahony Stage 2 Development Plan [Revision C 25th August 2025](#) document and outlines measures that will meet and often exceed mandatory ESD requirements for this type of residential mixed-use development.

Specifically, this report addresses the following stated requirements of DPO7:

- The Development Plan must show or provide for (inter alia) any design and development techniques that incorporate environmentally sustainable design (ESD) principles.

Other mandatory requirements will also be addressed from planning schemes clauses and National Construction Code (NCC) / Building Code of Australia (BCA) energy efficiency clauses. These requirements include:

- Compliance with the Better Apartment Design Standard (BADs).
- Council planning scheme provisions and referenced frameworks and tools, including the Built Environment Sustainability Scorecard (BESS) and Water Sensitive Urban Design (WSUD) assessments.
- 7star average (6 star minimum) energy efficiency ratings for class 2 dwellings (NCC/BCA 2022 Section J - NatHERS assessments).
- Maximum lighting densities and performance efficiency limits for mechanical heating, cooling and ventilation (NCC - Volume One Section J).
- Building fabric, mechanical heating cooling and ventilation and lighting energy efficiency requirements of NCC – Volume One Section J).

In addition, initiatives identified in the following other non-mandatory guidelines will be included:

- Green Star tools
- Good design principles (identified in other publications such as Your Home)

This report will address the following key ESD commitments:

- Design inclusions to facilitate an optional net zero operational development when desired
- Onsite renewable energy generation
- Energy efficiency, passive solar design and building sealing
- Indoor environment quality – higher ventilation levels for health, daylight considerations, acoustics etc
- Water use efficiency
- Water Sensitive Urban Design (WSUD) and use of water tanks, rain gardens or permeable paving solutions for onsite water treatment.
- Choice of materials for reduced embodied energy, circular economy solutions and minimising harm to the environment

- Waste streaming and minimisation recommendations
- Sustainable transport commitments
- Biodiversity supporting measures
- Climate adaptation and resilience measures
- Community sustainability leadership

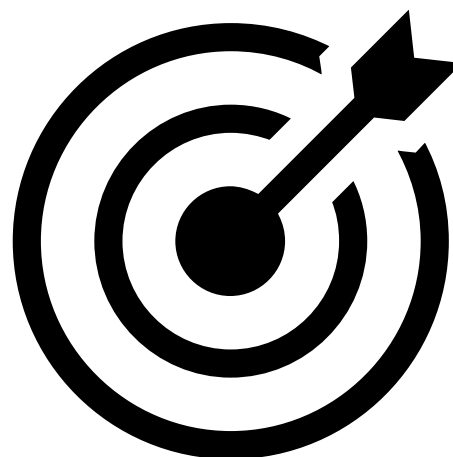
It is considered that the more detailed requirements associated with ESD performance can be suitably addressed at the relevant planning permit stage once the final configuration of the proposed dwellings is known. Final ESD measures are subject to Council approval as part of any future planning permit application(s).

As City of Whitehorse is a BESS member council, it is expected the development will address the ESD metrics associated with a BESS assessment at the town planning stage. This includes potable water, energy, and indoor environment quality.

Initiatives Summary

Carbon neutral considerations

Minimising greenhouse gas emissions means reducing carbon dioxide (carbon) and other greenhouse gas emissions. Actions to minimise emissions can occur during the operation of a building, through the choice of energy source and waste minimisation and maximised recycling, and also during the construction of that building/development.



Carbon neutral energy capability

The development will be built to facilitate going net zero carbon emissions in operation. To achieve this, no gas will be included within the development.

Delivering buildings that readily have carbon neutral capability in terms of energy consumption is not difficult to achieve in new developments. The solution is to use an energy source that can readily be supplied from a renewable, fossil free fuel source. Electricity is an energy source for buildings that can readily be sourced from renewable energy whether from onsite solar photovoltaic (PV) panels, or offsite solar PV systems or wind via readily accessible GreenPower or carbon neutral energy purchasing. Installing electricity infrastructure ensures building occupants can readily choose when they wish to purchase 100% renewable zero carbon energy.

In addition, without specifically making the commitment to renewable power, electricity purchased from the grid is increasingly being delivered by renewables. In the last year 35% of Victoria's grid electricity came from renewable electricity. By 2025 this will be 40% and by 2030 50%. All electric services and appliances will automatically become greener due to the greening of the electricity network.

Natural gas on the other hand is methane and produces carbon dioxide when burned in heating, hot water or cooking. While trials are occurring for introducing clean burning hydrogen into our gas network, no clear path is confirmed on how and when all of the network could deliver beyond 10% hydrogen.

Installing gas infrastructure into buildings ties the development to burning a greenhouse gas fuel until the infrastructure is replaced. Committing to electricity as the only energy source in the development is an important measure to ensure a commitment to fossil fuels is not locked in to a development.

Reduced greenhouse gas emissions during construction

The development will minimise embodied carbon in new buildings within the development by the following strategies:

- **Materials variants** will be selected that utilise lower carbon emission inputs. See commitments proposed in the Sustainable Materials selection section of this report.
- **Materials will be sourced locally** where possible to reduce carbon emissions generated in transport

A large amount of energy is consumed in sourcing, modifying, manufacturing and transporting materials used in the construction of buildings. This consumed energy is typically from fossil fuels and is termed the embodied carbon of building materials and buildings. While many materials have a high level of embodied energy in most material types there are lower embodied carbon versions or comparable alternative materials available. This development will endeavour to select lower embodied carbon variants or alternative materials.

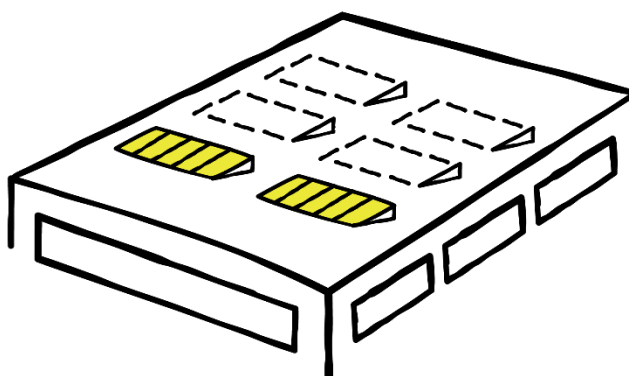
See the Materials section of this report for more detail on lower carbon construction options.

