lid Low Impact Development Consulting

Environmentally Sustainable Design

Sustainability Management Plan for:

139-141 Hawthorn Rd, Caulfield North

Prepared for: DO Architects
Prepared by: AV – Low Impact Development Consulting

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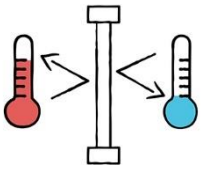
1.0	18/07/2023	TP Issue	Rev. 1	AV	JN

Disclaimer

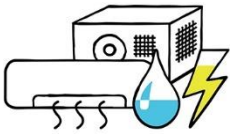
The content of this document represents the entirety of work output or recommendations offered by LID Consulting for this particular project. This content supersedes all other verbal discussions undertaken by LID Consulting representatives in relation to this project.

Development highlights

Energy efficient dwellings that meet NCC2022 7-star standards

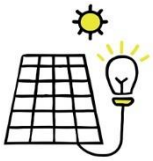


Improved energy efficiency - use of double glazed windows



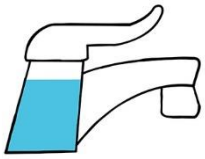
Energy and water efficient heating and cooling

Energy efficient hot water service

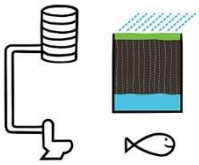


Renewable energy 26kW PV Panels

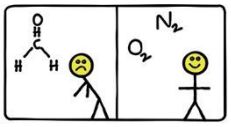
Potable (drinking) water savings – 7,000L Rainwater tank connected to toilets



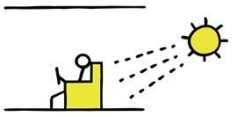
Potable (drinking) water efficient fixtures



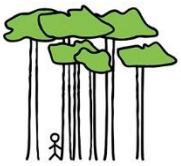
Onsite water use and infiltration - Best Practice Stormwater treatment



Improved indoor air quality due to reduced use of off-gassing materials



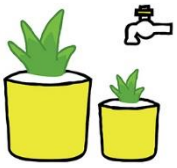
Daylight maximised for this design



Avoidance of use of rainforest timbers

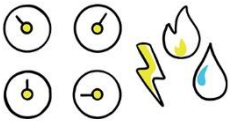
Environmentally friendly materials choices

Excellent public transport access



Tap on balconies to help facilitate balcony vegetation

Energy and water efficient appliances



Individual metering of services to each dwelling

Indoor clothes drying rails

Separate waste stream and recycling facilities

Contents

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.

Executive summary

Project summary

This ESD report is for the proposed residential development of 26 apartments at 139-141 Hawthorn Rd, Caulfield North and is based on the drawing set provided by DO Architects on the 26th of June 2023.

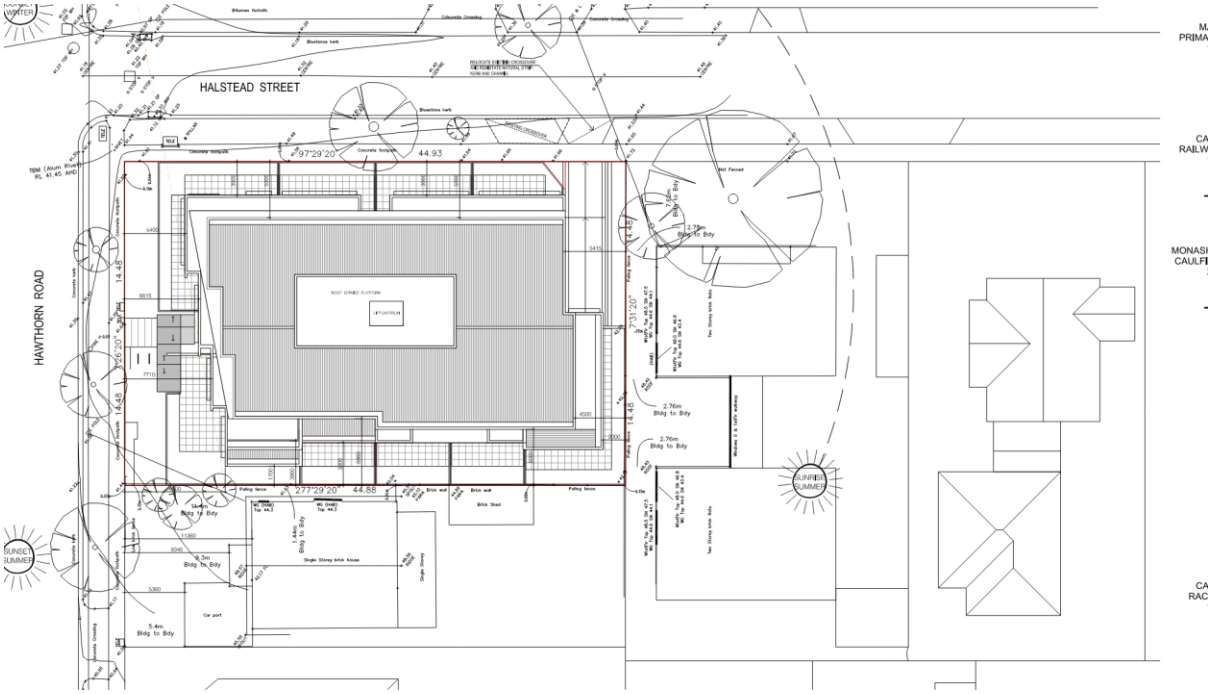


Figure 1: Proposed Site Layout

This report addresses the environmentally sustainable development requirements under the City of Glen Eira Planning Scheme (relevant clauses listed below), specifically per clause 15 Built environment and heritage:

Planning should promote development that is environmentally sustainable and minimise detrimental impacts on the built and natural environment.

Planning should facilitate development that:

- *Is adapted and resilient to climate related hazards*
- *Supports the transition to net zero greenhouse gas emissions*
- *Minimises waste generation and supports resource recovery*
- *Conserves potable water*
- *Supports the use of, and access to, low emission forms of transport*
- *Protects and enhances natural values*
- *Minimises off-site detrimental impacts on people and the environment.*

This sustainability report details measures that meet and often exceed mandatory Environmentally Sustainable Design (ESD) requirements for this type of residential development.

The body of the report contains a full list of ESD initiatives to be included in the development. A summary of the major ESD initiatives committed to are included below:

- Energy
    - Energy efficient dwellings that meet NCC2022 7 star NatHERS performance standards
    - Improved energy efficiency double glazed windows throughout the development
    - Energy efficient electric reverse cycle heat pump/air-conditioning heating and cooling systems beyond minimum standards (within one star of best available)
    - Renewable energy Photovoltaic (PV) Panels of 26kW (1kW per dwelling) to supply power to the development
- Water and Stormwater
    - On-site water use and infiltration measures to meet CSIRO Best Practice Stormwater Management (Water Sensitive Urban Design) treatment quality requirements
    - Rainwater tank(s) of size 7,000L connected to all toilets to reduce potable water consumption and assist with stormwater quality management requirements.
    - Potable (drinking) water saving measures including low flow toilets, showers and taps
- Indoor Environment Quality (IEQ)
    - Daylight levels assessed to Best Practice standards
    - Minimised indoor pollutants from the use of low off-gassing materials such as low VOC paints, carpets and adhesives, and low formaldehyde products
- Sustainable materials
    - Avoidance of the use of endangered rainforest timbers in this development.
    - Use of lower embodied carbon/energy alternatives for concrete.
    - More environmentally friendly material alternatives for timber, insulation and other building components
- Urban ecology
    - Light -medium coloured roofing to help mitigate the effects of the Urban Heat Island effect

Generally, other non-mandatory guidelines and good design principles (eg. Green Star) have also been incorporated where deemed to be relevant in respect to the scope and nature of this development. This encourages further levels of sustainability above and beyond the mandatory requirements.

The proposed development advances basic sustainability principles by increasing the potential use of the site, in line with the surrounding environment. In the context of rising living costs and a need to limit use of material, energy and land resources, the proposed development enables a more affordable and energy efficient model of housing. The expected design life of this development would be in excess of 40 years.

Mandatory guidelines and tools addressed in this report as relevant to sustainability include:

- National Construction Code (NCC) / Building Code of Australia (BCA) Volume One Section J;
- Victorian Planning Policy (VPP) and Local Planning Policy (LPP) clauses including

    - 11 Settlement
    - 12 Environmental and Landscape Values
    - **15 Built Environment and Heritage**
    - **15.01-2S Building Design**
    - 18.02 Movement Networks
    - 19.01-2R Renewable Energy – Metropolitan Melbourne
    - **19.03-3S Integrated Water Management**
    - **53.18 Stormwater Management in Urban Development**
    - 55.07 Apartment Developments
- Built Environment Sustainability Scorecard (BESS); and
- The STORM assessment.

The proposed development will address the relevant ESD requirements of the above planning scheme provisions.

Results summary

Further to the above initiatives and in conjunction with others listed in this report, the development was assessed using the 'Built Environment Sustainability Scorecard' (BESS), obtaining a total score of **51% and passing all mandatory categories.** A score of 50% or greater (including compliance under water, energy, stormwater and IEQ categories) demonstrates a Best Practice environmentally sustainable development.

Commitment & documentation on plans

Where possible the "ESD initiatives" in each section **should be included on the plans**. Examples include (where relevant):

- Water tank retention size(s) and location including whether above ground or underground
- Shading devices
- The openable component of a window
- Air-conditioning indoor and outdoor units
- Hot water system location and type
- Solar panels and total capacity
- Internal / external clotheslines
- Bicycle racks
- External materials
- Car park CO sensor
- Location for internal and external waste bins (should allow for separation of comingled recycling, food organics, glass and landfill as a minimum)
- Other relevant readily shown items.

Where items are not usually shown on town planning plans, these can be included on a notes box on the drawings to ensure they flow through to construction drawings, or included in the specification.

As a minimum this ESD report must be referenced in a single note, such as:

> "Plans are to be read in conjunction with the endorsed ESD report (which forms part of the town planning permit submission), and all initiatives contained within must be implemented to the satisfaction of the responsible authority"

Abbreviations used in this report include:

- BCA – Building Code of Australia
- SDAPP – Council Sustainable Design Assessment in the Planning Process
- BESS – Built Environment Sustainability Scorecard
- BADS – Better Apartment Design Standards (Victorian Planning Provision Clause 55.07)

1 Energy Efficiency

Goals

- To improve the efficient use of energy and reduce total operating greenhouse gas emissions
- To reduce energy peak demand through particular design measures (e.g. appropriate building orientation, shading to glazed surfaces, optimise glazing to exposed surfaces, space allocation for solar panels and external heating and cooling
- Improve efficiency in energy use through greater use of renewable energy technologies and other energy efficiency upgrades

Initiatives

Energy Rating	Current mandatory 7 star average (6 star minimum) energy efficiency requirements for class 2 dwellings will be met in line with NCC 2022 performance standards Sample energy ratings (eleven ratings) have been provided, demonstrating this commitment can readily be achieved. Refer to additional details below and Appendix 2 for further information.	SDAPP – Energy efficiency / BESS Energy / NCC2019 (Exceeded)
Maximum Cooling Loads	Dwellings in the proposed development will meet the residential maximum cooling load requirement for the relevant climate zone. This development is located in NatHERS climate zone '62 – Moorabbin Airport' with an annual cooling limit of 21MJ/m^2. A preliminary NatHERS assessment has been completed, indicating this target can readily be achieved. The maximum observed cooling load for the development is 20.8MJ/m^2.	Planning scheme clause 55.07-1
General insulation comments	Insulation installed in residential dwellings will meet minimum BCA requirements as appropriate to meet 7.0 star energy ratings.	BCA Part J
Building sealing	Building sealing will be in accordance with NCC 2019 Volume 1 Part J3 *Building Sealing*	NCC2019 Volume 1 Part J3
	No power data points etc. will be installed on external walls where insulation removal for electrical safety would compromise the external wall envelope. Alternatively, if installed, acoustic fire rated wall boxes will be installed behind these power and data points.	Additional sustainability practice

Hot water supply	The hot water supply for residences will be from gas instantaneous units (minimum 6 stars energy efficiency).	SDAPP - Energy efficiency / BESS Energy
Hot water meters in apartments	Hot water meters will be included for each apartment to determine the amount of energy used in generating hot water for each apartment. See additional details.	Additional sustainability practice
Space heating and cooling	Heating and cooling will be delivered via efficient electric inverter air-conditioner/heat pump units selected to be within 1 star of the best available system on the market of relevant size/capacity.	SDAPP - Energy efficiency / BESS Energy
Energy efficient cooking	Kitchen cooktops will be electric induction type. These are significantly more energy efficient than traditional electric coil or ceramic cooktops. Induction cooktops are also preferable to gas cooktops as electric cooktops can be fuelled by carbon neutral electricity from onsite or offsite mains renewable sources. Gas cooktops burn a fossil fuel which generates carbon emissions. Installing gas infrastructure locks in the use of this fossil fuel carbon emission source for a long time.	Additional sustainability practice
Windows	Windows will be double glazing throughout the development.	NCC2019 Part J1, NatHERS, BESS Energy
Natural ventilation	Where provided, one window or sliding door included on each elevation to each habitable room will be openable to provide natural ventilation and reduce the need for mechanical cooling. The openable component is to be shown on the plans.	Additional sustainability practice
Carpark ventilation	The carpark roller door will contain openings and allow for natural ventilation in order to reduce the need for operation of mechanical ventilation system.	Additional sustainability practice
CO sensors	Carbon monoxide sensors will be installed in carparks to control variable speed fan drives and save energy.	BESS
Lighting power density	Lighting power density will be at least 20% lower than NCC maximum allowances, providing significant power savings in operation. I.e. 4W/m^2 rather than 5W/m^2 for residences.	NCC2019 Part J6 – Additional sustainability practice
Downlights	Downlights will not require gaps in ceiling insulation. Downlights will be LED IC rated (Insulation Contact) type, running cooler and	Additional sustainability practice

