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Building Designers Association Victoria

SustainabilityWA

Address:
71 Allnutt Street, Mandurah WA 6210
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PO Box 4160 Mandurah North WA 6210

Energy Efficiency Report – HERS Software

Date:	22nd December 2020
Our Reference:	20-2958
Client Job Number:	1580
Project Address:	Lot 201 (#48A) Egina Street, Mount Hawthorn WA 6016
BCA Climate Zone:	5
HERS Climate Zone:	13
Report Commissioned By:	Integrity Developments
On Behalf of:	Roe's
Technical Contact:	David Barham

See NatHERS Certificate on the following pages

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BCA Part 3.12 Compliance Report

3.12.5.5 Artificial lighting

Artificial lighting has been calculated using Lamp power density.

Maximum Lighting Calculations			
Space	Area (m²)	Max. Wattage/m ²	Max. Wattage Allowed
Class 1 building	202.46	5	1012.3
Verandah/Balcony	16.49	4	65.96
Class 10A building	25.99	3	77.97

Vented light fittings are not included in the Class 1 or 10A building part of the HERS calculation.

Multiple spaces with similar allowances have been combined as per AN020. Unenclosed areas less than 5m² are treated as Perimeter lighting. Perimeter lighting to have either a daylight sensor or lamps > 40Lumens/W. Above report is based on design drawings. It remains the builder's responsibility to ensure compliance on site.

Nationwide House Energy Rating Scheme
NatHERS Certificate No. BL4CPSMLYA

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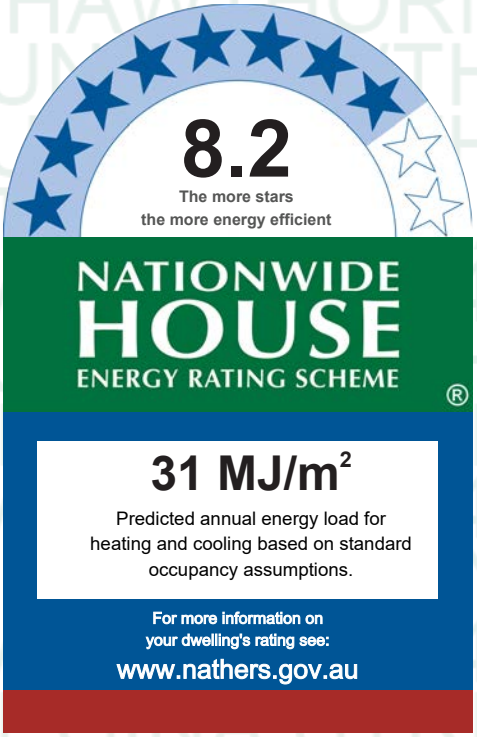

Property

Address	48A, Egina Street, Mount Hawthorn, WA, 6016
Lot/DP	201
NCC Class*	Class 1a
Type	New Home

Plans

Main plan	1580
Prepared by	Integrity Developments

Construction and environment

Assessed floor area (m²)*		**Exposure type**
Conditioned*	159.9	suburban
Unconditioned*	12.7	**NatHERS climate zone**
Total	193.3	13, Mount Hawthorn
Garage	20.7	

Thermal performance

Heating	**Cooling**
15.6 MJ/m²	**15.4** MJ/m²

About the rating

NatHERS software models the expected thermal energy loads using information about the design and construction, climate and common patterns of household use. The software does not take into account appliances, apart from the airflow impacts from ceiling fans.

Accredited assessor

Name	David Barham
Business name	Sustainability WA
Email	david@s-wa.com.au
Phone	08 9555 9444
Accreditation No.	DMN/18/1877
Assessor Accrediting Organisation	DMN
Declaration of interest	Declaration not completed

Verification

To verify this certificate, scan the QR code or visit https://www.fr5.com.au/QRCodeLanding?PublicId=BL4CPSMLYA When using either link, ensure you are visiting www.FR5.com.au.

National Construction Code (NCC) requirements

The NCC's requirements for NatHERS-rated houses are detailed in 3.12.0(a)(i) and 3.12.5 of the NCC Volume Two. For apartments the requirements are detailed in J0.2 and J5 to J8 of the NCC Volume One.

In NCC 2019, these requirements include minimum star ratings and separate heating and cooling load limits that need to be met by buildings and apartments through the NatHERS assessment. Requirements additional to the NatHERS assessment that must also be satisfied include, but are not limited to: insulation installation methods, thermal breaks, building sealing, water heating and pumping, and artificial lighting requirements. The NCC and NatHERS Heating and Cooling Load Limits (Australian Building Codes Board Standard) are available at www.abcb.gov.au.