Onsite renewable energy

Roof structures will be designed to accommodate solar PV panels on all suitable roof spaces.

Onsite renewable energy generation (solar photovoltaic PV panels) will be maximized to as much as possible to offset energy consumption on site.

As a minimum the new 2022 National Construction Code (NCC) / Building Code of Australia (BCA) Part J9 D5 requirements, in force from 1 October 2023, will be met. This requires at least 20% of the roof area of a building must be left clear for the installation of solar photovoltaic panels.





Based on the approximate areas above of 1060m² and 2660m² this minimum area to be set aside for solar panels would require 3720m² x 20% = 744m² of space for solar panels.

This space may comprise panels fixed on frames above the plant platform, or frames and panels providing shading over part of the outdoor communal areas, panels fixed on the flat roof outside of the plant platform areas or panels fixed to the sides of plant platform screening walls.



Images of installations at Yarra Valley Grammar (left – LID Consulting) and Scotch College (right – environmental Tech Solutions)

Assuming the 744m² required area comprises panels laid approximately flat over the plant platforms, with panel sizes of 1.1x1.8m increased to 1.1 x 2.1m to allow 600mm between pairs of panels for access, coverage over this space will amount to over 300 panels. Using common standard sized 420W solar PV panels, 300 panels should ensure a 126kW solar panel installation. With approximately 121 dwellings proposed it seems logical to commit to 1kW per dwelling ie at

present numbers a **121kW installation**.

This installation approach also aligns with the Merri-bek Zero Carbon Development Guidelines for Solar PV which require 1 kW per dwelling.

To further optimize the use of onsite generated solar the value of installing an Allume Energy SolShare system <https://allumeenergy.com/au/solshare-how-it-works/> or battery(ies) will be investigated.

As a precursor to this, an assessment will be made of the expected daytime energy use for the site and expected generation rates from the onsite solar panels. If the daytime usage exceeds the generated electricity levels, then no battery would be appropriate. If generation levels exceed use levels, a battery will be considered, to store energy for nighttime use.

An Allume SolShare system offers additional value by directing solar power to the apartment or tenancy that is using electricity at the time of generation. This maximises onsite solar utilisation—much like a battery—and reduces the amount of electricity exported to the grid.

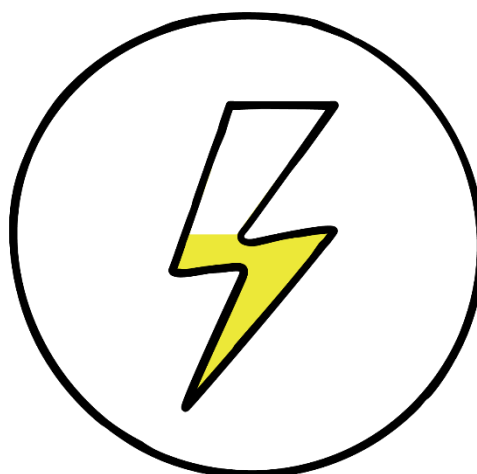
Onsite renewable energy generation such as from solar photovoltaic (PV) panels contributes a guaranteed source of cheap, zero carbon energy to the energy mix used onsite. With onsite solar PV sharing technology the use of this energy can be maximized on site.

If onsite renewable electricity is not sufficient to cover use requirements, given the development will be all electric, the remaining energy consumed will be able to be from 100% renewable sources or offset as carbon neutral energy.

Energy efficiency

Energy efficiency will be provided via the following measures to improve the building fabric and services or appliances efficiency

1. **Passive solar design** - The buildings will be designed taking account of passive design principles where possible. Passive design seeks reduce the energy consumption in buildings by allowing winter sun ingress to reduce mechanical heating, and exclude summer sun ingress to reduce mechanical cooling. Passive design also seeks to support natural ventilation and cross ventilation where possible.
2. **The energy efficiency** of the building(s) will meet or exceed current building code minimum compliance requirements.



Dwellings will achieve a NatHERS 7 star average with 6 star minimum for any dwelling energy rating.

Energy efficient buildings help reduce their energy consumption.

This development has committed to a Nationwide Home Energy Rating Scheme (NatHERS) 7 star average minimum for all apartments and 6 star minimum per apartment. While previously the building code required a 6 star average minimum for apartments and 5 star minimum per apartment, as of 1 October 2023 the 2022 Building Code comes into full effect. The NatHERS scale goes up to 10 stars for dwellings that require almost no energy for heating or cooling.

The non-residential sections of the development will meet the requirements of NCC/BCA – Volume One Section J.

The retail – commercial spaces will meet the building fabric energy efficiency, mechanical heating cooling and ventilation, lighting, metering and other requirements of the NCC/BCA.

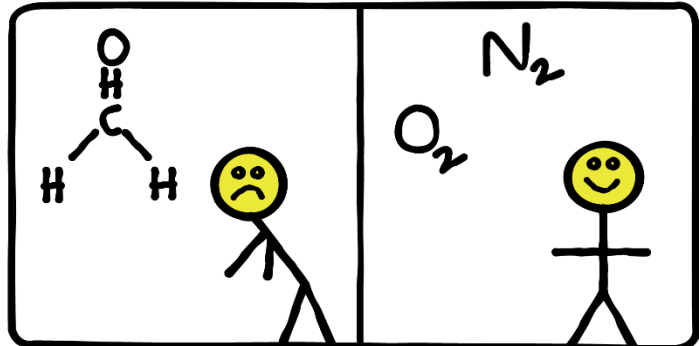
3. **The building fabric will be thoroughly sealed and checked during construction** to reduce unwanted air infiltration and ensure the buildings perform to their designed NatHERS level.
4. **Windows will be double glazed** to manage heat and sound transfer.
5. **Hot water supply** services will support the use of renewable energy and be from efficient electric sources such as:
 - a. heat pump storage units
 - b. solar thermal pre-heat storage units
 - c. instantaneous three phase units.
6. **Space heating and cooling** will support the use of renewable energy and be from efficient electric sources typically using reverse cycle heat pump – air-conditioner refrigerant systems.