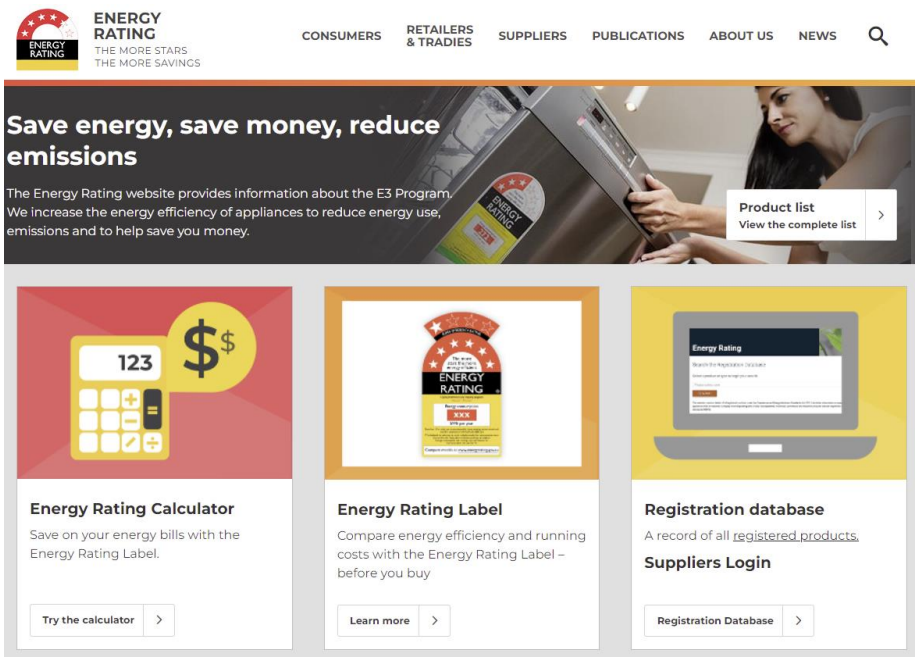
	allowing for insulation to be directly installed over the downlight fitting itself (as per manufacturer's instructions).	
External lighting	External lighting to paths and driveways/carparks will have a daylight sensor and either timer or motion sensors installed.	NCC2019 Part J6
Clothes drying facilities	Indoor clothes drying rails will be incorporated in the laundries in each dwelling to remove the need for electric dryers. These rails will operate much like a wardrobe rail that allows clothes to be hung on clothes hangers above the laundry tub.	BESS tool
Individual metering of services	Electricity will be individually metered for each dwelling, ensuring energy saving behaviour is rewarded.	Additional sustainability practice
Solar PV	Solar photovoltaic (PV) panels of 1kW capacity per apartment and 26kW total capacity will be installed to supply power to the development.	BESS Energy

Additional Details

Preview energy ratings	The energy efficiency rating of a development is directly affected by the passive solar design characteristics of dwellings which include the orientation of the residences, windows, window sizes, shading of windows; and also the levels of insulation, window type selected (i.e. single or double glazing with standard or insulated frames) and thermal mass levels within the space. These elements will be combined in such a way to ensure the residences achieve the required 7 star energy efficiency. A sample of eleven dwellings (see appendix 2) indicates that the development can readily achieve an average energy rating of 7.0 stars. Dwellings were selected to provide a representation of similar dwellings. In some instances likely slightly lower performing dwellings are selected to provide a conservative outcome. Preview ratings on sampled dwellings indicate that a combination of both increased wall insulation values above R2.0 and improved glazing may be required for all dwellings to achieve the minimum energy rating of 6 star minimum, 7 stars average and BADS maximum cooling load allowances (to be confirmed when undertaking final energy performance ratings).
Maximum Cooling Loads	The proposed development commits to achieving the maximum cooling load for the climate zone '62 - Moorabbin Airport' of 21MJ/m^2 per annum per clause '55.07-1 Energy Efficiency'.

	Further information is contained within the appendices.
Hot water meters in apartments	Meters are usually installed by the builder or developer within the building, and are usually located in a Common area such as a hallway cupboard, garage, basement, behind a ceiling or wall access panel in the foyer or in the corridor on each floor. In some cases, the builder may have installed the meter in your apartment. These can often be located under the sink or vanity unit in the bathroom or behind a hidden access panel in the wall. Refer to Origin Energy's fact sheet Information about your Hot Water meter https://www.originenergy.com.au/content/dam/origin/residential/docs/hot-water/your-centralised-hot-water.pdf
Building sealing	Building sealing prevents un-intended air movement through the thermal envelope (infiltration and exfiltration). Air gaps in the building fabric result is uncontrolled heating and cooling demands in addition to high risk of structural damage due to condensation internally in well insulated envelope walls. It is important to ensure air-tight connections between internal lining on exterior walls, ceiling and floor plate, around electrical and hydraulic penetrations going through the air-tight barrier by using a system of grommets, membranes and tapes. Alternatively, a combination of plasterboard and caulking with high level attention to detail can make a large difference to the air leakage rate of the building To address air leakage through doors and windows, the following measures are recommended: • Compressible foam or similar seals provided around doorways from conditioned to non-conditioned spaces; • Draft protection devices along the bottom edge of external swing doors; • Multi-fit cable and pipe seals/adhesive membrane grommets for sealing around pipes or conduits passing through the building envelope; and • Self-closing dampers fitted to exhaust fans.
Space heating and Cooling	A transition away from fossil fuel must happen as soon as possible. Installing gas fired space heaters, gas burners, gas fuelled domestic hot water services and commercial gas fuelled kitchen appliances into a new development is therefore highly discouraged. Electrical alternatives are readily available to suit the same needs and should be adopted. Electrical equipment and appliances are able to utilise electricity generated on-site with emission free photovoltaic (PV) panels. Achieving net zero emissions or preparing for net zero emissions in the future is not feasible with a gas installation. Future-proofing the development is therefore important by acquiring equipment that utilise the most flexible source of energy – electricity.

Space heating and cooling	Heating and cooling will be provided by reverse cycle air-conditioner units (which incorporate heat pump technology). Air-conditioning/heat pump unit sizes to cool or heat spaces typically range in output capacity from: • 2.5kW unit to cool or heat one bedroom only • 3.5kW unit for a larger master bedroom, robe, ensuite • 5-6kW unit for a one bedroom apartment • 6-7kW unit for a two bedroom apartment or open plan living/dining/kitchen • 7-10kW or multiple units to cool or heat larger apartments or living areas of dwellings. BESS Energy Efficiency commitments require heating and cooling system efficiency to be of the best 15% of available products within a certain size range, or within 1 star of the best available relevant system. Air-conditioners will be reviewed against the following government website to confirm their performance prior to specification. For simple availability checking use the Basic search under Energy Rating.gov.au selecting the Energy Rating calculator or Registration database https://reg.energyrating.gov.au/comparator/product_types/64/search/



Induction cooktops	While induction cooktops still use electricity to produce the electromagnetic field, they don't have to heat up an element to transfer heat as occurs with electric coil or ceramic cooktops. This means no heat or energy is wasted.

	More detail on induction cooktops can be found at: https://renew.org.au/renew-magazine/buyers-guides/induction-cooktop-guide/ Refer to induction cooking benefits videos or get a demonstration in retail stores. E&S Trading provide them without bookings.
Downlights	Previously, halogen downlights were installed with clearances around the fitting leaving gaps in the ceiling insulation. This created a point for undesirable heat losses and gains to occur. By installing IC (Insulation Contact) rated downlights, the insulation can be installed without interruption over the cooler operating temperature LED downlight.
Solar PV (on flat roofs)	All roofs must be structurally designed to be able to accommodate proposed solar photovoltaic (PV) panel coverage. Typically the structural allowance for this is small. Solar panels should ideally be on a minimum angle of 10 degrees for self-cleaning[1]. Panels orientated to the north are the most efficient, but can be oriented to the north east, east, north west or west, or a combination of these orientations as required to optimise solar power generation time with power use. Moreland City Council has recently published the **Moreland Zero Carbon Development Guidelines – Solar PV**. This guideline provides good background and technical advice for installing Solar PV electricity generation systems in townhouses, apartments and warehouses.

[1] Per Clean Energy Council Guidelines and the Australian Standards for self-cleaning and maintenance of the panels

2 Indoor Environment Quality

Background

Access to daylight and sunshine is advantageous to the wellbeing of humans.

Many paints, adhesives, sealants and flooring types contain Volatile Organic Compounds (VOCs) which are released into the indoor air. Joinery has, over the last 30 years, contained high levels of formaldehyde. VOCs and formaldehyde are recognised as potentially harmful to humans as well as contributors to atmospheric pollution.

Goals

- To achieve a healthy indoor environment quality for the wellbeing of building occupants, including the provision of fresh air intake, cross ventilation and natural daylight.
- To achieve thermal comfort levels with minimised need for mechanical heating, ventilation and cooling.
- To reduce indoor air pollutants by encouraging use of materials with low toxic chemicals levels.
- To minimise noise levels and noise transfer within and between buildings and associated external areas.

Initiatives

Natural ventilation	Dwelling windows will meet or exceed BCA minimum 5% room area allowance. The openable component is to be shown on the plans.	BCA requirement
	All dwelling habitable room windows will include an openable component.	Additional sustainability practice
	The development meets Clause 55.07-15 Standard B49 ventilation path requirements for ventilation openings on two different orientations and maximum and minimum ventilation path lengths to a minimum of 40% of apartments. Additionally, 38% of apartments meet the requirements of BESS IEQ 2.1 effective natural ventilation	Planning Scheme requirement BESS IEQ 2.1
	There are no habitable rooms with borrowed ventilation.	SDAPP - IEQ
	All ground and first floor openable windows will incorporate or have locks fitted to allow windows to be locked open 100mm at night safely allowing overnight ventilation.	Additional sustainability practice
	Hinged doors to habitable rooms will have mechanical or magnetic door catches to keep	BESS tool

	doors open and enable natural (cross)ventilation between rooms.	
Daylight	Glazing levels will meet the BCA minimum 10% room allowance in all habitable rooms.	NCC-BCA Section F4.1
	Daylight levels have been calculated and the results included in the attached BESS report.	BESS tool
	Light coloured walls internally will help to maximise daylight levels.	Additional sustainability practice
Glare (external sources)	Internal blinds will be installed to manage glare rather than rely on tinted glass.	Green Star - Visual Comfort
Localised Lighting control	Sufficient lighting control (on/off and dimmers) and/or power outlets will be provided for future task lights around kitchens (e.g. bench space where food is prepared), bathrooms, predicted furniture layouts, and service areas.	Green Star
Low VOC products	For occupant health benefits, paints and adhesives will be low volatile organic compounds (VOC) types. Contractors are required to provide evidence of these commitments.	Green Star / BESS tool
Low formaldehyde products	For occupant health benefits, engineered wood products (including MDF, particleboard and plywood) will be Class E1 formaldehyde or better.	Green Star

Additional details

Low VOC	Volatile Organic Compounds is the term used to describe several hundred petrochemical solvent type compounds found in paints, adhesives, sealants, carpets, reconstituted wood products, and new furniture. Newer buildings generally have higher concentrations of these VOC's that contribute to headache, lethargy etc. in occupants. **Low VOC paints, adhesives and sealants –** the VOC content of paints, adhesives and sealants will not exceed the levels listed in the table below (VOC limits are less water and exempt compounds) (from the Green Star Design and As Built v1.1 guidelines). Low VOC adhesives and sealants are readily available and can be purchased in bulk to minimise the price premium. Mapei adhesives offer a full low VOC adhesives range.

Product category	Maximum VOC content (g/litre)
General purpose adhesives and sealants	50
Interior wall and ceiling paint, all sheen levels	16
Trim, varnishes and wood stains	75
Primers, sealers and prep coats	65
One & two pack performance coatings for floors	140
Acoustic sealants, architectural sealant, waterproofing membrane and sealant, fire retardant sealant and adhesives	250
Structural glazing adhesive, wood flooring and laminate adhesive and sealants	100

Low VOC paints are readily available at all suppliers:

- Wattyl ID Eco System Low VOC
- Haymes - www.haymespaint.com.au
- Porters Paints - www.porterspaints.com
- Bio Products Aust - www.bioproducts.com.au
- Ecolor - www.ecolour.com.au
- Livos - www.livos.com.au
- Murobond - www.murobond.com.au
- Oikos non toxic Paints - http://www.nontoxicpaint.com.au
- The Natural Paint Company

Low formaldehyde products

Formaldehyde is used in the production of resins that act as glues for engineered wood products and is a colourless gas with a strong odour. Exposure to formaldehyde can cause irritation in the eyes, nose and throat with various authorities recommend E1 as a maximum emissions class.

Reduced formaldehyde emissions in engineered wood products are classed as below:

Class	Limits (mg/L)
Super E0	Less than or equal to 0.3
E0	Less than or equal to 0.5
E1	Less than or equal to 1.0
E2	Less than or equal to 2.0
E3	Greater than 2.0

Companies offering low formaldehyde engineered wood products include:

- Polytec offers E1 and E0.
- Nikpol offers E1, E0 and Super E0 for select products.
- Austral Plywood E1, E0 and Super E0 for select products.
- Laminex Australia offer E1, E0, Super E0 and no added formaldehyde for select products.

3 Water Conservation

Background

As populations increase and global warming contributes to fast climate change, the access to clean potable water will become more of an issue to Australians and the world. Inefficient use of water can lead to the destruction of habitat for dams, over-use of artesian water supplies creating a rising water table or intensive energy use for desalination plants.

Goals

- To ensure the efficient use of water.
- To reduce total operating potable water use.
- To encourage the collection and re-use of stormwater
- To encourage the appropriate use of alternative water sources.
- To minimise associated water costs.

Initiatives

Water efficient fixtures, fittings and appliances	Water saving, water efficient fixtures, fittings and appliances have been selected in line with the following WELS ratings: • 4 star shower (6-7.5L/min) • 4 star toilets • 5 star bathroom taps • 5 star kitchen taps	BESS, Green Star
Rainwater collection and use	Rainwater collection will reduce potable (drinking water) consumption. Rainwater collection and use will involve the installation of a rainwater tank of minimum 7,000L retention capacity, collecting water from all roof areas and supplying it to all toilets in the development.	STORM, BESS tool, Green Star
Accessibility of pumps	Water pumps and manual over-ride switches will be readily accessible for access in the event of malfunction.	Additional sustainability practice
Individual metering of water	Water will be individually metered for each dwelling, ensuring water saving behaviour is rewarded.	SDAPP – Water efficiency, BESS tool
Water efficient landscaping	Proposed planting will be water efficient and will not require watering after an initial period when plants are getting established. Therefore, no irrigation system is proposed.	BESS Water 3.1
Building systems water use reduction	Where installed, fire safety system test water will be reticulated to retention tanks in accordance with VBA PN-61-2018, ensuring a minimum 80% reduction in potable water consumption. No water-based heat rejection systems are proposed for this development.	BESS Water 4.1

Additional details

Water efficient fixtures & fittings	All fittings to be specified are based on recommendations from www.savewater.com.au or from the product search on the following site www.waterrating.gov.au and will be amongst the most efficient on the market, and a significant improvement on fittings historically used in most buildings. Traditionally shower heads would use more than 16 litres of water per minute. One star shower heads use between 12 – 16 litres per minute, 2 star shower heads use between 9-12 litres per minute. To reduce this to 6-7.5 litres per minute with a 4 star shower head is a significant improvement. Further water efficient appliances will be determined from sources such as the following web site http://www.waterrating.gov.au.

4 Stormwater Management

Background

Pollutants that build up on impervious surfaces get washed into the stormwater system and end up in local waterways. Water Sensitive Urban Design is now a major goal of urban development to prevent this occurring.

The quality of water leaving a site (and peak and total stormwater run-off volumes) can be improved by collection of water in water tanks, natural infiltration through gardens and lawns into the soils, and minimisation of impervious pavements or the shedding of water from impervious surfaces into garden beds that have particularly good infiltration into the ground – known as infiltration beds. The following measures have been adopted to ensure these concerns are addressed.