State and territory variations and additions to the NCC may also apply.

* Refer to glossary.

Certificate Check

Ensure the dwelling is designed and then built as per the NatHERS Certificate. While you need to check the accuracy of the whole Certificate, the following spot check covers some important items impacting the dwelling's rating.

Genuine certificate

Does this Certificate match the one available at the web address or QR code in the verification box on the front page? Does the set of NatHERS-stamped plans for the dwelling have a Certificate number on the stamp that matches this Certificate?

Ceiling penetrations*

Does the 'number' and 'type' of ceiling penetrations (e.g. downlights, exhaust fans, etc) shown on the stamped plans or installed, match what is shown in this Certificate?

Windows

Does the installed window meet the substitution tolerances (SHGC and U-value) and window type, of the window shown on this Certificate?

Apartment entrance doors

Does the 'External Door Schedule' show apartment entrance doors? Please note that an "external door" between the modelled dwelling and a shared space, such as an enclosed corridor or foyer, should not be included in the assessment (because it overstates the possible ventilation) and would invalidate the Certificate.

Exposure*

Has the appropriate exposure level (terrain) been applied? For example, it is unlikely that a ground-floor apartment is "exposed" or a top floor high-rise apartment is "protected".

Provisional* values

Have provisional values been used in the assessment and, if so, noted in "additional notes" below?

Additional Notes

Window and glazed door *type and performance*

Default* windows

				Substitution tolerance ranges	
Window ID	**Window description**	**Maximum U-value***	**SHGC***	SHGC lower limit	SHGC upper limit
ALM-001-03 A	Aluminium A SG High Solar Gain Low-E	5.4	0.49	0.47	0.51
ALM-002-03 A	Aluminium B SG High Solar Gain Low-E	5.4	0.58	0.55	0.61

Custom* windows

				Substitution tolerance ranges	
Window ID	**Window description**	**Maximum U-value***	**SHGC***	SHGC lower limit	SHGC upper limit
No Data Available					

Window and glazed door *Schedule*

Location	**Window ID**	**Window no.**	**Height (mm)**	**Width (mm)**	**Window type**	**Opening %**	**Orientation**	**Window shading device***
Entry	ALM-001-03 A	Entry	1543	910	awning	90.0	E	No
Bed 2	ALM-002-03 A	Bed 2	1543	2010	sliding	45.0	N	No
Bed 3	ALM-002-03 A	Bed 3	1972	2210	sliding	40.0	W	No
Bath	ALM-002-03 A	Bath	600	1610	sliding	45.0	N	No

* Refer to glossary.

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Laundry	ALM-001-03 A	Laundry	2143	820	awning	90.0	N	No
Kitchen/Living	ALM-002-03 A	Kitchen/Livin- g	1457	2010	sliding	45.0	N	No
Kitchen/Living	ALM-002-03 A	Kitchen/Livin- g	1543	2410	sliding	45.0	N	No
Kitchen/Living	ALM-002-03 A	Kitchen/Livin- g	1543	2410	sliding	45.0	N	No
Kitchen/Living	ALM-002-03 A	Kitchen/Livin- g	686	2410	sliding	45.0	S	No
Kitchen/Living	ALM-002-03 A	Kitchen/Livin- g	2143	3610	sliding	65.0	E	No
Master Suite	ALM-002-03 A	Master Suite	600	2410	sliding	45.0	N	No
Master Suite	ALM-002-03 A	Master Suite	1114	2410	sliding	45.0	E	No
Ensuite	ALM-002-03 A	Ensuite	600	1210	sliding	30.0	S	No
WC - Ensuite	ALM-001-03 A	Ensuite - WC	600	810	sliding	45.0	S	No
Bed 4/Study	ALM-002-03 A	Bed 4/Study	600	2410	sliding	30.0	S	No
Retreat	ALM-002-03 A	Retreat	600	2410	sliding	45.0	N	No
Retreat	ALM-001-03 A	Retreat	1372	910	awning	90.0	W	No
Retreat	ALM-001-03 A	Retreat	1372	910	awning	90.0	W	No
Retreat	ALM-001-03 A	Retreat	1372	910	awning	90.0	W	No
Passage	ALM-002-03 A	Passage	600	2210	sliding	45.0	N	No

Roof window *type and performance value*

Default* roof windows

				Substitution tolerance ranges	
Window ID	**Window description**	**Maximum U-value***	**SHGC***	SHGC lower limit	SHGC upper limit
No Data Available					

Custom* roof windows

				Substitution tolerance ranges	
Window ID	**Window description**	**Maximum U-value***	**SHGC***	SHGC lower limit	SHGC upper limit
No Data Available					

Roof window *schedule*

Location	Window ID	Window no.	Opening %	Area (m²)	Orientation	Outdoor shade	Indoor shade
No Data Available							

Skylight *type and performance*

Skylight ID	Skylight description
No Data Available	

Skylight *schedule*

Location	Skylight ID	Skylight No.	Skylight shaft length (mm)	Area (m²)	Orient- ation	Outdoor shade	Diffuser	Skylight shaft reflectance
No Data Available								

External door *schedule*

* Refer to glossary.