Where individual units are supplied in dwellings these will be within 1 star of the best readily available units for the required capacity. Units will be specified during the detailed design stage.

7. **Ventilation** is proposed to be through openable windows where possible. All apartments will be naturally ventilated. Mechanical ventilation will be provided to spaces where ventilation through openable windows is not deemed compliant.
8. **Energy efficient LED Lighting** will be used throughout the development. Lighting density in dwellings will be reduced to 20% below BCA allowances.
9. **Common, service and lift area lighting will be controlled with sensors/timers.**

Indoor environment quality – healthy buildings

The building(s) will be designed as comfortable spaces with best practice air quality, daylight, minimal glare, good views and connection to outside. The following will be addressed.



1. **Daylight** levels will meet current town planning framework (BESS) standards and will be facilitated throughout the development by appropriate layout and glazing design.
2. **Sun access** - passive solar design principles will be considered in the design of spaces. Winter sun access to living spaces will be prioritized in final designs. Measures will be taken to limit summer sun ingress.
3. **Glare** will be minimized with internal shading and building design
4. **Views** – dwellings and the roof spaces or break out spaces will overlook the surrounding suburb.
5. **Ventilation** – will be from natural ventilation in all apartments and other spaces where openable windows are included. Mechanical ventilation will be utilized for spaces without windows or where fixed glazing is proposed for security or other reasons.
 - Sensors will be incorporated in non-residential and residential spaces to identify if CO2 levels are exceeding the WELL building standard level (ie the goal is to stay below 800ppm). The sensors will prompt occupants to open windows or mechanical services to turn on or ramp up to provide sufficient fresh air and ensure carbon dioxide (CO2) levels are kept low.
 - Where reliant on mechanical ventilation buildings will have higher than required mechanical ventilation rates.

Better fresh air volumes delivering lower CO2 levels has been demonstrated to improve building occupant alertness, and reduced levels of general sickness. Higher ventilation rates also reduce the chance of covid transmission.

6. **Low VOC and low formaldehyde products** – will be used to help maintain better indoor air quality. Paints, adhesives, floor coatings and floor coverings will generally be required to be low VOC types. Engineered wood products (eg. MDF, plywood and particleboard) will generally be required to be class E1 formaldehyde or better. Contractors will be required to provide evidence of these variants.

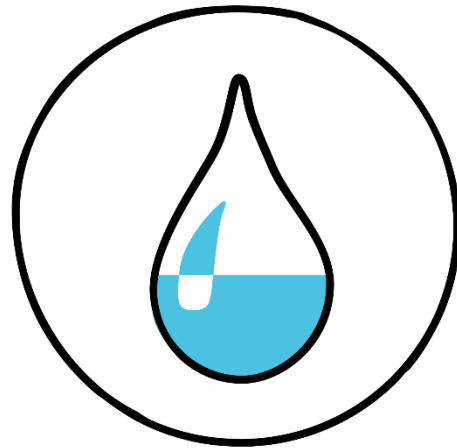
Volatile organic compounds (VOCs) are included in many modern building materials such as glues, paints, adhesives, carpet, joinery, vinyl. When installed these VOCs off-gas from

the material and can cause health concerns. Using low off-gassing materials helps to improve the air quality inside the building.

Water conservation

Potable water consumption will be reduced within the development stage with the following design inclusions:

1. **Rain water harvesting and reuse** – the buildings will have a combined rainwater tank of capacity of minimum size 40,000L connected to toilets and irrigation systems. Per the Stormwater Management section below the tank sizes will be designed to ensure stormwater management meets BPEMG. Tank size(s) will be confirmed later in the design process.
2. **Low flow fixtures** will be used in toilets, bathrooms, kitchens, laundries, showers and appliances. Fixtures at less as water efficient as the following will be selected:
 - 3 star shower (6.0-7.5L/min);
 - 4 star toilets (3.0/4.5L flushing);
 - 5 star basin, kitchen sink, and laundry (4.5-6.0L/min); and
 - Minimum 4 star water efficiency dishwashers (where installed).
3. **Water efficient irrigation systems** – if irrigation is proposed this will be water efficient and connected to on-site water tanks.

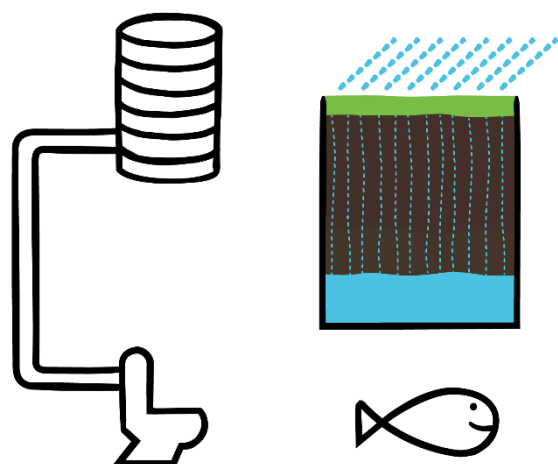


Stormwater Management

The development will comply with the requirements of planning scheme clause 53.18 Stormwater management in urban development.

Best Practice Environmental Management Stormwater Management outcomes will be achieved on site through a **combination of WSUD principles including the use of water tanks, proprietary devices, rain gardens or permeable paving solutions for onsite water treatment.**

Best practice stormwater treatment feasibility has been demonstrated below, however the final demonstration via the InSite Water or MUSIC software will occur later in the design process.



Preliminary assessments are unable to be undertaken with the STORM tool as the tool has its limitations for this large site. The STORM tool only allows up to 100 bedrooms to be assessed.

In lieu of STORM the Insite Water tool has been used for a preliminary assessment based on the following areas and further assumptions:

- Site, building, apartment and retail areas per below



- With approximately 121 dwellings with a mix of 1-3 bedroom, we have assumed an average of 2 bedrooms per dwelling. This results in 242 bedrooms for preliminary analysis.
- Total site area 7381m²
- All roof areas 3631m² drain to the water tanks
- Rainwater tanks of total volume 20,000L
- All toilets in the development are connected to the rain water tanks
- Of the non-building balance of the site area 3750m²
 - 50% is permeable grass and landscaping
 - 50% is paved courtyard, 50% (25% of total non-building area) of which can fall to a proprietary treatment device or a constructed rain garden, and the other 50% (25% of total non-building area) is untreated.