Goals

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

Initiatives

Best Practice Stormwater treatment	Stormwater run-off quality will be maintained in this development, and has been assessed using the Melbourne Water STORM calculator. The following is proposed to achieve Best Practice Environmental Management Guidelines (BPEMG) stormwater quality objectives: • Rainwater shed from roof areas (minimum 777m^2) will be collected in a rainwater tank of 7,000L capacity.	STORM, Planning scheme clause 53.18-5, 55.07-7

	• Rainwater tanks will be connected to all toilets within the development serving all toilets for flushing purposes. • Leaf diverting rain heads and first flush diverters will be included upstream of the tank to divert the initial sediment flow when rain events occur from entering the tank. • As balconies can gather more residual pollutants, a better filtration system and maintenance may be required for storing collected water in the water tank. • In accordance with the Australian Rainfall and Runoff (ARR2019) guidelines, impervious areas are those which have an immediate rainfall runoff response (i.e. dedicated drainage from a surface or concentrated flows). Paved paths and ground level terraces have been considered effectively pervious as runoff from these surfaces will drain directly into adjacent pervious landscaping.	

Additional details

Water sensitive urban design - rainwater tanks	The proposed rainwater tank collection system provides benefits of reducing the peak and total stormwater run-off when it rains. Since the water tanks are connected to all of the toilets, the tank water volumes are run down regularly. This leaves spare capacity to collect new rainfall water and hence reduces the level of rain from the roofs going down the drains. In addition, the pollutants leaving the site to the stormwater system (and hence local creeks) is reduced, by water collected off the roofs, going via the toilets into the sewer system rather than stormwater system as would otherwise have been the case. The final design of the Stormwater system will meet council drainage engineers' requirements. The designed system complies with Melbourne Water STORM requirements, satisfying the BPEMG stormwater quality objectives.
Collecting rainwater from terrace & balconies	When collecting rainwater from rooftop terraces, rainwater can be exposed to significantly more litter and pollutants than most roofs. Thus, the appropriate filters must be used to remove both coarse and fine sediment; to avoid causing damage to the pump, and to reduce odours and discoloration before the water is re-used within toilets. It is recommended that multiple filters be employed in series, as demonstrated below: Pleated Filter - Used for the removal of large particle sediment

Sediment Filter (20 micron) - Used to remove fine particle sediment (approx. 40 microns is the visible limit of the naked human eye).
Carbon Filter - Used to remove taste, odour & discolouration

It should be noted that the actual filters incorporated within the rainwater collection & reuse system will depend on several factors, such as the system configuration, pump type & size. The final filter specification will be confirmed during the detailed design process.

5 Material Selection

Background

Careful selection of construction materials can help to limit the environmental impacts of the production, transport and incorporation of these materials in our buildings. In many cases there are similarly performing, comparable but more environmentally friendly product selection options available.

Goals

The goals in environmentally sustainable construction material selection should be to:

- Limit the use of new materials where possible - to help minimise the detrimental outcomes of product manufacture or modification
- Select durable materials and re-use materials where possible – increase the lifespan of all products.
- To minimise the environmental impacts materials used by encouraging the use of materials with a favourable lifecycle assessment based on the fate of materials, their recycling / reuse potential, their embodied energy, their biodiversity, human health, and environmental toxicity impacts.

Initiatives

Greener concrete mixes	20-35% slag and/or flyash or similar geopolymer mixes will be incorporated in on-site on-ground poured structural and paving concrete mixes where vehicles will not be regularly driving over the concrete, subject to structural engineer's approval. The proposed concrete mix has circular economy and lower embodied energy components. Waste product slag and/or flyash (Supplementary Cement materials SCMs)- will partially substitute carbon intensive Portland cement in concrete mixes. In addition recycled aggregate, water and/or sand will be included in the concrete mixes	SDAPP / Green Star
Greener structural steel	Structural steel used in the project will be sourced from a Responsible Steel manufacturer.	Additional sustainability

	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/	practice / Green Star
Light coloured roofing	The building roof colour is to be light – medium colour (as per the BCA definitions) rather than dark to deliver a cooler surrounding micro-climate) and help mitigate the overall Urban Heat Island effect. Lighter external surfaces also result in lower cooling requirements and less air-conditioning use.	Additional sustainability practice
Light coloured paving	Paving will be light in colour to reduce solar absorption and mitigate the addition to the urban heat island effect. The alternative, dark pavers, would absorb more heat and potentially provides a hotter localised micro-climate on hot days requiring greater use of air-conditioning by occupants to keep cool.	Additional sustainability practice
Accredited plantation timber	Framing timber will be sourced from accredited sustainable plantations (either FSC or PEFC/AFS accreditation) that mitigates damage to ecosystems for flora and fauna.	SDAPP / Green Star
Sustainable timbers	No unsustainable rainforest timbers will be incorporated i.e. no Oregon, Western Red Cedar, Meranti, Merbau, Teak or Luan as timbers sourced from unmanaged (often overseas) rainforests disrupt under threat ecosystems.	Green Star
Glasswool insulation	Where glasswool insulation is to be used, a circular economy and lower embodied energy product with 80% recycled glass will be used. In addition, the product will avoid negative health effects by not using formaldehyde as a binder.	Additional sustainability practice

Additional details

Greener concrete mixes - Partial cement replacement in concrete	Cement production is the single biggest industrial producer of greenhouse gas generating emissions. Cement production causes 8% of global emissions – more than the global car fleet. (*From page7 of the BZE Rethinking Cement report which references International Energy Agency 2015. Various data sources http://www.iea.org/statistics/*).

The industry standard cement type has been Portland cement, for which the raw material is limestone. The first stage of cement making is to transform limestone (calcium carbonate - $CaCO_3$) into lime (CaO), thus releasing carbon dioxide (CO_2) a Greenhouse Gas as a waste product. This single process accounts for about half of the carbon emissions associated with cement making, and therefore around 4% of the world's total emissions. The rest comes from the heat required to drive the production processes and the energy to grind and transport material.

Alternative supplementary cementious materials (SCM) concrete mixes have a complying strength, are a similar price and use a reduced amount of high greenhouse gas producing Portland cement when compared with standard cement mixes. They also incorporate the recycling of industrial waste products such as fly ash and slag and reduce the amount of raw resources required to produce the end product.

Embodied energy levels:

Concrete Product	Embodied carbon TCO_2-e/m^3	Emboddied carbon as a percentage of OPC 32MPA
Generic 32MPA Ordinary Portland Cement	0.481	100%
With 20% flyash	0.397	82.5%
With 20% blast furnace slag	0.404	84.0 %
With 50% flyash	0.273	56.8%
With 50% blast furnace slag	0.288	60.0%
With 100% slag or flyash geopolymer replacement (must be structurally approved. Suitable for some applications)	0.120	25.0%
Holcim EcoPact (lowest non geopolymer we are aware of)	0.198	41.1%
Holcim EcoPact Zero (ECOPact with carbon offset)	0.028	5.8%

Source – The Green Book

Suppliers of geopolymer – Supplementary Cementitious Materials cement:

Company	Product	Contact
Hansen Concrete	Ask for the **Green Star mix**. Common mixes include 30-50% fly ash/slag component	Bob Aldersy 03 9274 3700 Kevin Skilling 9570 3244 Dave Miller 0418 548 321
Boral Concrete	**Envirocrete** **Envirocrete Plus** **Envisia**	Office 13 30 06 Tania Neil 0401 892 027

Barro Concrete	**Triple blend mix** is the fly ash/slag/cement mix - generally has 20-35% fly ash and/or slag	Tom Kovaks 9646 5520 Piero 0438 181 681
Holcim	**ECOPact** Low carbon concrete range offers between 30-60% reduction on embodied carbon. **Cost premium $4-6per cubic metre as at 2022. This premium can be minor in total cost for example where townhouse slabs are approximately 100m2 and require 20m3 of concrete, this amounts to a $100 per slab premium.** ECOPact ZERO is a full 100% Carbon Neutral product where ECOPact concrete mix is used and emissions are offset with a certified eligible carbon offset through the Climate Active program. **Cost premium $7-10 per cubic metre as at 2022.**	Dylan Viviers 0429 790 600

Responsible Steel

The Responsible Steel Standard V1.1 was developed to recognise steel sites that are operated in a responsible manner. The 12 Principles of the Standard cover environmental, social and governance issues.

1. Corporate Leadership
2. Social, Environmental and Governance Management Systems
3. Occupational Health and Safety
4. Labour Rights
5. Human Rights
6. Stakeholder Engagement and Communication
7. Local Communities
8. Climate Change and Greenhouse Gas Emissions
9. Noise, Emissions, Effluents and Waste
10. Water Stewardship
11. Biodiversity
12. Decommissioning and Closure

Light coloured roofing

The proposed development will adhere to the NCC2019 Section J Deemed to Satisfy requirements of J1.3 Roof and ceiling construction. The upper surface of all roof elements will have a solar absorptance not greater than 0.45.

The Colorbond colour range noted below can inform solar absorptance values of different finishes for metal roof construction.

https://colorbond.com/sites/default/files/pdf/brochures/colorbond_steel_colours_for_your_home_colour_chart.pdf

Light coloured paving

Light coloured paving has a low solar absorptance per below. Alternatively it has a high Solar Reflective Index (SRI) of 39 minimum initial value or 34 as a three year value (from the Green Star Design and As Built Credit 25 criteria).

Note typical initial SRI values are:

Description	SRI
Grey concrete 35	35
White concrete 86	86
Standard white paint 100	100
Standard black paint 5	5
New asphalt 0	0

Glasswool insulation

Recycled glass used for glasswool manufacture is typically glass that cannot be used in higher grade flat or container glass uses. If using glass based (glasswool/fibreglass) insulation batts the following products which have better environmental characteristics:

- Earthwool by Knauf - Earthwool (Green Tag certified) is made using up to 80% recycled glass and with ECOSE® Technology a sustainable bio-based binder that contains no added formaldehyde or artificial colours or dyes, the brown colour is completely natural.
- CSR Bradford Gold batts (Green Tag certified) made from up to 80% recycled glass.

6 Location and Transport

Goals

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

Initiatives

Bicycle parking	The proposed residential development requires 1 bicycle parking space per 5 dwellings for residents and 1 space per 10 dwellings for visitors. The development will provide 7 formal bicycle parking spaces for residents and 4 for visitors.	Planning Scheme clause 52.34 / SDAPP – Transport / BESS
Local public transport information packs	Relevant local train, tram and bus timetables will be included in the Building Users Guide provided. Also included will be brief details of the Melbourne myki public transport payment card system including how to register and load funds against a myki card. Occupants will be alerted to the existence of various public transport smartphone apps such as the Public Transport Victoria app and/or train or tram tracker	SDAPP - Transport
Public transport	The proposed location is serviced by the following public transport options: • Train – 1.7 kilometres from the site (Caulfield Station) • Tram – 70 metres from the site (Route 64) • Bus – 700 metres from the site (Route 623)	Additional sustainability practice

Additional details

Public transport	Tram, bus and train timetables can be accessed from http://ptv.vic.gov.au/timetables/ A full range of Public Transport Victoria maps can be sourced from http://ptv.vic.gov.au/getting-around/maps/ For more train specific information visit www.metrotrains.com.au A Travel Smart map showing major local travel interchanges can be obtained for the councils listed on the site http://www.transport.vic.gov.au/projects/travelsmart/maps

7 Waste Management

Goals

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

Initiatives

Demolition stage	The developer has committed to ensuring the demolition contractor recycles a minimum of 80% of materials from the existing building to be demolished. This will include recycling building materials. The demolition contractor will be required to identify in advance what materials will be recycled, and confirm in writing on company letterhead the percentage of materials by mass actually recycled on completion of works.	SDAPP - Waste
Construction waste	A minimum of 80% of materials will be recycled during construction. Written documentation will be required from contractor(s) in advance on company letterhead confirming items to be recycled, and on completion, confirmation of percentage of materials recycled.	SDAPP - Waste
Plastering waste	The plastering contractor will be required to supply their own bin and recycle plasterboard off-cuts.	Additional sustainability practice
Separate waste stream collection	Space for four bins will be allowed for in each kitchen and in the bin store location to facilitate separation of • garbage (landfill waste) • co-mingled recycling (paper and plastic), • FOGO (food organics and garden organics) • glass bins This is in line with planning scheme clause 15.01-2S. For residential developments, the Victorian government shift for all councils to provide a four waste stream collection service by 2027.	SDAPP - Waste

Additional details

Recyclable materials	The following materials can generally be recycled: • Bricks • Concrete products (ie. Blocks, roof tiles, pavers etc) • Unpainted or treated timber • Steel / metal products • Glass • Plasterboard • Plastics • Carpet underlay • Carpet tiles • Asphalt • Cardboard • Green waste Bin companies or similar that recycle more than others include: • Jobsite Recyclers. http://www.jobsiterecyclers.com.au/ • Mobius Waste http://www.mobiusmr.com.au/ • Eastern Recycling www.easternrecycling.com.au • BinGo Industries www.bingoindustries.com.au
Plastering (recycling)	Bins are available from plasterboard recyclers such as ecoGypsum (http://www.ecogypsum.com.au/collections.html) or Sunshine Groupe http://www.sunshinegroupe.com.au/. Alternatively contact recycling companies such as T&L recycling on 0407 867 133 or similar firms.
Operational waste - Separate waste stream collection	The **National Waste Policy Action Plan 2019** prepared by the federal, state and territory governments and the Australian Local Government Association. The key targets of this plan are: 1. Ban on export of waste plastic, paper, glass and tyres, commencing in the second half of 2020. 2. Reduce total waste generated in Australia by 10% per person by 2030. 3. 80% average resource recovery rate from all waste streams following the waste hierarchy by 2030. 4. Significantly increase the use of recycled content by governments and industry. 5. Phase out problematic and unnecessary plastics by 2025. 6. Halve the amount of organic waste sent to landfill for disposal by 2030. 7. Make comprehensive, economy-wide and timely data publicly available to support better consumer, investment and policy decisions.

8 Urban Ecology

Background

Urban development has seen the destruction and displacement of plant species and in turn wildlife habitat. With new developments there is an opportunity to redress this that should be taken up. In all infill development cases there should be an improvement on the current environment.