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Location	Height (mm)	Width (mm)	Opening %	Orientation
Garage	2400	2510	100.0	W
Garage	2143	820	100.0	E
Entry	2143	920	90.0	W

External wall *type*

Wall ID	Wall type	Solar absorptance	Wall shade (colour)	Bulk insulation (R-value)	Reflective wall wrap*
1	FR5 - Single Brick	0.5	Medium		No
2	FR5 - Double Brick	0.5	Medium		No
3	SWA - SWA - 2c BWK	0.5	Medium		No

External wall *schedule*

Location	Wall ID	Height (mm)	Width (mm)	Orientation	Horizontal shading feature* maximum projection (mm)	Vertical shading feature (yes/no)
Garage	1	2657	5611	N	0	No
Garage	2	2657	3150	W	0	No
Garage	2	2657	1940	E	0	Yes
Entry	3	2657	1069	N	0	Yes
Entry	3	2657	1210	W	1404	Yes
Entry	3	2657	16132	S	0	No
Entry	3	2657	967	E	0	Yes
Bed 2	3	2657	3010	N	0	Yes
Bed 2	3	2657	300	E	0	Yes
Bed 3	3	2657	460	N	290	Yes
Bed 3	3	2657	2730	W	290	No
Bed 3	3	2657	2300	S	290	Yes
Bath	3	2657	2220	N	0	Yes
Laundry	3	2657	1980	N	0	Yes
Kitchen/Living	3	2657	10831	N	490	Yes
Kitchen/Living	3	2657	600	W	0	Yes
Kitchen/Living	3	2657	127	E	0	Yes
Kitchen/Living	3	2657	7203	S	0	Yes
Kitchen/Living	3	2657	4430	E	3490	No
Master Suite	3	2607	3630	N	490	No
Master Suite	3	2607	600	W	491	Yes
Master Suite	3	2607	800	W	490	Yes
Master Suite	3	2607	3637	S	490	No
Master Suite	3	2607	4430	E	490	No
WIR - Master	3	2607	1340	S	0	Yes
Ensuite	3	2607	1470	S	0	Yes
WC - Ensuite	3	2607	1294	S	490	Yes

* Refer to glossary.

Bed 4/Study	3	2607	3010	S	0	No
Bed 4/Study	3	2607	800	E	490	Yes
Retreat	3	2607	891	E	493	Yes
Retreat	3	2607	8021	N	491	No
Retreat	3	2607	4729	W	490	No
Retreat	3	2607	4929	S	490	No
Passage	3	2607	4275	N	490	Yes

Internal wall *type*

Wall ID	Wall type	Area (m²)	Bulk insulation
1	FR5 - Single Brick	169.4	

Floor *type*

Location	Construction	Area (m²)	Sub-floor ventilation	Added insulation (R-value)	Covering
Garage	FR5 - CSOG: Slab on Ground	20.7	Enclosed	R0.0	none
Entry	FR5 - CSOG: Slab on Ground	25.6	Enclosed	R0.0	Vinyl
Bed 2	FR5 - CSOG: Slab on Ground	12.9	Enclosed	R0.0	Carpet
Bed 3	FR5 - CSOG: Slab on Ground	10.9	Enclosed	R0.0	Carpet
Bath	FR5 - CSOG: Slab on Ground	5.6	Enclosed	R0.0	Tiles
Laundry	FR5 - CSOG: Slab on Ground	7	Enclosed	R0.0	Tiles
Pdr	FR5 - CSOG: Slab on Ground	1.8	Enclosed	R0.0	Tiles
Kitchen/Living	FR5 - CSOG: Slab on Ground	17.6	Enclosed	R0.0	Vinyl
Kitchen/Living	FR5 - CSOG: Slab on Ground	30.8	Enclosed	R0.0	Vinyl
Master Suite	FR5 - 250mm concrete slab	16.1	Enclosed	R0.0	Carpet
WIR - Master	FR5 - 250mm concrete slab	2.7	Enclosed	R0.0	Carpet
Ensuite	FR5 - 250mm concrete slab	4.3	Enclosed	R0.0	Tiles
WC - Ensuite	FR5 - 250mm concrete slab	1.2	Enclosed	R0.0	Tiles
Bed 4/Study	FR5 - 250mm concrete slab	8.4	Enclosed	R0.0	Carpet
Retreat	FR5 - 250mm concrete slab	2.5	Open	R0.0	Vinyl
Retreat	FR5 - 250mm concrete slab	26.5	Enclosed	R0.0	Vinyl
Passage	FR5 - 250mm concrete slab	4	Enclosed	R0.0	Carpet