Note all assumptions are considered feasible at this early stage of the design but may change at the detailed design stage.

Based on the above assumptions the development can deliver a complying InSite Water Best Practice Quality score as follows (noting a score of 100 or above demonstrates compliance):

- 104 for proprietary treatment devices; and
- 100 for constructed rain gardens.

By committing to the following additional specifications, the Insite Water and STORM Quality requirements can be met (a score of 100 or more) while also meeting Council's required greater volume reductions and efficiency gains (as well as obtaining a pass in confirming the average annual stormwater run-off is no more than pre-development average annual run-off volumes – within the realm of estimation quality):

- Increasing the tank size to 40,000L
- Basin and kitchen taps are 5 star WELS rated, toilets 4 star WELS, Shower 3 Star WELS 7.5-9.0L, dishwashers and washing machines (where supplied) are 4 star water efficiency or greater.

For details see Appendix 1.

Sustainable Materials selection

The development will minimise environmental damage from materials selected for construction. Factors such as embodied energy, destruction to habitat in sourcing the materials and circular economy opportunities for the material will be investigated. Minimising material use, opportunities for re-use and the ability to disassemble for recycling will be key considerations.

Key commitments include

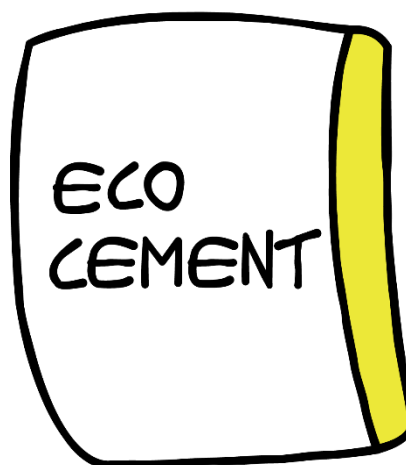
- **Greener concrete mixes** - Supplementary Cementitious Materials (blast furnace slag and coal waste flyash) will provide a partial substitute for energy intensive Portland cement in concrete mixes. SCMs will represent a minimum of 30% of concrete mixes subject to structural engineers approval although a higher percentage will be sought where possible, including for non-structural concrete applications such as paving.

These options represent double environmental win: using a lower embodied energy material variant and finding use for waste products that have disposal issues.

- **Greener asphalt mixes** such as foam mix or warm mix asphalt will be incorporated delivering an environmental improvement on the standard hot-mix with potential for significant cost savings. The City of Whitehorse commonly specifies greener asphalt mixes for their road projects.

Environmental improvements include:

- Increased recycling opportunities
- Greater cost efficiency
- Low emission, energy saving technology
- Consistent product
- Quality controlled manufacturing
- Significant health and safety benefits



- **Greener aggregate options** - Aggregate and sand will be from circular economy and lower embodied energy sources. 50% recycled aggregate or recycled glass sand will be used as sub-base under paths and or roads subject to design engineer's approval.
- **Greener pipe bedding options** 100% recycled glass sand will be used for pipe bedding (plumbing pipe, electrical cable etc) In preference to mined virgin sand, subject to the design engineer's approval.
- **Steel** - Structural steel used in the project will be sourced from a Responsible Steel manufacturer.

Fabricators will be required to confirm their steel is sourced from one of the Responsible Steel member suppliers listed here <https://www.responsiblesteel.org/about/members-and-associates/>

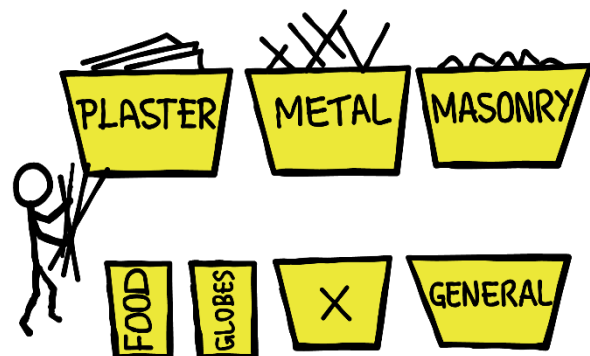
- **All framing timber will be from accredited plantations** – either FSC or PEFC/AFS.
- **The development will not include use of unsustainable rainforest timbers** ie no Oregon, Western Red Cedar, Meranti, Merbau, Teak or Luan will be included.
- **Carpet tiles in lieu of carpet** will be specified to common areas and non-residential spaces. Carpet tiles have a longer life, are more readily re-used, and individual tiles can be replaced to avoid broad scale whole of room replacement of localized stained or worn carpet.

Waste Management

Construction waste minimisation – Construction methodology will reflect best practice waste to landfill minimization practice.

The following materials can generally be recycled:

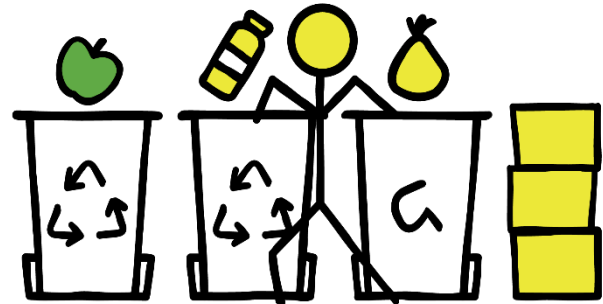
- Concrete products (ie. Blocks, roof tiles, pavers etc)
- Asphalt
- Bricks
- Steel / metal products
- Unpainted or treated timber
- Glass
- Broken lights – mercury containing products
- Plasterboard
- Plastics
- Carpet underlay
- Carpet tiles
- Cardboard
- Green waste



80% of construction material waste will be recycled.

Operational waste to landfill minimisation - Waste to landfill minimization will be facilitated by the provision of best practice separation of the following readily recyclable waste streams.