Goals

- To protect and enhance habitat bio-diversity of the urban environment
- To encourage the retention of significant trees
- To encourage the planting of indigenous vegetation.
- To reduce CO_2 in the atmosphere through increased vegetation
- Reduce the urban heat island effect by greening urban areas, buildings, transport corridors and open spaces with vegetation (cl15.02-1S)
- Encourage retention of existing vegetation and planting of new vegetation as part of development proposals (cl15.02-1S)

Initiatives

Vegetative cover	Approximately 20% of the proposed development has garden area, helping to minimise the urban heat island effect and increasing opportunities for biodiversity on site.	BESS tool
Facilitating balcony gardens	A tap will be installed on all balconies to help facilitate watering and maintenance of balcony planting.	Additional sustainability practice
Erosion control	Silt fences, erosion control blankets, and/or drain filters will be utilised during construction to ensure top soil/earth is not eroded to drains and creeks.	Additional sustainability practice
Deep soil plantings	Developments with a site area greater than 750m^2 will comply with planning scheme recommended minimum deep soil areas (see additional details below).	Planning scheme clause 55.07-4 / 58.03-5

Additional details

Deep soil plantings

Deep soil areas and deep soil requirements

Site area (m^2)	Canopy Cover	Deep Soil
<1000	5% of site area. Include at least one Type A tree	5% of site area or 12m^2 whichever is greater

1001-1500	50m^2 plus 20% of site area above 1000m^2. Include at least one Type B tree	7.5% of site area
1501-2500	150m^2 plus 20% of site area above 1500m^2. Include at least two Type B trees or Type C tree	10% of site area
>2500	350m^2 plus 20% of site area above 2500m^2. Include at least two Type B trees or Type C tree	15% of site area

Soil requirements for trees

Tree type	**Tree in deep soil**	**Tree in planter**	
	Area of deep soil	**Volume of planter soil**	**Depth of planter soil**
A	12m^2 (min. plan dimension 2.5m)	12m^3 (min. plan dimension of 2.5m)	0.8m
B	49m^2 (min. plan dimension 4.5m)	28m^3 (min. plan dimension of 4.5m)	1m
C	121m^2 (min. plan dimension 6.5m)	64m^3 (min. plan dimension of 6.5m)	1.5m

Tree types and sizes

Tree type	**Minimum canopy diameter at maturity**	**Minimum height at maturity**
A	4 metres	6 metres
B	8 metres	8 metres
C	12 metres	12 metres

9 Management, Innovation, Climate Adaptation and Community Benefit

Goals

- To encourage design and innovation in the development, which positively influence the improved life of, and sustainability of, the building.
- To encourage a holistic and integrated design and construction process and ongoing high performance.

Initiatives

Climate Adaptation and Resilience	The development will address climate adaptation and resilience by ensuring the following risks are considered and addressed.
	
	• **Higher temperature threats**
	  ○ Thermal envelope well insulated and shaded to offer comfort in any conditions
	  ○ Cooling equipment will be located out of the sun for improved efficiency and air intake locations will be away from heat surces.
	• **Extreme wind threats** - external services will be installed so as to be protected from wind blown vegetation or high wind loads
	• **Extreme rainfall events** - heating/cooling, services, lifts and energy supply services will be located to not suffer the effects of heavy rainfall, hail stones or flooding of roof drainage systems or flooding at ground level.
	• **Poor indoor air quality** - airborne dust or smoke ingress has been considered and addressed
	• **Weather proofing** - Windows and doors will be designed to handle water from extreme rainfall events.	

Lift access	A lift will provide access to all floors.	Additional practice

Appendix 1 - BESS Report

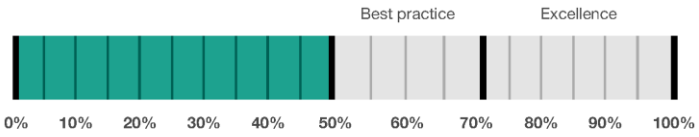
BESS Report

Built Environment Sustainability Scorecard

This BESS report outlines the sustainable design commitments of the proposed development at 139 Hawthorn Rd Caulfield North Victoria 3161. 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 Glen Eira 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

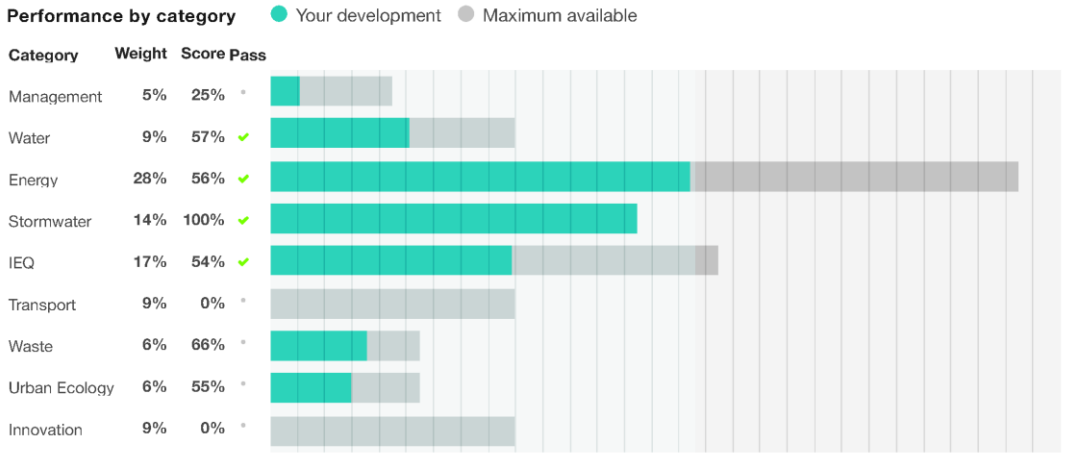


51%

Project details

Address	139 Hawthorn Rd Caulfield North Victoria 3161
Project no	CFB1BB70-R1
BESS Version	BESS-7
Site type	Multi unit development (apartment building)
Account	info@lidconsulting.com.au
Application no.	
Site area	1,300.00 m²
Building floor area	1,866.00 m²
Date	14 July 2023
Software version	1.8.0-B.401

Performance by category



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

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Buildings

Name	Height	Footprint	% of total footprint
Apartment	3	786 m²	100%

Dwellings & Non Res Spaces

Dwellings

Name	Quantity	Area	Building	% of total area
Apartment				
Apt 2.01	3	82.0 m²	Apartment	13%
Apt G.07	3	80.0 m²	Apartment	12%
Apt G.05	2	85.0 m²	Apartment	9%
Apt G.01	2	87.5 m²	Apartment	9%
Apt 2.05	3	53.0 m²	Apartment	8%
Apt 1.07	3	50.0 m²	Apartment	8%
Apt 1.04	2	80.5 m²	Apartment	8%
Apt 1.03	2	78.0 m²	Apartment	8%
Apt G.03	2	83.5 m²	Apartment	8%
Apt 2.02	2	59.0 m²	Apartment	6%
Apt 1.09	2	62.0 m²	Apartment	6%
Total	**26**	**1,866 m²**	**100%**	

Supporting information

Floorplans & elevation notes

Credit	Requirement	Response	Status
Management 3.1	Annotation: Individual utility meters to be provided to all individual dwellings		-
Management 3.3	Annotation: Sub-meters to be provided to all major common area services (list each)		-
Water 3.1	Annotation: Water efficient garden details		-
Energy 3.1	Carpark with natural ventilation or CO monitoring system		-
Energy 3.4	Location of clothes line (if proposed)		-
Energy 4.2	Location and size of solar photovoltaic system		-
Stormwater 1.1	Location of any stormwater management systems (rainwater tanks, raingardens, buffer strips)		-
IEQ 1.1	If using BESS daylight calculator, references to floorplans and elevations showing window sizes and sky angles.		-
IEQ 1.2	If using BESS daylight calculator, references to floorplans and elevations showing window sizes and sky angles.		-
Waste 2.1	Location of food and garden waste facilities		-
Waste 2.2	Location of recycling facilities		-
Urban Ecology 1.1	Location and size of communal spaces		-
Urban Ecology 2.1	Location and size of vegetated areas		-
Urban Ecology 2.4	Location of taps and floor waste on balconies / courtyards		-

Supporting evidence

Credit	Requirement	Response	Status
Energy 3.1	Details of either the fully natural carpark ventilation or CO monitoring system proposed		-
Energy 3.6	Average lighting power density and lighting type(s) to be used		-
Energy 4.2	Specifications of the solar photovoltaic system(s)		-
Stormwater 1.1	STORM report or MUSIC model		-
IEQ 1.1	If using an alternative daylight modelling program, a short report detailing assumptions used and results achieved.		-
IEQ 1.2	If using an alternative daylight modelling program, a short report detailing assumptions used and results achieved.		-

Credit summary

Management Overall contribution 4.5%

		25%
1.1 Pre-Application Meeting		0%
2.2 Thermal Performance Modelling - Multi-Dwelling Residential		0%
3.1 Metering - Residential		100%
3.3 Metering - Common Areas		100%
4.1 Building Users Guide		0%

Water Overall contribution 9.0%

	Minimum required 50%	**57%**	✔ **Pass**
1.1 Potable Water Use Reduction		40%	
3.1 Water Efficient Landscaping		100%	
4.1 Building Systems Water Use Reduction		100%	

Energy Overall contribution 27.5%

	Minimum required 50%	56%	✔ Pass
1.2 Thermal Performance Rating - Residential		50%	
2.1 Greenhouse Gas Emissions		100%	
2.2 Peak Demand		0%	
2.3 Electricity Consumption		100%	
2.4 Gas Consumption		0%	
2.6 Electrification		0%	⊘ Disabled
	Credit is available when project is declared to have no gas connection.		
3.1 Carpark Ventilation		100%	
3.2 Hot Water		0%	
3.4 Clothes Drying		100%	
3.6 Internal Lighting - Apartments		100%	
4.2 Renewable Energy Systems - Solar		100%	
4.4 Renewable Energy Systems - Other		0%	⊘ Disabled
	No other (non-solar PV) renewable energy is in use.		

Stormwater Overall contribution 13.5%

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

IEQ Overall contribution 16.5%

	Minimum required 50%	54%	✔ Pass
1.1 Daylight Access - Living Areas		100%	
1.2 Daylight Access - Bedrooms		100%	
1.3 Winter Sunlight		0%	
1.5 Daylight Access - Minimal Internal Bedrooms		0%	
2.1 Effective Natural Ventilation		0%	

Transport **Overall contribution 9.0%**

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

Waste **Overall contribution 5.5%**

	66%
1.1 - Construction Waste - Building Re-Use	0%
2.1 - Operational Waste - Food & Garden Waste	100%
2.2 - Operational Waste - Convenience of Recycling	100%

Urban Ecology **Overall contribution 5.5%**

	55%
1.1 Communal Spaces	100%
2.1 Vegetation	75%
2.2 Green Roofs	0%
2.3 Green Walls and Facades	0%
2.4 Private Open Space - Balcony / Courtyard Ecology	100%
3.1 Food Production - Residential	0%

Innovation **Overall contribution 9.0%**

	0%
1.1 Innovation	0% ⊘ Disabled
	A minimum project score of 50% is required before an Innovation Credit can be used.

Credit breakdown

Management Overall contribution 1%

1.1 Pre-Application Meeting		0%
Score Contribution	This credit contributes 37.5% towards the category score.	
Criteria	Has an ESD professional been engaged to provide sustainability advice from schematic design to construction? AND Has the ESD professional been involved in a pre-application meeting with Council?	
Question	Criteria Achieved ?	
Project	No	
2.2 Thermal Performance Modelling - Multi-Dwelling Residential		0%
Score Contribution	This credit contributes 25.0% towards the category score.	
Criteria	Have preliminary NatHERS ratings been undertaken for all thermally unique dwellings?	
Question	Criteria Achieved ?	
Apartment	No	
3.1 Metering - Residential		100%
Score Contribution	This credit contributes 12.5% towards the category score.	
Criteria	Have utility meters been provided for all individual dwellings?	
Question	Criteria Achieved ?	
Apartment	Yes	
3.3 Metering - Common Areas		100%
Score Contribution	This credit contributes 12.5% towards the category score.	
Criteria	Have all major common area services been separately submetered?	
Question	Criteria Achieved ?	
Apartment	Yes	
4.1 Building Users Guide		0%
Score Contribution	This credit contributes 12.5% towards the category score.	
Criteria	Will a building users guide be produced and issued to occupants?	
Question	Criteria Achieved ?	
Project	No	

Water Overall contribution 5% Minimum required 50%

Water Approach	
What approach do you want to use for Water?:	Use the built in calculation tools
Project Water Profile Question	
Do you have a reticulated third pipe or an on-site water recycling system?:	No
Are you installing a swimming pool?:	No
Are you installing a rainwater tank?:	Yes
Water fixtures, fittings and connections	
Showerhead: All	4 Star WELS (>= 6.0 but <= 7.5)
Bath: All	Scope out
Kitchen Taps: All	>= 5 Star WELS rating
Bathroom Taps: All	>= 5 Star WELS rating
Dishwashers: All	Default or unrated
WC: All	>= 4 Star WELS rating
Urinals: All	Scope out
Washing Machine Water Efficiency: All	Occupant to Install
Which non-potable water source is the dwelling/space connected to?: All	RWT
Non-potable water source connected to Toilets: All	Yes
Non-potable water source connected to Laundry (washing machine): All	No
Non-potable water source connected to Hot Water System: All	No
Rainwater Tank	
What is the total roof area connected to the rainwater tank?: RWT	777 m²
Tank Size: RWT	7,000 Litres
Irrigation area connected to tank: RWT	-
Is connected irrigation area a water efficient garden?: RWT	-
Other external water demand connected to tank?: RWT	-

1.1 Potable Water Use Reduction		40%
Score Contribution	This credit contributes 71.4% 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	2944 kL	
Output	Proposed (excluding rainwater and recycled water use)	
Project	2399 kL	
Output	Proposed (including rainwater and recycled water use)	
Project	2104 kL	
Output	% Reduction in Potable Water Consumption	
Project	28 %	
Output	% of connected demand met by rainwater	
Project	100 %	
Output	How often does the tank overflow?	
Project	Very Often	
Output	Opportunity for additional rainwater connection	
Project	1117 kL	
3.1 Water Efficient Landscaping		100%
Score Contribution	This credit contributes 14.3% towards the category score.	
Criteria	Will water efficient landscaping be installed?	
Question	Criteria Achieved ?	
Project	Yes	
4.1 Building Systems Water Use Reduction		100%
Score Contribution	This credit contributes 14.3% 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	Yes	

Energy Overall contribution 16% Minimum required 50%

Dwellings Energy Approach	
What approach do you want to use for Energy?:	Use the built in calculation tools
Project Energy Profile Question	
Are you installing any solar photovoltaic (PV) system(s)?:	Yes
Are you installing any other renewable energy system(s)?:	No
Energy Supply:	Electricity & Natural Gas
Dwelling Energy Profiles	
Building: All	Apartment
Below the floor is:	
Apt G.01 Apt G.03 Apt G.05 Apt G.07	Ground or Carpark
Apt 1.03 Apt 1.04 Apt 1.07 Apt 1.09 Apt 2.01 Apt 2.02 Apt 2.05	Another Occupancy
Above the ceiling is:	
Apt G.01 Apt G.03 Apt G.05 Apt G.07 Apt 1.03 Apt 1.04 Apt 1.07 Apt 1.09	Another Occupancy
Apt 2.01 Apt 2.02 Apt 2.05	Outside
Exposed sides:	
Apt G.01 Apt G.05 Apt 1.04 Apt 1.09 Apt 2.01 Apt 2.05	2
Apt G.03 Apt G.07 Apt 1.03 Apt 1.07 Apt 2.02	1
NatHERS Annual Energy Loads - Heat: All	72.8 MJ/sqm
NatHERS Annual Energy Loads - Cool: All	18.2 MJ/sqm

NatHERS star rating: All	7.0
Type of Heating System: All	D Reverse cycle space
Heating System Efficiency: All	std/MEPS
Type of Cooling System: All	Refrigerative space
Cooling System Efficiency: All	Current Default / MEPS
Type of Hot Water System: All	J Gas Instantaneous 6 star
Is the hot water system shared by multiple dwellings?: All	Yes
% Contribution from solar hot water system: All	-
Clothes Line: All	F Other permanent indoor in dwelling with 4 metres/bedroom
Clothes Dryer: All	Occupant to Install