Ceiling *type*

Location	Construction material/type	Bulk insulation R-value (may include edge batt values)	Reflective wrap*
Garage	FR5 - 250mm concrete slab	R0.0	No
Garage	Plasterboard	R4.0	No
Entry	FR5 - 250mm concrete slab	R0.0	No
Entry	Plasterboard	R4.0	No
Bed 2	FR5 - 250mm concrete slab	R0.0	No
Bed 3	FR5 - 250mm concrete slab	R0.0	No
Bed 3	Plasterboard	R4.0	No

* Refer to glossary.

Bath	FR5 - 250mm concrete slab	R0.0	No
Laundry	FR5 - 250mm concrete slab	R0.0	No
Laundry	Plasterboard	R4.0	No
Pdr	FR5 - 250mm concrete slab	R0.0	No
Pdr	Plasterboard	R4.0	No
Kitchen/Living	FR5 - 250mm concrete slab	R0.0	No
Kitchen/Living	Plasterboard	R4.0	No
Master Suite	Plasterboard	R4.0	No
WIR - Master	Plasterboard	R4.0	No
Ensuite	Plasterboard	R4.0	No
WC - Ensuite	Plasterboard	R4.0	No
Bed 4/Study	Plasterboard	R4.0	No
Retreat	Plasterboard	R4.0	No
Retreat	Plasterboard	R4.0	No
Passage	Plasterboard	R4.0	No

Ceiling *penetrations**

Location	Quantity	Type	Diameter (mm)	Sealed/unsealed
Bath	1	Exhaust Fans	300	Sealed
Pdr	1	Exhaust Fans	300	Sealed
Kitchen/Living	1	Exhaust Fans	150	Sealed

Ceiling *fans*

Location	Quantity	Diameter (mm)
No Data Available		

Roof *type*

Construction	Added insulation (R-value)	Solar absorptance	Roof shade
Cont:Attic-Continuous	0.0	0.7	Dark

* Refer to glossary.

Explanatory Notes

About this report

A NatHERS rating is a comprehensive, dynamic computer modelling evaluation of a home, using the floorplans, elevations and specifications to estimate an energy load. It addresses the building layout, orientation and fabric (i.e. walls, windows, floors, roofs and ceilings), but does not cover the water or energy use of appliances or energy production of solar panels.

Ratings are based on a unique climate zone where the home is located and are generated using standard assumptions, including occupancy patterns and thermostat settings. The actual energy consumption of a home may vary significantly from the predicted energy load, as the assumptions used in the rating will not match actual usage patterns. For example, the number of occupants and personal heating or cooling preferences will vary.

While the figures are an indicative guide to energy use, they can be used as a reliable guide for comparing different dwelling designs and to demonstrate that the design meets the energy efficiency requirements in the National Construction Code. Homes that are energy efficient use less energy, are warmer on cool days, cooler on hot days and cost less to run. The higher the star rating the more thermally efficient the dwelling is.

Accredited assessors

To ensure the NatHERS Certificate is of a high quality, always use an accredited or licenced assessor. NatHERS accredited assessors are members of a professional body called an Assessor Accrediting Organisation (AAO).

Australian Capital Territory (ACT) licensed assessors may only produce assessments for regulatory purposes using software for which they have a licence endorsement. Licence endorsements can be confirmed on the ACT licensing register

AAOs have specific quality assurance processes in place, and continuing professional development requirements, to maintain a high and consistent standard of assessments across the country. Non-accredited assessors do not have this level of quality assurance or any ongoing training requirements.

Any questions or concerns about this report should be directed to the assessor in the first instance. If the assessor is unable to address these questions or concerns, the AAO specified on the front of this certificate should be contacted.

Disclaimer

The format of the NatHERS Certificate was developed by the NatHERSAdministrator. However the content of each individual certificate is entered and created by the assessor to create a NatHERS Certificate. It is the responsibility of the assessor who prepared this certificate to use NatHERS accredited software correctly and follow the NatHERS Technical Notes to produce a NatHERS Certificate.

The predicted annual energy load in this NatHERS Certificate is an estimate based on an assessment of the building by the assessor. It is not a prediction of actual energy use, but may be used to compare how other buildings are likely to perform when used in a similar way.