- Food organics and Garden organics (FOGO)
- Glass
- Paper/cardboard
- Co-mingled plastic and cans recycling
- Soft plastics
- E-waste, batteries
- Landfill garbage
- Hard bulky waste (furniture, metals)
- Polystyrene
- Other



Space will be provided within each dwelling for the separation and temporary storage of

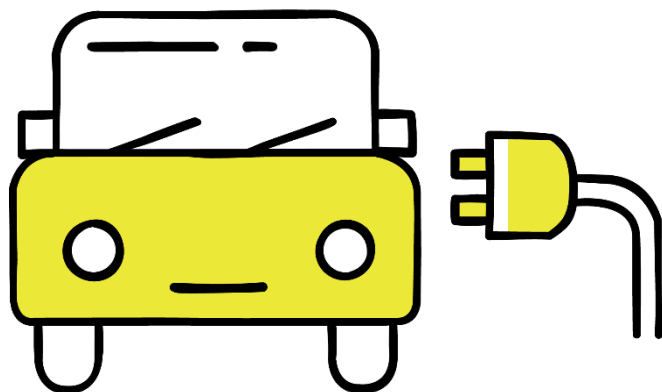
- food organics
- glass
- co-mingled plastic, cans and paper recycling
- landfill

Waste Management Plan – a separate operational waste management plan will be produced for this development in accordance with the City of Whitehorse's waste management policy.

Sustainable Transport

The development will help support the use of lower emissions and more sustainable transport options:

1. **Electric Vehicle (EV) charging infrastructure** will be provided within each building *ie the buildings will be EV ready*. The EV infrastructure will include the basic skeleton infrastructure *to 100% of car parking spaces* that allows *all* future EV owners (*residential and commercial*) to easily connect their own chargers to the infrastructure *at a time appropriate to their needs*.



The base skeleton infrastructure will be per the **Merri-bek Zero Carbon Development Guidelines for Electric Vehicles** and BCA 2022 Part J9D4 and include:

- Centrally located dedicated EV distribution board(s) in each carpark level – *with capacity for circuits to each car parking bay when required and installed by car parking bay owners/tenants*.

- An approved power use metering system
- Cable trays from the distribution board(s) to the edge of each car parking space. These cable trays will support the future installation of EV cabling by EV owners as required.

Note the EV distribution boards will be capable of managing the maximum demand load of charging EVs so that EV charging does not exceed the site capacity. It is possible to provide minimum top-up charging of all vehicles without increasing the supply capacity required to the building. Load management systems can be installed later to charge vehicles when the use of power elsewhere in the building is low – usually overnight.

2. Bicycle parking, end of trip facilities, and other personal mobility devices

- Prominent, accessible and secure locations will be provided for bicycle parking.
- Bicycle rails will be installed in the public open spaces throughout the site for visitors.
- End of trip facilities for cyclists will be provided for the retail / commercial tenancies.
- Standard power outlets will be accessible to all bicycle parking and personal mobility spaces to allow access to charging by electric variants of these modes of personal transport.
- Prominent, accessible and secure parking locations will be provided for other personal mobility devices such as motor cycles, mopeds, or scooters.

The final locations for bicycle parking are to be shown on town planning drawings. Quantities of facilities to be provided will be per below.

Installation	Areas as basis for calculations	Clause 52.34 requirements	Proposed
Resident bicycle parking		One per 5 dwellings	One secure space per dwelling. Standard best practice and BESS expectations.
Employee bicycle parking	Building A 2008m ² Building B 895m ²	Office: 1 to each 300 sq m of net floor area if the net floor area exceeds 1000 sq m. Retail: 1 to each 300 sq m of leasable floor area Applying retail requirements: 10 spaces	10 spaces
Dwelling visitor bicycle parking		1 per 10 dwellings	1 per 10 dwellings

Installation	Areas as basis for calculations	Clause 52.34 requirements	Proposed
Retail / commercial visitor bicycle parking	Building A 2008m2 Building B 895m2	Offices: One per 1000m2. Retail / shop: 1 per 500m2 if leasable floor area exceeds 1000m2 Applying retail / shop requirements 5 spaces	6 spaces
Retail / commercial end of trip facilities		One shower for the first 5 required spaces. As a minimum one shower, change room and lockers for 5 staff	As a minimum one shower, change room and lockers for 6 staff

3. **A shared or communal EV charging space(s)** will be provided in the development. This will be located in highly visible location(s) to encourage EV uptake. Clear signage will be provided to indicate that EV charging is available at the charging space(s).

Urban ecology – Biodiversity

Environmental and biodiversity considerations surrounding the site will be addressed by:

1. **Tree and vegetation planting** to add back and improve to contribution to biodiversity of the currently denuded site. There will be a gain overall in terms of plant numbers and ecological variety on the site.
2. **The planting strategy will include predominantly native to Australia** and where suitable, locally indigenous plants.
3. **Low maintenance planting** – new plantings will be predominantly low water consuming and low maintenance type.
4. **Surrounding waterways will be protected from erosion from the site** during construction by the use of silt fences, erosion control blankets, and drain filters. This will ensure earth is not eroded to fill up creeks while also ensuring pollutants that may exist on site do not enter important waterways.



Climate adaptation and resilience

Climate projections - The following are climate projections for Melbourne:¹

- Average temperatures will continue to increase in all seasons (very high confidence).
- More hot days and warm spells are projected with very high confidence. Fewer frosts are projected with high confidence.
- Generally, less rainfall in winter and spring is projected with high confidence. Changes to summer and autumn rainfall are possible but less clear.
- Increased evapotranspiration is projected (high confidence).
- Increased intensity of extreme daily rainfall events is projected, with high confidence.
- Mean sea level will continue to rise and height of extreme sea-level events will also increase (very high confidence).
- A harsher fire-weather climate is projected (high confidence).



Note on an annual and decadal basis, natural variability in the climate system can act to either mask or enhance any long-term human induced trend, particularly in the next 20 years and for rainfall.

More specific numbers are provided in the tables below.

Table A - Projected changes for 2030 for weather variables below for the sub-cluster in which Melbourne is located, relative to the 1986-2005 average. For 2030 the results for all RCP's are similar. The median projection is shown with the 10th to 90th percentile range in brackets (*5th to 95th for sea level rise projections).

¹ based on the Climate Change In Australia (CCIA) Projections for Australian Cities - Melbourne.