Solar Photovoltaic system	
System Size (lesser of inverter and panel capacity): PV	26.0 kW peak
Orientation (which way is the system facing)?: PV	North
Inclination (angle from horizontal): PV	10.0 Angle (degrees)

1.2 Thermal Performance Rating - Residential		50%
Score Contribution	This credit contributes 26.1% towards the category score.	
Criteria	What is the average NatHERS rating?	
Output	Average NATHERS Rating (Weighted)	
Apartment	7.0 Stars	

2.1 Greenhouse Gas Emissions		100%
Score Contribution	This credit contributes 8.7% towards the category score.	
Criteria	What is the % reduction in annual greenhouse gas emissions against the benchmark?	
Output	Reference Building with Reference Services (BCA only)	
Apartment	106,450 kg CO2	
Output	Proposed Building with Proposed Services (Actual Building)	
Apartment	57,203 kg CO2	
Output	% Reduction in GHG Emissions	
Apartment	46 %	

2.2 Peak Demand		0%
Score Contribution	This credit contributes 4.3% towards the category score.	
Criteria	What is the % reduction in the instantaneous (peak-hour) demand against the benchmark?	
Output	Peak Thermal Cooling Load - Baseline	
Apartment	340 kW	
Output	Peak Thermal Cooling Load - Proposed	
Apartment	325 kW	
Output	Peak Thermal Cooling Load - % Reduction	
Apartment	4 %	

2.3 Electricity Consumption	100%	
Score Contribution	This credit contributes 8.7% towards the category score.	
Criteria	What is the % reduction in annual electricity consumption against the benchmark?	
Output	Reference	
Apartment	87,345 kWh	
Output	Proposed	
Apartment	40,127 kWh	
Output	Improvement	
Apartment	54 %	
2.4 Gas Consumption	0%	
Score Contribution	This credit contributes 8.7% towards the category score.	
Criteria	What is the % reduction in annual gas consumption against the benchmark?	
Output	Reference	
Apartment	337,710 MJ	
Output	Proposed	
Apartment	316,596 MJ	
Output	Improvement	
Apartment	6 %	
2.6 Electrification	0%	⊘ Disabled
This credit is disabled	Credit is available when project is declared to have no gas connection.	
3.1 Carpark Ventilation	100%	
Score Contribution	This credit contributes 8.7% 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	Yes	
3.2 Hot Water	0%	
Score Contribution	This credit contributes 4.3% towards the category score.	
Criteria	What is the % reduction in annual energy consumption (gas and electricity) of the hot water system against the benchmark?	
Output	Reference	
Apartment	337,710 MJ	
Output	Proposed	
Apartment	331,629 MJ	
Output	Improvement	
Apartment	1 %	

3.4 Clothes Drying		100%
Score Contribution	This credit contributes 4.3% towards the category score.	
Criteria	What is the % reduction in annual energy consumption (gas and electricity) from a combination of clothes lines and efficient driers against the benchmark?	
Output	Reference	
Apartment	11,765 kWh	
Output	Proposed	
Apartment	4,706 kWh	
Output	Improvement	
Apartment	60 %	
3.6 Internal Lighting - Apartments		100%
Score Contribution	This credit contributes 8.7% towards the category score.	
Criteria	Is the maximum illumination power density (W/m2) in at least 90% of the relevant building class at least 20% lower than required by Table J6.2a of the NCC 2019 Vol 1 (Class 2-9)?	
Question	Criteria Achieved ?	
Apartment	Yes	
4.2 Renewable Energy Systems - Solar		100%
Score Contribution	This credit contributes 4.3% towards the category score.	
Criteria	What % of the estimated energy consumption of the building class it supplies does the solar power system provide?	
Output	Solar Power - Energy Generation per year	
Apartment	31,508 kWh	
Output	% of Building's Energy	
Apartment	24 %	
4.4 Renewable Energy Systems - Other		0% ⊘ Disabled
This credit is disabled	No other (non-solar PV) renewable energy is in use.	

Stormwater

Overall contribution 14% Minimum required 100%

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

IEQ Overall contribution 9% Minimum required 50%

IEQ DTS	
Use the BESS Deemed to Satisfy (DtS) method for IEQ?:	No
Dwellings IEQ Approach	
What approach do you want to use for dwellings?:	Use the built in calculation tools
Dwelling Daylight Room Profile Questions	
Room Designation:	
Living Pass DTS Living Pass Dual Aspect Living G.02, G.03 & G.04 Living G.06, G.07 & G.08 Living 1.02, 1.03 & 1.04 Living 1.06, 1.07 & 1.08 Living 2.04 Living 2.05 Living 2.06 & 2.07	Living
Beds Pass DTS G.05 Bed 1 G.09 Bed 1	Bedroom
Quantity:	
Living Pass DTS	7
Living Pass Dual Aspect Living G.02, G.03 & G.04 Living G.06, G.07 & G.08 Living 1.02, 1.03 & 1.04 Living 1.06, 1.07 & 1.08	3
Beds Pass DTS	37
G.05 Bed 1 G.09 Bed 1 Living 2.04 Living 2.05	1
Living 2.06 & 2.07	2
Auto-Pass:	
Living Pass DTS Living Pass Dual Aspect Beds Pass DTS	Yes
G.05 Bed 1 G.09 Bed 1 Living G.02, G.03 & G.04 Living G.06, G.07 & G.08 Living 1.02, 1.03 & 1.04 Living 1.06, 1.07 & 1.08 Living 2.04 Living 2.05 Living 2.06 & 2.07	No

Room Floor Area:	
Living Pass DTS Living Pass Dual Aspect Beds Pass DTS	-
G.05 Bed 1	11.8 m²
G.09 Bed 1	10.0 m²
Living G.02, G.03 & G.04	27.0 m²
Living G.06, G.07 & G.08 Living 1.02, 1.03 & 1.04 Living 2.04	33.0 m²
Living 1.06, 1.07 & 1.08	19.0 m²
Living 2.05	28.0 m²
Living 2.06 & 2.07	19.5 m²
Vertical Angle:	
Living Pass DTS Living Pass Dual Aspect Beds Pass DTS	-
G.05 Bed 1 G.09 Bed 1 Living 2.05	90.0 Angle (degrees)
Living G.02, G.03 & G.04	65.2 Angle (degrees)
Living G.06, G.07 & G.08	63.4 Angle (degrees)
Living 1.02, 1.03 & 1.04	35.3 Angle (degrees)
Living 1.06, 1.07 & 1.08 Living 2.06 & 2.07	26.5 Angle (degrees)
Living 2.04	66.0 Angle (degrees)
Horizontal Angle:	
Living Pass DTS Living Pass Dual Aspect Beds Pass DTS	-
G.05 Bed 1	94.8 Angle (degrees)
G.09 Bed 1	127 Angle (degrees)
Living G.02, G.03 & G.04	89.7 Angle (degrees)
Living G.06, G.07 & G.08	75.2 Angle (degrees)
Living 1.02, 1.03 & 1.04	89.1 Angle (degrees)
Living 1.06, 1.07 & 1.08	70.0 Angle (degrees)
Living 2.04	125 Angle (degrees)
Living 2.05	135 Angle (degrees)
Living 2.06 & 2.07	72.0 Angle (degrees)

Window Area:	
Living Pass DTS Living Pass Dual Aspect Beds Pass DTS	-
G.05 Bed 1 G.09 Bed 1	4.3 m²
Living G.02, G.03 & G.04	10.0 m²
Living G.06, G.07 & G.08 Living 1.06, 1.07 & 1.08 Living 2.06 & 2.07	7.2 m²
Living 1.02, 1.03 & 1.04	10.3 m²
Living 2.04	9.7 m²
Living 2.05	9.2 m²
Window Orientation:	
Living Pass DTS Living Pass Dual Aspect Beds Pass DTS	-
G.05 Bed 1 Living 2.05	East
G.09 Bed 1 Living G.06, G.07 & G.08 Living 1.06, 1.07 & 1.08 Living 2.06 & 2.07	South
Living G.02, G.03 & G.04 Living 1.02, 1.03 & 1.04 Living 2.04	North
Glass Type:	
Living Pass DTS Living Pass Dual Aspect Beds Pass DTS	-
G.05 Bed 1 G.09 Bed 1 Living G.02, G.03 & G.04 Living G.06, G.07 & G.08 Living 1.02, 1.03 & 1.04 Living 1.06, 1.07 & 1.08 Living 2.04 Living 2.06 & 2.07	Clear Low-E Double (VLT 0.73)
Living 2.05	Bronze Double (VLT 0.39)
Daylight Criteria Achieved?: All	Yes

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

1.2 Daylight Access - Bedrooms		100%
Score Contribution	This credit contributes 27.3% towards the category score.	
Criteria	What % of bedrooms achieve a daylight factor greater than 0.5%	
Output	Calculated percentage	
Apartment	100 %	
1.3 Winter Sunlight		0%
Score Contribution	This credit contributes 9.1% towards the category score.	
Criteria	Do 70% of dwellings receive at least 3 hours of direct sunlight in all Living areas between 9am and 3pm in mid-winter?	
Question	Criteria Achieved ?	
Apartment	-	
1.5 Daylight Access - Minimal Internal Bedrooms		0%
Score Contribution	This credit contributes 9.1% towards the category score.	
Criteria	Do at least 90% of dwellings have an external window in all bedrooms?	
Question	Criteria Achieved ?	
Apartment	-	
2.1 Effective Natural Ventilation		0%
Score Contribution	This credit contributes 27.3% towards the category score.	
Criteria	What % of dwellings are effectively naturally ventilated?	
Question	Percentage Achieved?	
Apartment	-	

Transport Overall contribution 0%

1.1 Bicycle Parking - Residential		0%	
Score Contribution	This credit contributes 22.2% towards the category score.		
Criteria	How many secure and undercover bicycle spaces are there per dwelling for residents?		
Question	Bicycle Spaces Provided ?		
Apartment	7		
Output	Min Bicycle Spaces Required		
Apartment	26		
1.2 Bicycle Parking - Residential Visitor		0%	
Score Contribution	This credit contributes 22.2% towards the category score.		
Criteria	How many secure bicycle spaces are there per 5 dwellings for visitors?		
Question	Visitor Bicycle Spaces Provided ?		
Apartment	4		
Output	Min Visitor Bicycle Spaces Required		
Apartment	6		
1.3 Bicycle Parking - Convenience Residential		0%	⊘ Disabled
This credit is disabled	Credit 1.1 must be achieved first.		
2.1 Electric Vehicle Infrastructure		0%	
Score Contribution	This credit contributes 22.2% towards the category score.		
Criteria	Are facilities provided for the charging of electric vehicles?		
Question	Criteria Achieved ?		
Project	No		
2.2 Car Share Scheme		0%	
Score Contribution	This credit contributes 11.1% towards the category score.		
Criteria	Has a formal car sharing scheme been integrated into the development?		
Question	Criteria Achieved ?		
Project	No		
2.3 Motorbikes / Mopeds		0%	
Score Contribution	This credit contributes 11.1% towards the category score.		
Criteria	Are a minimum of 5% of vehicle parking spaces designed and labelled for motorbikes (must be at least 5 motorbike spaces)?		
Question	Criteria Achieved ?		
Project	No		

Waste Overall contribution 4%

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		100%
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	Yes	
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 3%

1.1 Communal Spaces		100%
Score Contribution	This credit contributes 11.1% towards the category score.	
Criteria	Is there at least the following amount of common space measured in square meters : * 1m² for each of the first 50 occupants * Additional 0.5m² for each occupant between 51 and 250 * Additional 0.25m² for each occupant above 251?	
Question	Common space provided	
Apartment	66.0 m²	
Output	Minimum Common Space Required	
Apartment	48 m²	
2.1 Vegetation		75%
Score Contribution	This credit contributes 44.4% towards the category score.	
Criteria	How much of the site is covered with vegetation, expressed as a percentage of the total site area?	
Question	Percentage Achieved ?	
Project	20 %	
2.2 Green Roofs		0%
Score Contribution	This credit contributes 11.1% towards the category score.	
Criteria	Does the development incorporate a green roof?	
Question	Criteria Achieved ?	
Project	No	
2.3 Green Walls and Facades		0%
Score Contribution	This credit contributes 11.1% towards the category score.	
Criteria	Does the development incorporate a green wall or green façade?	
Question	Criteria Achieved ?	
Project	No	
2.4 Private Open Space - Balcony / Courtyard Ecology		100%
Score Contribution	This credit contributes 11.1% towards the category score.	
Criteria	Is there a tap and floor waste on every balcony / in every courtyard?	
Question	Criteria Achieved ?	
Apartment	Yes	
3.1 Food Production - Residential		0%
Score Contribution	This credit contributes 11.1% towards the category score.	
Criteria	What area of space per resident is dedicated to food production?	
Question	Food Production Area	
Apartment	-	
Output	Min Food Production Area	
Apartment	13 m²	

Innovation Overall contribution 0%

1.1 Innovation		0%	⊘ Disabled
This credit is disabled	A minimum project score of 50% is required before an Innovation Credit can be used.		

Disclaimer

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Appendix 2 - Preliminary Energy Ratings

The FirstRate5 preview energy rating for apartments G.01, G.03, G.05, G.07, 1.03, 1.04, 1.07, 1.09, 2.01, 2.02 & 2.05 incorporates the full list of assumptions as listed below. Note, improved glazing or shading specifications can be incorporated to improve these ratings.

Thermal Group	Apartment Modelled	No. of similar/better performing apartments	Similar or better performing apartments	Heating Load (MJ/m^2)	Cooling Load (MJ/m^2)	Star Rating
1	G.01	G.09	1	79.5	20.5	6.7
2	G.03	G.02	1	54.1	9.1	7.8
3	G.05	G.04	1	85.1	13.7	6.8
4	G.07	G0.06, G.08	2	72.7	11.3	7.2
5	1.03	1.02	1	39.4	11.1	8.3
6	1.04	1.01	1	69.7	15.9	7.2
7	1.07	1.06, 1.08	2	50.1	13.5	7.8
8	1.09	1.05	1	57.7	20.2	7.4
9	2.01	2.04, 2.08	2	91.3	20.8	6.4
10	2.02	2.03	1	43.3	15.3	7.9
11	2.05	2.06, 2.07	2	67.5	20.7	7.1
					Average star rating	7.3

Full list of assumptions:

- Offset from north point - 355 degrees – ie north to top of page
- Heating and cooling choices when optional - All rooms except as indicated.
- Floor type - suspended slab to all floors
- Floor coverings – carpet to bedrooms, timber to living areas, tiles to wet areas
- Floor insulation – R2.0 under floor above carpark and where an apartment floor sits above an open area such as a balcony below.
- Ceiling insulation – R5.0 + 1 reflective foil insulation where there is a balcony above an apartment, or a roof above an apartment
- Roof colour – medium light grey / dull zincalume.
- Balcony tile colour - light
- Wall colour – medium
- Wall height to ceiling – all floors generally 2.7m (ie measured floor to ceiling above or confirm if different per plans
- Exterior Walls –
    - Lightweight construction with FC sheet and R2.5 insulation.
- Interior walls – R2.0 insulation between condition and unconditioned spaces
- Windows
    - Window heights as shown in full on elevations
    - Window widths all as per plans
    - Glazing type:
        1. G.03, G.05, G.07, 1.03, 1.04, 1.07 & 2.02: Aluminium frame, double glazed air filled gap, clear (U-value = 4.8, SHGC = 0.59)
        2. 2.01: Aluminium thermally broken frame, double glazed argon filled gap, low E film (U-value = 2.9, SHGC=0.51)

3. G.01, 1.09 & 2.05: Aluminium thermally broken frame, double glazed argon filled gap, low E film (U-value = 3.0, SHGC=0.26)
    - All windows and doors weather stripped
- Skylights – per architectural drawings cited. Assume aluminium frame double glazed clear roof light (U-value = 4.22, SHGC = 0.72)
- Exhaust fans, all sealed –
    - All bathrooms and ensuites: 300mm
    - Kitchen: 180mm
- Ceiling fans – none
- Eaves – per architectural drawings cited
- Wing walls – per architectural drawings cited
- Fences – per architectural drawings cited
- Lights – no unsealed downlights. Max 4W/m^2 density. If downlights are installed they will be IC rated downlights with insulation installed over downlight as per manufacturer's recommendations.