Information presented in this report relies on a range of standard assumptions (both embedded in NatHERS accredited software and made by the assessor who prepared this report), including assumptions about occupancy, indoor air temperature and local climate.

Not all assumptions that may have been made by the assessor while using the NatHERS accredited software tool are presented in this report and further details or data files may be available from the assessor.

Glossary

Annual energy load	the predicted amount of energy required for heating and cooling, based on standard occupancy assumptions.
Assessed floor area	the floor area modelled in the software for the purpose of the NatHERS assessment. Note, this may not be consistent with the floor area in the design documents.
Ceiling penetrations	features that require a penetration to the ceiling, including downlights, vents, exhaust fans, rangehoods, chimneys and flues. Excludes fixtures attached to the ceiling with small holes through the ceiling for wiring, e.g. ceiling fans; pendant lights, and heating and cooling ducts.
Conditioned	a zone within a dwelling that is expected to require heating and cooling based on standard occupancy assumptions. In some circumstances it will include garages.
Custom windows	windows listed in NatHERS software that are available on the market in Australia and have a WERS (Window Energy Rating Scheme) rating.
Default windows	windows that are representative of a specific type of window product and whose properties have been derived by statistical methods.
Entrance door	these signify ventilation benefits in the modelling software and must not be modelled as a door when opening to a minimally ventilated corridor in a Class 2 building.
Exposure category - exposed	terrain with no obstructions e.g. flat grazing land, ocean-frontage, desert, exposed high-rise unit (usually above 10 floors).
Exposure category - open	terrain with few obstructions at a similar height e.g. grasslands with few well scattered obstructions below 10m, farmland with scattered sheds, lightly vegetated bush blocks, elevated units (e.g. above 3 floors).
Exposure category - suburban	terrain with numerous, closely spaced obstructions below 10m e.g. suburban housing, heavily vegetated bushland areas.
Exposure category - protected	terrain with numerous, closely spaced obstructions over 10 m e.g. city and industrial areas.
Horizontal shading feature	provides shading to the building in the horizontal plane, e.g. eaves, verandahs, pergolas, carports, or overhangs or balconies from upper levels.

National Construction Code (NCC) Class	the NCC groups buildings by their function and use, and assigns a classification code. NatHERS software models NCC Class 1, 2 or 4 buildings and attached Class 10a buildings. Definitions can be found at www.abcb.gov.au.
Opening Percentage	the openability percentage or operable (moveable) area of doors or windows that is used in ventilation calculations.
Provisional value	an assumed value that does not represent an actual value. For example, if the wall colour is unspecified in the documentation, a provisional value of 'medium' must be modelled. Acceptable provisional values are outlined in the NatHERS Technical Note and can be found at www.nathers.gov.au
Reflective wrap (also known as foil)	can be applied to walls, roofs and ceilings. When combined with an appropriate airgap and emissivity value, it provides insulative properties.
Roof window	for NatHERS this is typically an operable window (i.e. can be opened), will have a plaster or similar light well if there is an attic space, and generally does not have a diffuser.
Shading device	a device fixed to windows that provides shading e.g. window awnings or screens but excludes eaves.
Shading features	includes neighbouring buildings, fences, and wing walls, but excludes eaves.
Solar heat gain coefficient (SHGC)	the fraction of incident solar radiation admitted through a window, both directly transmitted as well as absorbed and subsequently released inward. SHGC is expressed as a number between 0 and 1. The lower a window's SHGC, the less solar heat it transmits.
Skylight (also known as roof lights)	for NatHERS this is typically a moulded unit with flexible reflective tubing (light well) and a diffuser at ceiling level.
U-value	the rate of heat transfer through a window. The lower the U-value, the better the insulating ability.
Unconditioned	a zone within a dwelling that is assumed to not require heating and cooling based on standard occupancy assumptions.
Vertical shading features	provides shading to the building in the vertical plane and can be parallel or perpendicular to the subject wall/window. Includes privacy screens, other walls in the building (wing walls), fences, other buildings, vegetation (protected or listed heritage trees).

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BCA Part 3.12 Performance Requirements

3.12.1.1 Building fabric thermal insulation

Where required, insulation must comply with AS/NZS 4859.1 and be installed so that it abuts or overlaps adjoining insulation other than at supporting members such as columns, studs, noggings, joists, furring channels and the like where the insulation must butt against the member; and forms a continuous barrier with ceilings, walls, bulkheads, floors or the like that inherently contribute to the thermal barrier; and does not affect the safe or effective operation of a domestic service or fitting.

Where required, reflective insulation must be installed with the necessary airspace, to achieve the required R-Value between a reflective side of the reflective insulation and a building lining or cladding; and the reflective insulation closely fitted against any penetration, door or window opening; and the reflective insulation adequately supported by framing members; and each adjoining sheet of roll membrane being overlapped not less than 150mm; or taped together.