VARIABLE	SEASON	2030 RCP4.5
Temperature (°C)	Annual	0.6 (0.5 to 0.9)
Rainfall (%)	Annual	-2 (-8 to +3)
	Summer	-2 (-20 to +16)
	Autumn	0 (-20 to +14)
	Winter	-3 (-10 to +7)
	Spring	-5 (-14 to +6)
Evapotranspiration (%)	Annual	2.7 (1.8 to 4.8)
Wind speed (%)	Annual	-0.2 (-3.3 to +1)
Solar radiation (%)	Annual	0.8 (0.1 to 2.3)
Relative humidity (%) (absolute)	Annual	-0.4 (-1.1 to +0.5)
Sea level rise (m)* (Stony Point)	Annual	0.11 (0.07 to 0.16)

Table B - Current average (1981–2010) annual number of days above 35 and 40 °C and RCP 4.5 2030 projections for the median, 10th and 90th percentile projections to observed daily temperature data for 1981-2010.

THRESHOLD	CURRENT	2030 RCP4.5
Over 35 °C	11	13 (12 to 15)
Over 40 °C	1.6	2.4 (2.1 to 3.0)
Below 2 °C	0.9	0.6 (0.8 to 0.4)

In addition to climate change projections for increasing temperatures the Urban Heat Island (UHI) effect serves to amplify temperatures surrounding hard surfaces further.

Strategies to mitigate the effects of climate change and the UHI will include:

- light to medium roof, wall, and paved surface colours to not increase the temperatures of the micro climate surrounding the building(s). (Also reduces energy consumption within buildings).
- increased vegetation
- where there are large expanses of walls vegetation will be proposed to be placed in front to keep the walls cooler and provide a cool micro-environment.
- shading provided around the building(s) as a refuge from heat and heavy rainfall events
- higher performance thermal envelope to reduce cooling loads on hot days
- location of services to avoid flooding from extreme rainfall events

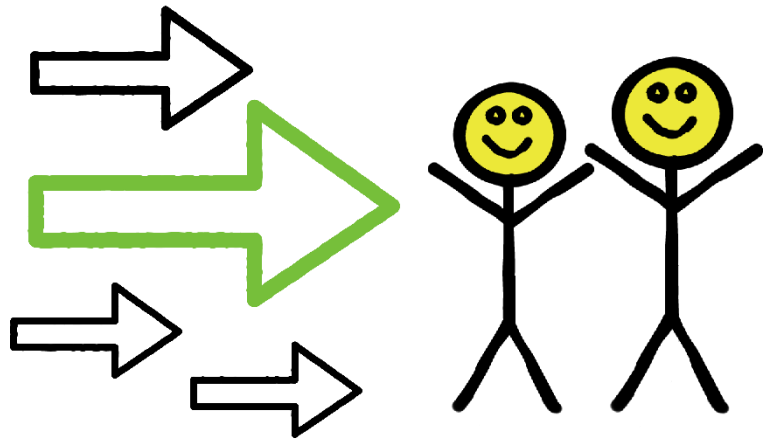
- considering the location of cooling equipment out of direct sunlight to improve performance, protection from winds, and heavier rainfall events
- planning for airborne dust or smoke, or viruses. Better ventilation and filtering of ventilation.

Community sustainability leadership

Sustainability is to be a weighting consideration in expression of interest, tender and quote evaluation. This is to ensure this project provides sustainability leadership not just within the project but also to the wider community.

For all job types consultants and contractors are to demonstrate as many of the following in their submission:

- Experience initiating sustainability measures on previous projects
- Sustainability measures in their operations.
- An understanding of the relevant sustainability requirements for the project.



Sustainability responses may be anything that addresses any of the following areas (as examples):

- Reduced use of non-renewable fossil fuel energy by increased energy efficiency of buildings and or operations including transport.
- Use of renewable energy.
- Reduced water consumption.
- Reduced pollution of the air and reduced pollutants into the water cycle.
- Selection of materials that:
 - Have a lower embodied energy
 - Do not destroy or impact negatively on habitats and ecosystems
 - Do not introduce pollutants such as Volatile Organic Compounds (VOCs) to indoor spaces
- Reduced waste generation measures.
- Reduced destruction, or the improvement of the local ecological footprint (improvements to the urban forest and biodiversity opportunities).
- Climate change adaptation measures.

Obtaining sustainability statements from all consultants and contractors raises further the expectation that sustainability is a key element of future development work. It changes expectations and will cause some of these development stakeholders to consider and address sustainability where they may not have done so in the past.

The statement may deliver additional ideas from consultants or contractors to incorporate in this project.

Appendix 1 – Preliminary Stormwater Quality Analysis



1

Project details

2

Specify Stormwater Runoff Areas and
Treatments

Instructions

In addition to conveying stormwater in pipes, stormwater design should: Reduce the average **Volume** of runoff, manage peak **Flows** and volumes so as not to overwhelm local drainage networks, improve water **Quality** flowing into our streams and coastal areas, and improve water **Efficiency** for drought resilience.

STEP 1: Please enter all impervious areas in your site connected to Council or Water Authority drains. Pervious areas like lawn and gardens can be excluded. Then enter any connected tank and WSUD treatments.

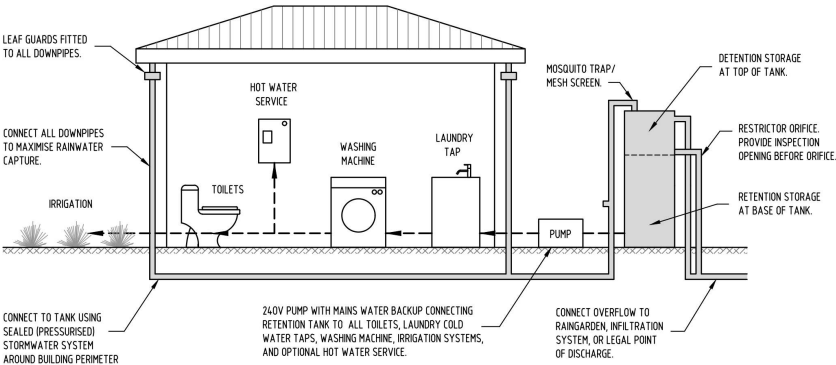
STEP 2: Press 'Calculate' and check which of the stormwater design criteria your project has passed.