The above assumptions form the basis of the preliminary energy rating assessment, and are not to be used as construction detail. Dwellings will be subject to a building certification NatHERS assessment, and construction detail is to be determined by the appointed NatHERS assessor as described in NatHERS certificates issued for each dwelling.

FirstRate® Provisional Diagnostic Information

Project Information

Mode	New Home
Climate	62 Moorabbin Airport
Site Exposure	suburban
Client Name	
Rated Address	139-141 HAWTHORN RD CAULFIELD NORTH
Accredited Rater	
Date	
Reference	G.01 - 6.7 Stars

Energy Usage

Type	Energy MJ/m²
Total	100.0
Heating	79.5
Cooling	20.5

Areas

Area	Size (m²)
Net Conditioned Floor Area (NCFA)	72.1
Unconditioned Room Area	3.2
Garage Area	0.0
Basement Car Park Area	874.7
Glazed Common Area	0.0

Zones

Zone	Area (m²)	Conditioning Type	Conditioned
Basement carpark	874.7	basementCarPark	N
Bedroom 1	12.0	bedroom	Y
Bedroom 2	12.8	bedroom	Y
ENS	4.3	nightTime	Y
Bath	4.3	dayTime	Y
Ldry	3.2	unconditioned	N
Kitchen/Living	41.8	kitchen	Y

Walls

Type	Bulk Insulation (R)	Num Reflective Airgaps	Area (m²)
Retaining Wall with Insulation	0.0	0	202.0

Retaining Wall with Insulation	2.0	0	293.3
Concrete block party wall	2.0	0	44.6
Brick veneer with airgap	2.5	1	54.7
Internal Plasterboard Stud Wall	0.0	0	60.6
Internal Plasterboard Stud Wall	2.0	0	9.6

Floors

Type	Bulk Insulation (R)	Slab edge insulation (R)	Ventilation	Area (m²)
CSOG: Slab on Ground	0.0	0.0	encl	874.7
200mm concrete slab	2.0	0.0	encl	78.5

Roofs/Ceilings

Type	Bulk Ceiling Insulation (R)	Bulk Roof Insulation (R)	Area (m²)
Slab:Slab - Suspended Slab	0.0	0.0	874.7
Ceil: Ceiling	0.0	0.0	69.8
Slab:Slab - Suspended Slab	2.0	0.0	8.6

Windows

Type	U-Value	SHGC	Area (m²)
ATB-006-04 B Al Thermally Broken B DG Argon Fill Low Solar Gain low-E -Clear	3.00	0.26	36.72

Window Directions

Direction	Area (m²)
N	16.5
W	20.2

Air leakage

Item	Sealed	Unsealed
Generic Vent	-	0
Unflued Gas Heater	-	0
Exhaust Fan	4	0
Downlight	0	0
Chimney	0	0
Heater Flue	-	0

Zone Energy Loads

Zone	Heating (MJ/m2)	Total Heating (MJ)	Cooling (MJ/m2)	Total Cooling (MJ)
Bedroom 2 (Z003)	31.8	408.1	10.8	138.6
Bedroom 1 (Z002)	37.3	449.7	4.9	59.3
ENS (Z004)	4.3	18.8	0.0	0.0

Bath (Z005)	166.4	719.3	0.0	0.0
Kitchen/Living (Z007)	110.5	4616.7	33.6	1405.3

Provisional Diagnostic Information 13-07-2023 08:15:19 Ver:5.3.2b (3.21) Engine Ver:3.21 Accredited Rater: Assessor's Accreditation Number:

FirstRate® Provisional Diagnostic Information

Project Information

Mode	New Home
Climate	62 Moorabbin Airport
Site Exposure	suburban
Client Name	
Rated Address	139-141 HAWTHORN RD CAULFIELD NORTH
Accredited Rater	
Date	
Reference	G.03 - 7.8 Stars

Energy Usage

Type	Energy MJ/m²
Total	63.2
Heating	54.1
Cooling	9.1

Areas

Area	Size (m²)
Net Conditioned Floor Area (NCFA)	71.1
Unconditioned Room Area	4.0
Garage Area	0.0
Basement Car Park Area	874.7
Glazed Common Area	0.0

Zones

Zone	Area (m²)	Conditioning Type	Conditioned
Basement carpark	874.7	basementCarPark	N
Bedroom 1	13.4	bedroom	Y
Bedroom 2	11.2	bedroom	Y
ENS	4.5	nightTime	Y
Bath	4.0	unconditioned	N
Kitchen/Living	40.5	kitchen	Y
Ptry	2.9	dayTime	Y

Walls

Type	Bulk Insulation (R)	Num Reflective Airgaps	Area (m²)
Retaining Wall with Insulation	0.0	0	254.4

Retaining Wall with Insulation	2.0	0	354.4
Concrete block party wall	2.0	0	76.8
Brick veneer with airgap	2.5	1	29.5
Internal Plasterboard Stud Wall	0.0	0	50.9
Internal Plasterboard Stud Wall	2.0	0	10.9

Floors

Type	Bulk Insulation (R)	Slab edge insulation (R)	Ventilation	Area (m²)
CSOG: Slab on Ground	0.0	0.0	encl	874.7
200mm concrete slab	2.0	0.0	encl	76.4

Roofs/Ceilings

Type	Bulk Ceiling Insulation (R)	Bulk Roof Insulation (R)	Area (m²)
Slab:Slab - Suspended Slab	0.0	0.0	874.7
Ceil: Ceiling	0.0	0.0	71.3
Slab:Slab - Suspended Slab	2.0	0.0	5.1

Windows

Type	U-Value	SHGC	Area (m²)
ALM-004-01 A Aluminium B DG Air Fill Clear-Clear	4.80	0.59	20.25

Window Directions

Direction	Area (m²)
N	20.2

Air leakage

Item	Sealed	Unsealed
Generic Vent	-	0
Unflued Gas Heater	-	0
Exhaust Fan	3	0
Downlight	0	0
Chimney	0	0
Heater Flue	-	0

Zone Energy Loads

Zone	Heating (MJ/m2)	Total Heating (MJ)	Cooling (MJ/m2)	Total Cooling (MJ)
Bedroom 2 (Z003)	91.9	1025.0	14.1	157.2
Ptry (Z007)	57.6	166.4	0.0	0.0
Bedroom 1 (Z002)	26.7	358.0	2.9	39.2
ENS (Z004)	9.2	41.3	0.0	0.0

Kitchen/Living (Z006)	59.8	2418.1	11.9	479.7

Provisional Diagnostic Information 13-07-2023 08:50:59 Ver:5.3.2b (3.21) Engine Ver:3.21 Accredited Rater: Assessor's Accreditation Number:

FirstRate® Provisional Diagnostic Information

Project Information

Mode	New Home
Climate	62 Moorabbin Airport
Site Exposure	suburban
Client Name	
Rated Address	139-141 HAWTHORN RD CAULFIELD NORTH
Accredited Rater	
Date	
Reference	G.05 - 6.8 Stars

Energy Usage

Type	Energy MJ/m²
Total	98.8
Heating	85.1
Cooling	13.7

Areas

Area	Size (m²)
Net Conditioned Floor Area (NCFA)	72.3
Unconditioned Room Area	3.7
Garage Area	0.0
Basement Car Park Area	874.7
Glazed Common Area	0.0

Zones

Zone	Area (m²)	Conditioning Type	Conditioned
Basement carpark	874.7	basementCarPark	N
Bedroom 1	17.5	bedroom	Y
Bedroom 2	10.9	bedroom	Y
ENS	4.3	nightTime	Y
Bath	3.7	unconditioned	N
Kitchen/Living	39.5	kitchen	Y

Walls

Type	Bulk Insulation (R)	Num Reflective Airgaps	Area (m²)
Retaining Wall with Insulation	2.0	0	354.4
Fibro cement	0.5	1	42.5

Fibre cement	2.5	1	48.5
Concrete block party wall	2.0	0	46.3
Brick veneer with airgap	2.5	1	19.2
Internal Plasterboard Stud Wall	0.0	0	38.9
Internal Plasterboard Stud Wall	2.0	0	21.0

Floors

Type	Bulk Insulation (R)	Slab edge insulation (R)	Ventilation	Area (m²)
CSOG: Slab on Ground	0.0	0.0	encl	874.7
200mm concrete slab	2.0	0.0	encl	76.0

Roofs/Ceilings

Type	Bulk Ceiling Insulation (R)	Bulk Roof Insulation (R)	Area (m²)
Slab:Slab - Suspended Slab	0.0	0.0	874.7
Ceil: Ceiling	0.0	0.0	68.1
Slab:Slab - Suspended Slab	2.0	0.0	7.8

Windows

Type	U-Value	SHGC	Area (m²)
ALM-004-01 A Aluminium B DG Air Fill Clear-Clear	4.80	0.59	22.26

Window Directions

Direction	Area (m²)
E	11.0
S	11.3

Air leakage

Item	Sealed	Unsealed
Generic Vent	-	0
Unflued Gas Heater	-	0
Exhaust Fan	3	0
Downlight	0	0
Chimney	0	0
Heater Flue	-	0

Zone Energy Loads

Zone	Heating (MJ/m2)	Total Heating (MJ)	Cooling (MJ/m2)	Total Cooling (MJ)
Bedroom 2 (Z003)	43.2	471.3	4.1	44.4
Bedroom 1 (Z002)	44.0	770.0	3.9	67.9
ENS (Z004)	97.6	422.6	9.5	41.0

Kitchen/Living (Z006)	128.8	5089.2	23.7	936.0

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FirstRate® Provisional Diagnostic Information

Project Information

Mode	New Home
Climate	62 Moorabbin Airport
Site Exposure	suburban
Client Name	
Rated Address	139-141 HAWTHORN RD CAULFIELD NORTH
Accredited Rater	
Date	
Reference	G.07 - 7.2 Stars

Energy Usage

Type	Energy MJ/m²
Total	84.0
Heating	72.7
Cooling	11.3

Areas

Area	Size (m²)
Net Conditioned Floor Area (NCFA)	47.5
Unconditioned Room Area	4.6
Garage Area	0.0
Basement Car Park Area	874.7
Glazed Common Area	0.0

Zones

Zone	Area (m²)	Conditioning Type	Conditioned
Basement carpark	874.7	basementCarPark	N
Bedroom 1	12.2	bedroom	Y
Study	6.6	dayTime	Y
Kitchen/Living	28.7	kitchen	Y
Bath	4.6	unconditioned	N

Walls

Type	Bulk Insulation (R)	Num Reflective Airgaps	Area (m²)
Retaining Wall with Insulation	2.0	0	354.4
Concrete block party wall	2.0	0	61.6
Brick veneer with airgap	2.5	1	17.9

Brick veneer with airgap	2.5	1	17.0
Internal Plasterboard Stud Wall	0.0	0	25.9
Internal Plasterboard Stud Wall	2.0	0	11.9

Floors

Type	Bulk Insulation (R)	Slab edge insulation (R)	Ventilation	Area (m²)
CSOG: Slab on Ground	0.0	0.0	encl	874.7
200mm concrete slab	2.0	0.0	encl	52.1

Roofs/Ceilings

Type	Bulk Ceiling Insulation (R)	Bulk Roof Insulation (R)	Area (m²)
Slab:Slab - Suspended Slab	0.0	0.0	874.7
Ceil: Ceiling	0.0	0.0	44.8
Slab:Slab - Suspended Slab	1.0	0.0	7.3

Windows

Type	U-Value	SHGC	Area (m²)
ALM-004-01 A Aluminium B DG Air Fill Clear-Clear	4.80	0.59	10.80

Window Directions

Direction	Area (m²)
S	10.8

Air leakage

Item	Sealed	Unsealed
Generic Vent	-	0
Unflued Gas Heater	-	0
Exhaust Fan	2	0
Downlight	0	0
Chimney	0	0
Heater Flue	-	0

Zone Energy Loads

Zone	Heating (MJ/m2)	Total Heating (MJ)	Cooling (MJ/m2)	Total Cooling (MJ)
Bedroom 1 (Z002)	32.2	391.9	3.2	38.4
Study (Z003)	148.6	981.6	0.0	0.0
Kitchen/Living (Z004)	77.3	2221.2	18.1	518.7

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FirstRate® Provisional Diagnostic Information

Project Information

Mode	New Home
Climate	62 Moorabbin Airport
Site Exposure	suburban
Client Name	
Rated Address	139-141 HAWTHORN RD CAULFIELD NORTH
Accredited Rater	
Date	
Reference	1.03 - 8.3 Stars

Energy Usage

Type	Energy MJ/m²
Total	50.5
Heating	39.4
Cooling	11.1

Areas

Area	Size (m²)
Net Conditioned Floor Area (NCFA)	65.9
Unconditioned Room Area	4.0
Garage Area	0.0
Basement Car Park Area	0.0
Glazed Common Area	0.0

Zones

Zone	Area (m²)	Conditioning Type	Conditioned
Bedroom 1	13.3	bedroom	Y
Bedroom 2	10.7	bedroom	Y
ENS	4.1	nightTime	Y
Bath	4.0	unconditioned	N
Kitchen/Living	37.7	kitchen	Y

Walls

Type	Bulk Insulation (R)	Num Reflective Airgaps	Area (m²)
Concrete block party wall	2.0	0	72.8
Brick veneer with airgap	2.5	1	33.0
Internal Plasterboard Stud Wall	0.0	0	42.0

Internal Plasterboard Stud Wall	0.0	0	48.0

Floors

Type	Bulk Insulation (R)	Slab edge insulation (R)	Ventilation	Area (m²)
200mm concrete slab	0.0	0.0	encl	69.9

Roofs/Ceilings

Type	Bulk Ceiling Insulation (R)	Bulk Roof Insulation (R)	Area (m²)
Ceil: Ceiling	0.0	0.0	64.6
Slab:Slab - Suspended Slab	2.0	0.0	5.3