Where required, bulk insulation must be installed so that it maintains its position and thickness, other than where it crosses roof battens, water pipes, electrical cabling or the like; and in a ceiling, where there is no bulk insulation or reflective insulation in the external wall beneath, it overlaps the external wall by not less than 50 mm.

3.12.1.2(c) and 3.12.1.4(b) Thermal breaks

A roof that has metal sheet roofing directly fixed to metal purlins, metal rafters or metal battens; and does not have a ceiling lining or has a ceiling lining fixed directly to those metal purlins, metal rafters or metal battens, must have a thermal break, consisting of a material with an R-Value of not less than 0.2, installed between the metal sheet roofing and its supporting metal purlins, metal rafters, or metal battens.

A wall that has lightweight external cladding such as weatherboards, fibre-cement or metal sheeting fixed to the metal frame; and does not have a wall lining or has a wall lining that is fixed directly to the metal frame, must have a thermal break, consisting of a material with an R-Value of not less than 0.2, installed between the external cladding and the metal frame.

3.12.1.2(e) Compensation for a loss of ceiling insulation

The house energy rating software used automatically compensates for a loss of ceiling insulation. Ceiling insulation penetrations are included in the final energy assessment on page 1 of the NatHERS Certificate.

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3.12.1.5(c) and 3.12.1.5(d) Floor edge insulation

A concrete slab-on-ground with an in-slab or in-screed heating or cooling system, must have insulation with an R-Value of not less than 1.0, installed around the vertical edge of its perimeter; and when in climate zone 8, must be insulated around the vertical edge of its perimeter with insulation having an R-Value of not less than 1.0; and underneath the slab with insulation having an R-Value of not less than 2.0.

Insulation required must be water resistant; and be continuous from the adjacent finished ground level to a depth of not less than 300mm; or for at least the full depth of the vertical edge of the concrete slab-on-ground.

These requirements do not apply to an in-screed heating or cooling system used solely in a bathroom, amenity area or the like.

3.12.3 Building Sealing

This Part applies to a Class 1 building and a Class 10a building with a conditioned space.

The Part does not apply to a building in climate zones 1, 2, 3 and 5 where the only means of air-conditioning is by using an evaporative cooler; or a permanent building ventilation opening that is necessary for the safe operation of a gas appliance; or A Class 10a building used for the accommodation of vehicles.

Chimneys and flues will be designed and installed in accordance with 3.12.3.1.

Roof lights will be designed and installed in accordance with 3.12.3.2.

External windows and doors will be designed and installed in accordance with 3.12.3.3.

Exhaust fans will be designed and installed in accordance with 3.12.3.4.

Construction of roofs, walls and floor will comply with 3.12.3.5.

Evaporative coolers will be designed and installed in accordance with 3.12.3.6.

3.12.5 Services

This Part applies to a Class 1 building, a Class 10a building and a Class 10b swimming pool associated with a Class 1 or 10a building.

A heated water supply system must be designed and installed in accordance with Part B2 of NCC Volume Three — Plumbing Code of Australia.

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Insulation of services will be designed and installed in accordance with 3.12.5.1.

Central heating water piping will be designed and installed in accordance with 3.12.5.2.

Heating and cooling ductwork will be designed and installed in accordance with 3.12.5.3.

Electric resistance space heating will be designed and installed in accordance with 3.12.5.4.

Artificial lighting will be designed and installed in accordance with 3.12.5.5.

A water heater in a heated water supply system will be designed and installed in accordance with 3.12.5.6.

Swimming pool heating and pumping will be designed and installed in accordance with 3.12.5.7.

Spa pool heating and pumping will be designed and installed in accordance with 3.12.5.8.

WA 2.3.1 Water use efficiency

All tap fittings other than bath outlets and garden taps must be a minimum of 4 stars WELS rated.

All showerheads must be a minimum of 3 stars WELS rated.

All sanitary flushing systems must be a minimum of 4 stars WELS rated dual flush.

WA 2.3.2 Swimming pool covers and blankets

An outdoor private swimming pool or spa associated with a Class 1 building must be supplied with a cover, blanket or the like that is designed to reduce water evaporation; and is accredited under the Smart Approved Watermark Scheme governed by the Australian Water Association, the Irrigation Association of Australia, the Nursery and Garden Industry Australia and the Water Services Association of Australia.