STEP 3: Optimise your design by changing the impervious areas, tank sizes, roof area connected to tanks and treatments. Press 'Calculate' each time you make a change

Specify Stormwater Runoff Areas and Treatments

Enter only the impervious areas in your site connected to Council or Stormwater Authority drains. To simplify input add total roof areas and total tank areas. Don't enter pervious areas like garden, gravel and lawn areas.

Impervious area	Impervious area name	Impervious Area (m2)	Roof area connected to tank (m2)	Water tank size (L)	On-Site Detention (OSD)
Roof are ▾ Only add areas that are impervious and that are connected to drainage	All roofs Enter your own name for this impervious area (optional)	3631 Size of impervious area in square metres	3631	40000 Total rainwater + detention tank size (if applicable)	☐ Use tank for OSD



RETENTION TANK RETICULATION DETAIL
N.T.S.
NOTE: THE DESIGN AND INSTALLATION OF ALL STORMWATER SYSTEMS SHALL COMPLY WITH AS/NZS 3500.3:2018 "STORMWATER DRAINAGE".

Total tank volume (retention + detention) (L)
40000.0

Minimum total size of tank on site including detention and retention components

Enter any treatments for roof areas not connected to the rainwater tank

Area not connected to tank (m2)
0.0

Stormwater Quality Improvement Device (SQID)

No treat ▼

Select Stormwater Quality Improvement Device (SQID)

Example drawing
☒ Show

Remove

Impervious area

Courtyard ▼

Only add areas that are impervious and that are connected to drainage

Impervious area name

Paved areas

Enter your own name for this impervious area (optional)

Impervious Area (m2)

937.5

Size of impervious area in square metres

Stormwater Quality Improvement Device (SQID)

Manufact ▼

Select Stormwater Quality Improvement Device (SQID)

Vendor

▼

Device Family

▼

Device Model

▼

Flow from impervious area (L/s)
6.1
Q=CIA for a 1-in-3 month storm (4EY)

Nominal Q (L/s) for device

Number of
devices
needed

Example
drawing

☒ Show

=Flow from
impervious area
/ Nominal Q
(rounded up to
nearest integer)



Footprint of device
(m2)

This device is
[SQIDEP Approved](#)

Remove

Impervious
area

Courtyard ☐

Only add areas
that are
impervious and
that are
connected to
drainage

Impervious
area name

Paved areas

Enter your own
name for this
impervious area
(optional)

Impervious
Area (m2)

937.5

Size of
impervious area
in square metres

Stormwater
Quality
Improvement
Device (SQID)

No treatment ☐

Select
Stormwater
Quality
Improvement
Device (SQID)

Example
drawing

☒ Show

Add another impervious area

Remove

On-Site Detention Tank Design -> Click to expand ^

Additional site detention volume added adjacent to the legal point of discharge for peak flow detention. Detention tanks must have an orifice plate to control discharge rate in line with the site's PSD.

Existing Site
Runoff
Coefficient

0.45

Existing Site
Runoff
Coefficient
(Weighted Ce)
pre-
development

Proposed Site
Runoff
Coefficient

0.713

Proposed Site
Runoff
Coefficient
(Weighted Cp)
post-
development

OSD REQUIRED

Stormwater
peak runoff
flows are
increased by
the
development.

Rainwater tank
detention
allowance (L)

0

Total weighted
volume of
detention
allowance in
rainwater tank(s)

Additional
Detention
Storage
Required (L)

59310

Recommended
additional
detention to
pass FLOW
requirements.

Enter
Detention
Storage
Provided (L)

Additional site
detention
volume added
adjacent to the
legal point of

discharge for peak flow detention. Detention tanks must have an orifice plate to control discharge rate in line with the site's PSD.

Head acting on restrictor orifice (m)

1

Enter height from restrictor orifice centre to top of OSD storage in meters

Required OSD restrictor orifice size (mm)

168

The required orifice diameter is calculated as follows:
 $d=21.9*\sqrt{(PSD/\sqrt{H})}$ (mm).
Avoid specifying diameters less than 50mm for underground tanks and 25mm for above ground water tanks to avoid leaf blockages.

Example drawing

☐ Show

Tank calculator

The water calculator runs a daily tank balance simulation using 20 years of rainfall data.

Water Tank Reliability %	Rainwater Tank Overflow %
36.4	32.1
End use demand met by the rainwater tank. Target 50% or better – increase tank size or connected roof area to improve reliability	% of roof runoff flowing to stormwater system. Target less than 25%. (Increase tank water demand and increase tank size to reduce overflow)

Water tank performance over time

Rainwater and recycled water options

Tick boxes if rainwater or recycled water is connected

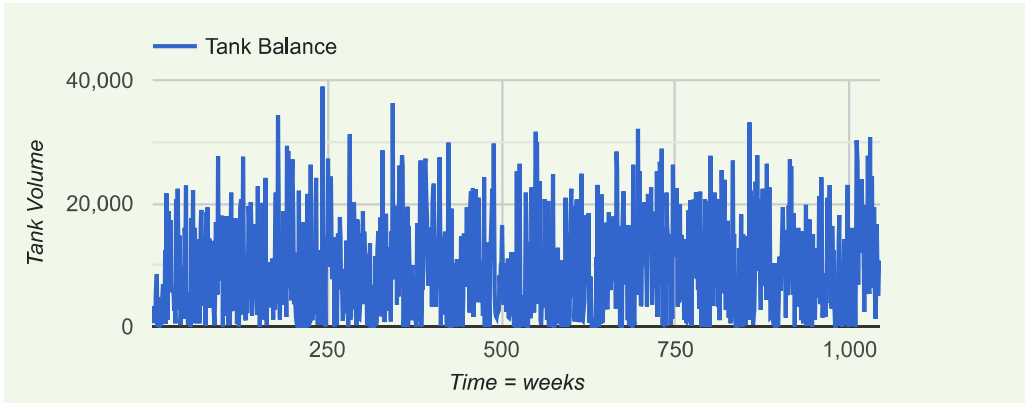
☒ Toilet

☒ Laundry

☐ Irrigation

☐ Hot water service

Roof area (m2)	Rainwater tanks (L)	Rainwater tanks (L)
3631.0	40000	40000
Total roof areas connected to tank(s)	Total volume of retention only in rainwater tank(s)	Total volume of rainwater tanks retention + detention