Windows

Type	U-Value	SHGC	Area (m²)
ALM-004-01 A Aluminium B DG Air Fill Clear-Clear	4.80	0.59	17.82

Window Directions

Direction	Area (m²)
N	17.8

Air leakage

Item	Sealed	Unsealed
Generic Vent	-	0
Unflued Gas Heater	-	0
Exhaust Fan	3	0
Downlight	0	0
Chimney	0	0
Heater Flue	-	0

Zone Energy Loads

Zone	Heating (MJ/m2)	Total Heating (MJ)	Cooling (MJ/m2)	Total Cooling (MJ)
Bedroom 2 (Z004)	70.1	750.0	17.3	185.2
Bedroom 1 (Z001)	13.0	173.0	4.6	60.9
ENS (Z002)	1.0	4.2	0.0	0.2
Kitchen/Living (Z003)	46.7	1759.7	13.6	511.8

Provisional Diagnostic Information 13-07-2023 12:04:23 Ver:5.3.2b (3.21) Engine Ver:3.21 Accredited Rater: Assessor's Accreditation Number:

FirstRate® Provisional Diagnostic Information

Project Information

Mode	New Home
Climate	62 Moorabbin Airport
Site Exposure	suburban
Client Name	
Rated Address	139-141 HAWTHORN RD CAULFIELD NORTH
Accredited Rater	
Date	
Reference	1.04 - 7.2 Stars

Energy Usage

Type	Energy MJ/m²
Total	85.6
Heating	69.7
Cooling	15.9

Areas

Area	Size (m²)
Net Conditioned Floor Area (NCFA)	67.2
Unconditioned Room Area	3.9
Garage Area	0.0
Basement Car Park Area	0.0
Glazed Common Area	0.0

Zones

Zone	Area (m²)	Conditioning Type	Conditioned
Bedroom 1	13.0	bedroom	Y
Bedroom 2	11.5	bedroom	Y
ENS	4.2	nightTime	Y
Bath	3.9	unconditioned	N
Kitchen/Living	38.5	kitchen	Y

Walls

Type	Bulk Insulation (R)	Num Reflective Airgaps	Area (m²)
Concrete block party wall	2.0	0	57.3
Fibre cement	2.5	1	19.5
Brick veneer with airgap	2.5	1	20.2

Brick veneer with airgap	2.5	1	26.8
Internal Plasterboard Stud Wall	0.0	0	36.9
Internal Plasterboard Stud Wall	2.0	0	10.8

Floors

Type	Bulk Insulation (R)	Slab edge insulation (R)	Ventilation	Area (m²)
200mm concrete slab	0.0	0.0	encl	71.1

Roofs/Ceilings

Type	Bulk Ceiling Insulation (R)	Bulk Roof Insulation (R)	Area (m²)
Ceil: Ceiling	0.0	0.0	64.1
Slab:Slab - Suspended Slab	2.0	0.0	7.0

Windows

Type	U-Value	SHGC	Area (m²)
ALM-004-01 A Aluminium B DG Air Fill Clear-Clear	4.80	0.59	20.25

Window Directions

Direction	Area (m²)
E	4.3
N	15.9

Air leakage

Item	Sealed	Unsealed
Generic Vent	-	0
Unflued Gas Heater	-	0
Exhaust Fan	2	0
Downlight	0	0
Chimney	1	0
Heater Flue	-	0

Zone Energy Loads

Zone	Heating (MJ/m2)	Total Heating (MJ)	Cooling (MJ/m2)	Total Cooling (MJ)
Bedroom 2 (Z003)	99.2	1142.7	21.7	250.0
Bedroom 1 (Z001)	33.7	439.3	20.7	270.3
ENS (Z002)	4.3	18.2	0.5	2.0
Kitchen/Living (Z004)	86.4	3323.1	15.7	603.9

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FirstRate® Provisional Diagnostic Information

Project Information

Mode	New Home
Climate	62 Moorabbin Airport
Site Exposure	suburban
Client Name	
Rated Address	139-141 HAWTHORN RD CAULFIELD NORTH
Accredited Rater	
Date	
Reference	1.07 - 7.8 Stars

Energy Usage

Type	Energy MJ/m²
Total	63.6
Heating	50.1
Cooling	13.5

Areas

Area	Size (m²)
Net Conditioned Floor Area (NCFA)	38.8
Unconditioned Room Area	4.4
Garage Area	0.0
Basement Car Park Area	0.0
Glazed Common Area	0.0

Zones

Zone	Area (m²)	Conditioning Type	Conditioned
Bedroom 1	12.1	bedroom	Y
Bath	4.4	unconditioned	N
Kitchen/Living	26.7	kitchen	Y

Walls

Type	Bulk Insulation (R)	Num Reflective Airgaps	Area (m²)
Fibre cement	2.5	1	23.3
Concrete block party wall	2.0	0	54.4
Internal Plasterboard Stud Wall	0.0	0	12.5
Internal Plasterboard Stud Wall	2.0	0	11.9

Floors

Type	Bulk Insulation (R)	Slab edge insulation (R)	Ventilation	Area (m²)
200mm concrete slab	0.0	0.0	encl	43.2

Roofs/Ceilings

Type	Bulk Ceiling Insulation (R)	Bulk Roof Insulation (R)	Area (m²)
Ceil: Ceiling	0.0	0.0	37.4
Slab:Slab - Suspended Slab	2.0	0.0	5.7

Windows

Type	U-Value	SHGC	Area (m²)
ALM-004-01 A Aluminium B DG Air Fill Clear-Clear	4.80	0.59	9.30

Window Directions

Direction	Area (m²)
S	9.3

Air leakage

Item	Sealed	Unsealed
Generic Vent	-	0
Unflued Gas Heater	-	0
Exhaust Fan	2	0
Downlight	0	0
Chimney	0	0
Heater Flue	-	0

Zone Energy Loads

Zone	Heating (MJ/m2)	Total Heating (MJ)	Cooling (MJ/m2)	Total Cooling (MJ)
Bedroom 1 (Z001)	37.2	447.9	4.6	54.9
Kitchen/Living (Z004)	59.1	1579.2	18.4	493.1

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FirstRate® Provisional Diagnostic Information

Project Information

Mode	New Home
Climate	62 Moorabbin Airport
Site Exposure	suburban
Client Name	
Rated Address	139-141 HAWTHORN RD CAULFIELD NORTH
Accredited Rater	
Date	
Reference	1.09 - 7.4 Stars

Energy Usage

Type	Energy MJ/m²
Total	77.9
Heating	57.7
Cooling	20.2

Areas

Area	Size (m²)
Net Conditioned Floor Area (NCFA)	50.5
Unconditioned Room Area	3.2
Garage Area	0.0
Basement Car Park Area	0.0
Glazed Common Area	0.0

Zones

Zone	Area (m²)	Conditioning Type	Conditioned
Bedroom 1	11.9	bedroom	Y
Ldry	3.2	unconditioned	N
ENS	4.4	nightTime	Y
Study	5.4	dayTime	Y
Kitchen/Living	28.8	kitchen	Y

Walls

Type	Bulk Insulation (R)	Num Reflective Airgaps	Area (m²)
Brick veneer with airgap	2.5	1	32.7
Fibre cement	2.5	1	24.2
Internal Plasterboard Stud Wall	0.0	0	17.0

Internal Plasterboard Stud Wall	2.0	0	17.8
Internal Plasterboard Stud Wall	0.0	0	24.2
Concrete block party wall	2.0	0	31.1

Floors

Type	Bulk Insulation (R)	Slab edge insulation (R)	Ventilation	Area (m²)
200mm concrete slab	0.0	0.0	encl	53.8

Roofs/Ceilings

Type	Bulk Ceiling Insulation (R)	Bulk Roof Insulation (R)	Area (m²)
Ceil: Ceiling	0.0	0.0	33.8
Slab:Slab - Suspended Slab	2.0	0.0	20.0

Windows

Type	U-Value	SHGC	Area (m²)
ATB-006-04 B Al Thermally Broken B DG Argon Fill Low Solar Gain low-E -Clear	3.00	0.26	16.74

Window Directions

Direction	Area (m²)
W	16.7

Air leakage

Item	Sealed	Unsealed
Generic Vent	-	0
Unflued Gas Heater	-	0
Exhaust Fan	2	0
Downlight	0	0
Chimney	0	0
Heater Flue	-	0

Zone Energy Loads

Zone	Heating (MJ/m2)	Total Heating (MJ)	Cooling (MJ/m2)	Total Cooling (MJ)
ENS (Z009)	78.9	347.6	2.2	9.7
Bedroom 1 (Z001)	78.5	933.3	24.6	292.3
Study (Z006)	201.9	1099.9	17.5	95.4
Kitchen/Living (Z005)	28.7	826.5	25.2	725.4

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FirstRate® Provisional Diagnostic Information

Project Information

Mode	New Home
Climate	62 Moorabbin Airport
Site Exposure	suburban
Client Name	
Rated Address	139-141 HAWTHORN RD CAULFIELD NORTH
Accredited Rater	
Date	
Reference	2.01 - 6.4 Stars

Energy Usage

Type	Energy MJ/m²
Total	112.1
Heating	91.3
Cooling	20.8

Areas

Area	Size (m²)
Net Conditioned Floor Area (NCFA)	68.9
Unconditioned Room Area	3.8
Garage Area	0.0
Basement Car Park Area	0.0
Glazed Common Area	0.0

Zones

Zone	Area (m²)	Conditioning Type	Conditioned
Bedroom 1	13.1	bedroom	Y
Bedroom 2	10.2	bedroom	Y
ENS	4.3	nightTime	Y
Bath	3.8	unconditioned	N
Kitchen/Living	41.3	kitchen	Y

Walls

Type	Bulk Insulation (R)	Num Reflective Airgaps	Area (m²)
Concrete block party wall	2.0	0	45.7
Fibre cement	2.5	1	57.8
Internal Plasterboard Stud Wall	2.0	0	43.1

Internal Plasterboard Stud Wall	0.0	0	43.1
Internal Plasterboard Stud Wall	2.0	0	10.5

Floors

Type	Bulk Insulation (R)	Slab edge insulation (R)	Ventilation	Area (m²)
200mm concrete slab	0.0	0.0	encl	72.7

Roofs/Ceilings

Type	Bulk Ceiling Insulation (R)	Bulk Roof Insulation (R)	Area (m²)
Framed:Flat - Flat Framed (Metal Deck)	5.0	0.0	72.7

Windows

Type	U-Value	SHGC	Area (m²)
ATB-006-03 B Al Thermally Broken B DG Argon Fill High Solar Gain low-E -Clear	2.90	0.51	44.82

Window Directions

Direction	Area (m²)
N	16.7
W	28.1

Air leakage

Item	Sealed	Unsealed
Generic Vent	-	0
Unflued Gas Heater	-	0
Exhaust Fan	3	0
Downlight	0	0
Chimney	0	0
Heater Flue	-	0

Zone Energy Loads

Zone	Heating (MJ/m2)	Total Heating (MJ)	Cooling (MJ/m2)	Total Cooling (MJ)
Bedroom 1 (Z001)	37.2	485.6	8.2	106.8
ENS (Z005)	13.6	58.0	0.3	1.4
Kitchen/Living (Z004)	133.7	5522.1	31.6	1305.2
Bedroom 2 (Z006)	75.5	773.9	14.5	148.9

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FirstRate® Provisional Diagnostic Information

Project Information

Mode	New Home
Climate	62 Moorabbin Airport
Site Exposure	suburban
Client Name	
Rated Address	139-141 HAWTHORN RD CAULFIELD NORTH
Accredited Rater	
Date	
Reference	2.02 - 7.9 Stars

Energy Usage

Type	Energy MJ/m²
Total	58.6
Heating	43.3
Cooling	15.3

Areas

Area	Size (m²)
Net Conditioned Floor Area (NCFA)	47.8
Unconditioned Room Area	4.5
Garage Area	0.0
Basement Car Park Area	0.0
Glazed Common Area	0.0

Zones

Zone	Area (m²)	Conditioning Type	Conditioned
Bedroom 1	9.9	bedroom	Y
WIR	3.0	nightTime	Y
Bath	4.5	unconditioned	N
Kitchen/Living	34.8	kitchen	Y

Walls

Type	Bulk Insulation (R)	Num Reflective Airgaps	Area (m²)
Concrete block party wall	2.0	0	68.5
Fibre cement	2.5	1	18.1
Internal Plasterboard Stud Wall	0.0	0	20.5
Internal Plasterboard Stud Wall	0.0	0	11.0

Internal Plasterboard Stud Wall	2.0	0	11.9

Floors

Type	Bulk Insulation (R)	Slab edge insulation (R)	Ventilation	Area (m²)
200mm concrete slab	0.0	0.0	encl	52.2

Roofs/Ceilings

Type	Bulk Ceiling Insulation (R)	Bulk Roof Insulation (R)	Area (m²)
Framed:Flat - Flat Framed (Metal Deck)	5.0	0.0	52.2

Windows

Type	U-Value	SHGC	Area (m²)
ALM-004-01 A Aluminium B DG Air Fill Clear-Clear	4.80	0.59	13.93

Window Directions

Direction	Area (m²)
N	13.9

Air leakage

Item	Sealed	Unsealed
Generic Vent	-	0
Unflued Gas Heater	-	0
Exhaust Fan	2	0
Downlight	0	0
Chimney	0	0
Heater Flue	-	0

Zone Energy Loads

Zone	Heating (MJ/m2)	Total Heating (MJ)	Cooling (MJ/m2)	Total Cooling (MJ)
Bedroom 1 (Z001)	56.7	563.2	9.3	91.9
WIR (Z005)	4.2	12.4	0.7	2.2
Kitchen/Living (Z004)	45.1	1571.4	19.2	667.2

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FirstRate® Provisional Diagnostic Information

Project Information

Mode	New Home
Climate	62 Moorabbin Airport
Site Exposure	suburban
Client Name	
Rated Address	139-141 HAWTHORN RD CAULFIELD NORTH
Accredited Rater	
Date	
Reference	2.05 - 7.1 Stars

Energy Usage

Type	Energy MJ/m²
Total	88.2
Heating	67.5
Cooling	20.7

Areas

Area	Size (m²)
Net Conditioned Floor Area (NCFA)	42.2
Unconditioned Room Area	4.2
Garage Area	0.0
Basement Car Park Area	0.0
Glazed Common Area	0.0

Zones

Zone	Area (m²)	Conditioning Type	Conditioned
Bedroom 1	12.5	bedroom	Y
Bath	4.2	unconditioned	N
Kitchen/Living	29.7	kitchen	Y

Walls

Type	Bulk Insulation (R)	Num Reflective Airgaps	Area (m²)
Fibre cement	2.5	1	40.0
Concrete block party wall	2.0	0	46.5
Internal Plasterboard Stud Wall	0.0	0	22.7

Floors

Type	Bulk Insulation (R)	Slab edge insulation (R)	Ventilation	Area (m²)
200mm concrete slab	0.0	0.0	encl	46.4

Roofs/Ceilings

Type	Bulk Ceiling Insulation (R)	Bulk Roof Insulation (R)	Area (m²)
Framed:Flat - Flat Framed (Metal Deck)	5.0	0.0	46.4