WA 2.3.3 Heated water use efficiency

All internal heated water outlets (such as taps, showers and washing machine water supply fittings) must be connected to a heated water system or a re-circulating heated water system with pipes installed and insulated in accordance with AS/NZS 3500: Plumbing and Drainage, Part 4 Heated Water Services. The pipe from the heated water system or re-circulating heated water system to the furthest heated water outlet must not be more than 20m in length or 2 litres of internal volume.

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Image: Arcologic Design

ENVIRONMENTALLY SUSTAINABLE DESIGN REQUIREMENTS FOR SINGLE HOUSES AND GROUPED DWELLINGS

The City's Built Form Policy includes Local Housing Objectives related to achieving a development which incorporates Environmentally Sustainable Design (ESD) principles.

These principles seek to achieve new developments which have a reduced environmental impact, improved energy and water efficiency, and reduced reliance on non-renewable energy sources. The development of energy efficient buildings also delivers medium to long-term savings for owners and occupants.

By considering these principles of ESD through the development application process, a more holistic approach can be taken towards incorporating ESD principles into the building design, rather than retrospectively once the building design has been completed.

The Local Housing Objectives in the Built Form Policy are performance-based, which requires consideration as to how each of these have been achieved.

To assist landowners and applicants in preparing a development application, the below table outlines the Local Housing Objectives applicable to Single Houses and Grouped Dwellings, and information on how these can be addressed through principles of ESD.

For further information and further examples of what you could provide, please refer to the City's Environmentally Sustainable Design Information Sheet HERE. Alternatively, feel free to contact the City's Development and Design team on 9273 6000.

Please outline how each of the following elements have been addressed and attach any relevant or supporting photos, images, diagrams or drawings where applicable.

What does this mean and how can I achieve this?	Applicant Comment – How I have achieved this objective
Environmental Impact *Development that considers the whole of life environmental impact of the building and incorporates measures to reduce this impact.*	
The environmental impact of developments can be impact by considerations such as building orientation, design and construction materials. Construction materials which are durable and are low maintenance generally have a low environmental impact. Some examples of building materials and design choices with reduced environmental impacts include: • Incorporating an east-west orientation (where possible); • Minimising the extent of the building footprint; • Incorporating good solar-passive design; • Reverse brick veneer (internal thermal mass, external insulation); • Low emission concrete; • Lightweight, recycled, non-toxic, minimally processed and recyclable materials; • Gabion walls filled with demolition waste; • High quality (durable), energy and water saving fixtures and fittings (such as reversible ceiling fans, water efficient taps and toilets); and • Installation of appropriate and effective insulation.	The design incorporates an east-west orientation. All living areas, including upper floor retreat, has north facing windows with eaves to reduce summer heat gain in summer. External walls is insulated cavity brick work which has an R value of 2.0. The fittings will be high quality with the aim of prolonging the working life of the fittings. Insulation has been maximised in ceiling and roofs.
Thermal Performance *Development that optimises thermal performance of the building throughout the year through design elements and material selection.*	
Thermal performance relates to the efficiency of buildings and materials to retain or transmit heat. In summer, a development with poor thermal performance will often absorb and retain more heat, resulting in the inside of the building feeling hotter. Design elements which can assist with achieving a high level of thermal performance relate to solar-passive design and includes the orientation and layout of the building, the placement of thermal mass, and the use of insulation. Material selection which can assist with achieving a high level of thermal performance can include those which have thermal mass (such as concrete, brick, tile, rammed earth) and insulation properties (such lightweight cladding, wood, recycled plastic composite, range of insulation materials, strategic use of air gaps).	The design has a high level of insulated thermal mass. Solar access is provided through the north facing windows on both the ground and upper floors.

What does this mean and how can I achieve this?	Applicant Comment – How I have achieved this objective
Solar Passive Design *Development shall incorporate site planning principles that maximise solar passive design opportunities for both summer and winter*	
Where the long axis of building runs east-west, the majority of glazing being provided to the north, with limited glazing provided to the east and west; and/or The inclusion of a central light well or courtyard can help to maximise access to northern light.	The axis of the building runs east-west. The east facing glazing to the living has significant shading. Glazing to the south has been minimised as to the glazing to the west. However as the road is to the west, glazing cannot be eliminated to ensure correct street presence.
Sunlight and Ventilation *The provision of natural ventilation and daylight penetration to reduce energy consumption*	
• Rooms provided with ventilation openings on both sides to allow cross-flow of air; • Maximum glazing provided to north-facing living areas; • Bedrooms being located on the south; and/or • Utility rooms and garages being located on east and west sides of a dwelling.	All rooms, besides the two minor rooms, has excellent cross ventilation incorporated within the room. Minor rooms have the doors positioned to ensure cross ventilation is maximised. Garages are to the west.
Solar Heating *The provision of daytime areas with north-facing glazing to allow passive solar heating during winter*	
• Up to 80% of the glazing provided to north facing living areas being unshaded in winter, and fully shaded by external structures in summer.	The eaves provides, allow for correct shading to the northern glazing although some winter sun will be blocked due to overshadowing by neighbours.
Cross Ventilation *The provision of openable windows and/or ceiling fans to habitable rooms or occupied spaces that allow natural and cross ventilation*	
• Windows located on north and south side of the dwelling being openable to utilise cooling breezes in summer; and/or • Reversible ceiling fans facilitate cooling in summer and improve air dispersion for more efficient heating in winter.	All windows are openable.
Water Re-use *The provision of recovery and re-use of rainwater, storm water, grey water and/or black water for non-potable water applications*	
• Rainwater captured in tank/s above or below ground and plumbed into toilet and laundry; • Greywater used for garden irrigation, or hand basin draining into toilet cistern for flushing; and/or • Soft landscaping is maximised to increase on-site stormwater infiltration.	Garden spaces has been maximised to allow for on site storm water to infiltrate the soil.