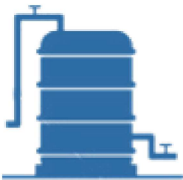


ilding
nnecte

00

fault is
0% = all
ilding
lets and
of recycled
water
demands in
L/day
rainwater
or recycled
water
source

Results

			
VOLUME	QUALITY	FLOW	EFFICIENCY
Objective: Harvest or infiltrate stormwater	Objective: Improve stormwater runoff water quality	Objective: Control Peak Discharge	Objective: Increase drought resilience
VOLUME RESULT	QUALITY RESULT	PEAK FLOW RESULT *	EFFICIENCY RESULT
7.4	100	59.3	34.0
Average Annual Stormwater Runoff Volume: Target – post development is no more than pre-development annual average runoff volume (score of less than 0)	Nitrogen reduction score equivalent to 'STORM': Target – score of 100 or more	Additional On-Site Detention (OSD) volume required (in cubic meters): Target – score of less than or equal to 0	Water Savings: Target – greater than 25% potable water use reduction
PASS	PASS	NOT YET PASSED	PASS
		Why?	

VOLUME SETTINGS –> Click to expand ^

Annual average runoff volume – advanced options

Volume targetCompare pre and 

Set the stormwater volume target appropriate for your site

Mean Annual Impervious Runoff from site

4.27 ML / year

Runoff from site impervious areas (ML/year) according to the [EPA Stormwater Guidelines](#)

Rainwater Harvested (ML / year)

2.12

Rain that is captured and prevented from entering the waterway.

Evapotranspiration (ML / year)

0.60

Evapotranspiration from vegetated areas. Is equal to total area (m2) – impervious area (m2) – pervious paving area (m2)

Harvest / evapotranspire reduction achieved (ML)

2.72

Runoff infiltrated (ML)

0.00

Run-off from impervious surfaces that soaks into the ground (infiltrates) including irrigation, rainfall on permeable and permeable paving areas, and volume put into infiltration devices.

Runoff filtered (ML)

Run-off from impervious surfaces that is slowly (mimics infiltration rates of the surrounding soil) released to the drainage system from a stormwater management system (filter). Will require a 'leaky tank'

Infiltrate / filter reduction achieved (ML)

0.00

Harvest / evapotranspire target (%)

0

Targets expressed as a % reduction from Mean Annual Impervious Runoff

Infiltrate / filter target (%)

0

Targets expressed as a % reduction from Mean Annual Impervious Runoff

Runoff without treatments (ML)

4.27

Run-off from impervious surfaces $Q=C.I.A$

Total volume reduction achieved (ML / year)

2.72

Total volume reduction achieved (%)

63.7

Rainfall total per annum (mm)

860.7

Roof runoff total per annum (L)

3125201.7

First flush device (L)

0

Enter the volume of first flush device (if fitted – we recommend a leaf diverter instead)

☐ Recycled water source

Recycled water from a local (3rd pipe) scheme used in the building. This calculator will assume that rainwater (if a tank is connected) will be used preferentially to recycled water.

Rainwater Tank Overflow (kL)	Pre-development Volume (kL/annum)	Post-development Volume (kL/annum)	Change in volume %
1003.6	2287.0	2456.0	7.4
Water flowing from the roof that is not used or captured by the tank	$Q = C I A$	' Volume from impervious area x 860.7 Rainfall total per annum + 1456.4 rainwater tank overflow	No more than a 10% increase in runoff volume

QUALITY SETTINGS -> Click to expand ^

Stormwater quality – advanced options

Water Tank Runoff reduction (%)	Rainwater Tank(s) Total Nitrogen (TN) reduction	Total Nitrogen (TN) % reduction	Equivalent STORM Score
67.9	5478.8	44.8	100
Total stormwater volume reduction from water tank diversion		TN target is 45% retention of typical urban annual load	100 points = TN reduction > 45% of the typical annual load = best practice performance objectives. Calculations based on the Melbourne Water STORM Calculator

PEAK FLOW SETTINGS -> Click to expand v

Detention Calculator – engineering options

EFFICIENCY SETTINGS -> Click to expand ^

Water Efficiency – advanced options

Basin WELS star rating	Toilet WELS rating	Bath WELS star rating	Washing Machine WELS star rating
> 5 Star WELS rat v	> 4 Star WELS rat v	Medium Sized Co v	> 4 Star WELS rat v
4948.52	3141.92	5049.51	9425.76
Basin Benchmark (kL)	Toilet Benchmark (kL)	Bath Benchmark (kL)	Washing M Benchmark (kL)
3299.02	2592.08	5049.51	3231.69
Basin Water Use (kL)	Toilet Water Use (kL)	Bath Water Use (kL)	Washing M Water Use (kL)
Kitchen Taps WELS rating	Urinal WELS rating	Shower WELS star rating	Dishwasher WELS star rating
> 5 Star WELS rat v	Not Applicable v	3 Star WELS (> 7. v	> 4 Star WELS rat v

4948.52	0.00	8483.18	1548.18
Kitchen Tap Benchmark (kL)	Urinal Benchmark (kL)	Shower Benchmark (kL)	Dishwasher Benchmark (kL)
3299.02	0.00	8483.18	956.71
Kitchen Tap Water Use (kL)	Urinal Water Use (kL)	Shower Water Use (kL)	Dishwasher Water Use (kL)

Water savings from tank (kL/year)	Water savings from tank %	Roof Runoff (kL/year)
2121.6	36.4	3125.2
	End use demand met by the rainwater – this assumes that rainwater is used preferentially for non-potable demands	Water captured by the roof which is available to the water tank

Benchmark Water Use (kL/year)	Predicted potable water use (kL/year)	Predicted potable water use (L/Person/Day)	Total water saving (efficiency + tank + recycled water) (kL/year)	Total water saving (efficiency + tank + recycled water) %
37545.6	24789.6	171.3	12756.0	34.0
				Minimum Target > 25%, Best Practice > 40%, Excellent > 65%

Previous page

Save project and go to reporting