Windows

Type	U-Value	SHGC	Area (m²)
ATB-006-04 B Al Thermally Broken B DG Argon Fill Low Solar Gain low-E -Clear	3.00	0.26	18.81

Window Directions

Direction	Area (m²)
E	18.8

Air leakage

Item	Sealed	Unsealed
Generic Vent	-	0
Unflued Gas Heater	-	0
Exhaust Fan	2	0
Downlight	0	0
Chimney	0	0
Heater Flue	-	0

Zone Energy Loads

Zone	Heating (MJ/m2)	Total Heating (MJ)	Cooling (MJ/m2)	Total Cooling (MJ)
Bedroom 1 (Z001)	75.7	943.8	16.0	199.4
Kitchen/Living (Z004)	73.0	2169.4	25.5	756.9

Provisional Diagnostic Information 14-07-2023 08:15:27 Ver:5.3.2b (3.21) Engine Ver:3.21 Accredited Rater: Assessor's Accreditation Number:

Appendix 3 - Daylight Assessment

Residential – living areas

Apartment	DTS compliant	Dual aspect	BESS Built-in Calculator compliant	Room compliant
G.01	Yes	No	-	Yes
G.02	No	No	Yes	Yes
G.03	No	No	Yes	Yes
G.04	No	No	Yes	Yes
G.05	No	Yes	-	Yes
G.06	No	No	Yes	Yes
G.07	No	No	Yes	Yes
G.08	No	No	Yes	Yes
G.09	Yes	No	-	Yes
1.01	Yes	No	-	Yes
1.02	No	No	Yes	Yes
1.03	No	No	Yes	Yes
1.04	No	No	Yes	Yes
1.05	No	Yes	-	Yes
1.06	No	No	Yes	Yes
1.07	No	No	Yes	Yes
1.08	No	No	Yes	Yes
1.09	Yes	No	-	Yes
2.01	Yes	No	-	Yes
2.02	Yes	No	-	Yes
2.03	Yes	No	-	Yes
2.04	No	No	Yes	Yes
2.05	No	No	Yes	Yes
2.06	No	No	Yes	Yes
2.07	No	No	Yes	Yes
2.08	No	Yes	-	Yes

Residential – bedrooms

Apartment	Room	DTS compliant	BESS Built-in Calculator compliant	Room compliant
G.01	Bed 1	Yes	-	Yes
	Bed 2	Yes	-	Yes
G.02	Bed 1	Yes	-	Yes
	Bed 2	Yes	-	Yes
G.03	Bed 1	Yes	-	Yes
	Bed 2	Yes	-	Yes
G.04	Bed 1	Yes	-	Yes
	Bed 2	Yes	-	Yes
G.05	Bed 1	No	Yes	Yes
	Bed 2	Yes	-	Yes

G.06	Bed 1	Yes	-	Yes
G.07	Bed 1	Yes	-	Yes
G.08	Bed 1	Yes	-	Yes
G.09	Bed 1	No	Yes	Yes
	Bed 2	Yes	-	Yes
1.01	Bed 1	Yes	-	Yes
	Bed 2	Yes	-	Yes
1.02	Bed 1	Yes	-	Yes
	Bed 2	Yes	-	Yes
1.03	Bed 1	Yes	-	Yes
	Bed 2	Yes	-	Yes
1.04	Bed 1	Yes	-	Yes
	Bed 2	Yes	-	Yes
1.05	Bed 1	Yes	-	Yes
	Bed 2	Yes	-	Yes
1.06	Bed 1	Yes	-	Yes
1.07	Bed 1	Yes	-	Yes
1.08	Bed 1	Yes	-	Yes
1.09	Bed 1	Yes	-	Yes
2.01	Bed 1	Yes	-	Yes
	Bed 2	Yes	-	Yes
2.02	Bed 1	Yes	-	Yes
2.03	Bed 1	Yes	-	Yes
2.04	Bed 1	Yes	-	Yes
	Bed 2	Yes	-	Yes
2.05	Bed 1	Yes	-	Yes
2.06	Bed 1	Yes	-	Yes
2.07	Bed 1	Yes	-	Yes
2.08	Bed 1	Yes	-	Yes
	Bed 2	Yes	-	Yes

Appendix 4 - Natural Ventilation Assessment

Apartment	BADS Natural ventilation complaint	BESS Natural ventilation complaint
G.01	Yes	Yes
G.02	No	No
G.03	No	No
G.04	Yes	Yes
G.05	Yes	Yes
G.06	No	No
G.07	No	No
G.08	No	No
G.09	Yes	Yes
1.01	Yes	Yes
1.02	No	No
1.03	No	No
1.04	Yes	Yes
1.05	Yes	Yes
1.06	No	No
1.07	No	No
1.08	No	No
1.09	No	No
2.01	Yes	Yes
2.02	No	No
2.03	No	No
2.04	Yes	Yes
2.05	No	No
2.06	No	No
2.07	No	No
2.08	Yes	Yes
Total	**10/26 (38%)**	**10/26 (38%)**

Appendix 5 - STORM Report

STORM Rating Report

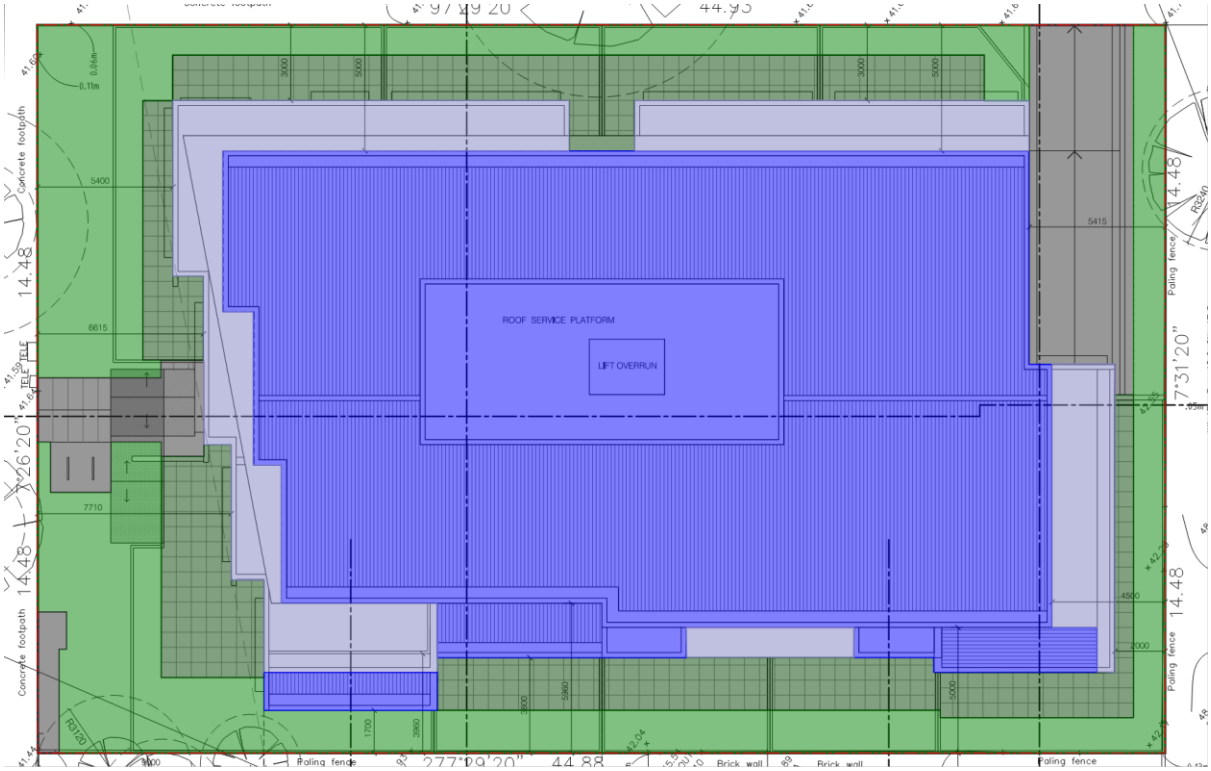
TransactionID:	1611715
Municipality:	GLEN EIRA
Rainfall Station:	GLEN EIRA
Address:	139-141 HAWTHORN RD
	CAULFIELD NORTH
	VIC 3161
Assessor:	LID Consulting
Development Type:	Residential - Multiunit
Allotment Site (m2):	1,300.40
STORM Rating %:	107

Description	Impervious Area (m2)	Treatment Type	Treatment Area/Volume (m2 or L)	Occupants / Number Of Bedrooms	Treatment %	Tank Water Supply Reliability (%)
Roof + L2 balcony to RWT	777.00	Rainwater Tank	7,000.00	40	119.00	58.00
Impervious Other	86.00	None	0.00	0	0.00	0.00

Date Generated: 12-Jul-2023 Program Version: 1.0.0

Note: The number of occupants for residential developments is based on the number of bedrooms not toilets.

Appendix 6 - STORM Area Proof



Legend

Description	Quantity	Unit
Impervious Other	86.0	sq m
Impervious to Landscape	174.0	sq m
L2 Balcony to RWT	149.7	sq m
Pervious	263.4	sq m
Roof to RWT	627.3	sq m
SIte Area	1,300.4	sq m

Appendix 7 - WSUD System Maintenance Plan

Rainwater Tanks

The following maintenance schedule is to be used as a guide for rainwater tank maintenance. It is based on average maintenance requirements for rainwater tanks in Victoria, and timings may need to be adjusted to suit specific site assets. Regular inspections should be undertaken every three months. Inspection and maintenance of all rainwater tanks will be the responsibility of the owner's corporation.

Refer to the Melbourne Water WSUD Maintenance Guidelines for further details.

Item	What to check for	Action	Frequency
Tank inlet	Tank inlet is not blocked by accumulated debris	Physically remove debris build up	1-3 months
First flush device and filters	First flush device and filters are not blocked and flow is not limited by litter or sediment accumulation	Physically remove litter and sediment from first flush device, or if it contains a flush-out valve, use water to remove sediment.	1-3 months
Tank outlet	Tank outlet is not restricted by sediment.	Flush tank as required.	1-3 months
Mosquito screens	Mosquito screens are not torn or loose	Replace mosquito screens if necessary. Put screens back carefully, ensuring they are tightly refitted.	1-3 months
Pumps	Water around pump equipment. Water pressure.	Replace seals where leaks are noted. Clean pumps as required to maintain pump pressure. Refer to pump manufacturer's maintenance requirements.	1-3 months
Roof and gutters	Accumulated debris in gutters. Discolouration of tank water, or notable odours.	Physically remove accumulated debris, including leaf and other plant material. More regular maintenance may be required where there are overhanging trees.	3-6 months
Overhanging trees	Vegetation overhanging roof and gutters	Prune overhanging trees where possible to reduce vegetation build up and chance of blockages in tank network.	3-6 months
Tank	Tank defects or damage. Sediment and sludge build up in tank, or sulphide/rotten egg odours.	Replace defect or damaged tank as necessary. Remove accumulated sediment and sludge from tank. Clean tank if required.	2-3 years

Appendix 8 - Stormwater Management During Construction

Stormwater management Planning Scheme clause 53.18 (specifically 53.18-06) require measures in place to ensure the protection of drainage infrastructure and receiving waterways during construction.

The following is intended to inform the site management plan in matters relating to stormwater management during construction. Relevant principles per the EPA Civil Construction, Building and Demolition Guide[2], and measures as per Urban Stormwater Best Practice Environmental Management Guidelines Section 6.3 are shown below.

The site management plan should restrict runoff to adjoining properties and ensure minimal earth disturbance occurs during construction. Additionally, building waste, dangerous chemicals and food waste must be managed to prevent damage to flora and fauna, or build up or blockage in drains and nearby creeks.

Item	Potential issues	Control Measure
Fences	Porous fences allow stormwater runoff to carry sediment across the site and discharge into the stormwater network.	Mesh fabric and silt fences to be installed on fences where site includes slopes greater than 1:20. Hay bales may also be suitable for larger sites.
Pit inlets	Without sediment filters, pit inlets allow sediment to enter the stormwater network causing sediment build-up downstream.	Sediment traps or drain filters should be installed on all pit inlets.
Downpipes	Localised flooding due to lack of site drainage.	Temporary downpipes to be installed as soon as roofing is installed to minimise overland flow across the site (see plastic tube roll image below). These should be connected to the rainwater tank where possible, or alternatively the stormwater pipes.

[2] *EPA Civil Construction, Building and Demolition Guide, Publication 1834 (2020)* https://www.epa.vic.gov.au/about-epa/publications/1834

Item	Potential issues	Control Measure
Vehicle traffic on site	Areas of vehicle traffic are subject to disturbance of soil.	Use stabilised vehicle entrances and paths, with crushed rock or other suitable material. Include rumble grates, track mats (where access is over sand), and physically remove mud from tyres of vehicles prior to leaving the site.
Mounded earth	Unsecured mounds create significant issues with sedimentation after rainfall.	Use erosion control blankets for mounded earth. Ensure correct installation, and incorporate secondary measures such as silt fences on steep sites.
Bins	Where suitable bins are not provided, litter can be washed from the site.	Ensure appropriate bins are provided for construction workers and staff. Ensure bins for lightweight food packaging and construction waste have lids to stop waste blowing away.
Waste material	Pollution of stormwater can occur where appropriate disposal methods for waste materials are not established on site.	Provide separate bins for paints and solvents to allow safe removal and disposal at accredited locations. Ensure all staff are aware of correct disposal methods.
Stockpiles	Incorrect stockpiling can lead to stormwater contamination, and site pollution.	Locate stockpiles away from drainage paths, and construct stockpiles with gentle slopes (max 1:2).

In addition, the contractor will be required to:

- **Identify and document,** prior to construction commencing, where these measures will be installed, and how erosion and loose waste will be managed.
- **Install tarps on site waste bins** every night.
- **Avoid overfilling vehicles** or cover all soil loads being taken offsite.
- **Sweep up the site** every day when works occur on site to ensure loose waste does not blow around the site and into the surrounding streets.
- **Ensure erosion and sediment control measures are maintained** through daily checks – maintenance measures may include removing sediment trapped in filters and topping up gravel on the vehicle entry path.

Figure 2 - Temporary Downpipes

Figure 3 - Sediment Trap

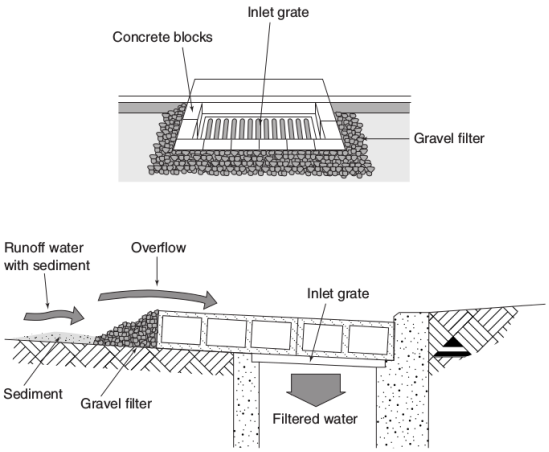


Figure 4 - Block and Gravel Filter (CSIRO)

Figure 5 - Sediment Trap