What does this mean and how can I achieve this?	Applicant Comment – How I have achieved this objective
Solar Gain *Incorporation of shading devices to reduce unwanted solar gain in summer and increase passive solar gain in winter*	
• Eaves, pergolas and other external shade structures designed to the correct depth to provide 0% shading in mid-winter and 100% shading in mid-summer. • Such structures may also be movable, (e.g. mobile screens and adjustable pergolas) to allow increased control over light and heat gain.	As per solar heating.
Energy Consumption *Integration of renewable energy and energy storage systems to optimise energy consumption.*	
• Solar photovoltaic system (with or without battery storage) for electricity generation; • Solar or heat pump hot water system; and/or • Smart-wired home to enable automated diversion of excess solar energy to power air conditioners and other appliances and reduce energy use at other times.	The project will utilise a solar heat pump or solar HWS.
Solar Absorptance ***Flat roof*** *structures that are not visible from the street or adjacent properties shall have a maximum solar absorptance rating of 0.4* or ***Pitched roof*** *structures or roof structures that are visible from the street or adjacent properties shall have a maximum solar absorptance rating of 0.5, unless a suitable alternative is identified in the Urban Design Study*	
Solar absorptance rating is a measure of how much solar energy a material absorbs and therefore how hot it gets when exposed to the sun. A rating of zero means no absorption and the material remains cool. A rating of 1 is 100% absorption and the material becomes very hot. As a general rule, light roof colours have lower absorptance values than dark roof colours. Roofing material suppliers can provide the absorptance values of their colour range. Roofs that are visible from the street or adjacent properties are permitted a higher absorptance value because lighter colours (which have lower absorptance values) may be visually less comfortable for some neighbours.	Solar absorbtance will be 0.69 - colorbond colour "Basalt" This SA was used to gain the 8-star rating for the house and the roof is visible from the street and from neighbouring properties so a higher SA is used to increase visual comfort.

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What does this mean and how can I achieve this?	Applicant Comment – How I have achieved this objective
Environmental Performance Demonstrate that the development is capable of achieving the following performance standards when compared against the Perth statistical average for residences: • 50% reduction in global warming potential (greenhouse gas emissions); and • 50% reduction in net fresh water use. The acceptable method for demonstrating this is an independently reviewed EN15978 compliant Target Setting life cycle assessment (LCA) with a 20% factor of safety applied to improvement strategies	
Applications for new Single Houses and Grouped Dwellings should be accompanied by a target setting LCA which measures the environmental performance of the building over its lifetime, to understand how the design contribute towards reduced environmental impacts. You can find an LCA assessor by contacting the Australian Life Cycle Assessment Society (ALCAS) or by doing a general internet search. Please ensure that you or the assessor you engage use methodologies compliant with: • Environmental standard EN15978 – Sustainability of construction works – Assessment of environmental performance of buildings – Calculation method; and • That the system boundary includes all Life Cycle Modules (A1-2, B1-7, C1-4 and D) in addition to non-integrated energy (plug loads). As an alternative to the LCA for Single and Grouped Dwellings, the City may accept an 8 star NatHERS rating, in conjunction with the development meeting the other local housing objectives listed above. The City can also consider other environmental sustainable design reports, however it is recommended these be discussed with the City prior to engaging someone, to ensure that the report will be accepted by the City.	As 8 star NatHERS assessment has been completed as per previous discussion with planning department

Please complete all sections of this template and send to **mail@vincent.wa.gov.au** along with all relevant attachments. Alternatively, you can submit your application in person at our **Administration Centre (244 Vincent Street, Leederville)** or post to **PO Box 82, Leederville, 6902**.