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.

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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.

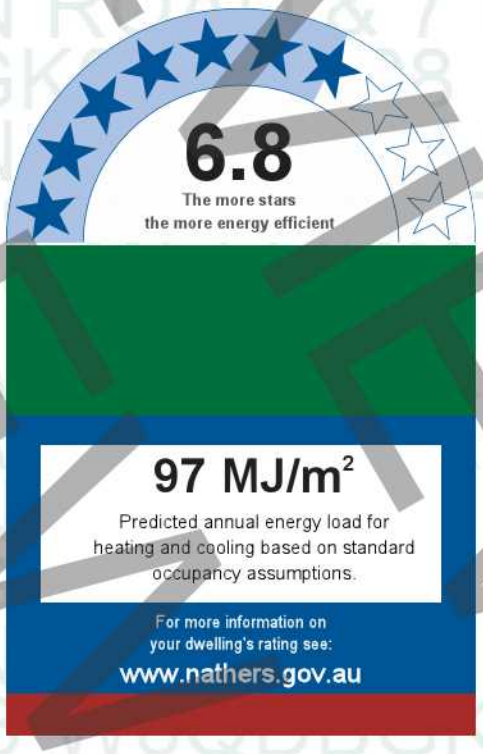
Glossary

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).

Nationwide House Energy Rating Scheme
NatHERS Certificate

Generated on 11 Jul 2023 using FirstRate5: 5.3.2b (3.21)



Property

Address	8, 5-9 Wellington Road & 7 Plar Street, Box Hill, VIC, 3128
Lot/DP	-
NCC Class*	Class 2
Type	New Home

Plans

Main plan	-
Prepared by	-

Construction and environment

Assessed floor area (m²)*	
Conditioned*	61.1
Unconditioned*	3.9
Total	65
Garage	-

Exposure type
open

NatHERS climate zone
62 Moorabbin Airport

Thermal performance

Heating	Cooling
88 MJ/m²	9 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	Margaret Turner
Business name	Ark Resources
Email	mt@arkresources.com.au
Phone	03 9636 0280
Accreditation No.	DMN/11/0194
Assessor Accrediting Organisation	-
Declaration of interest	Declaration completed: no conflicts

Verification

To verify this certificate, scan the QR code or visit 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? Substituted values must be based on the Australian Fenestration Rating Council (AFRC) protocol.

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

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

Custom* windows

Window ID	Window description	Maximum U-value*	SHGC*	Substitution tolerance ranges	
				SHGC lower limit	SHGC upper limit
CAP-055-52 A	Capral 419 Flushline Fixed Window DG 6/12Ar/6EA	2.71	0.58	0.55	0.61
CAP-051-06 A	Capral 35 Awning in 400 Frame DG 6EA/12Ar/6	4.42	0.41	0.39	0.43
CAP-057-13 A	Capral 900 Sliding Door DG 6EA/12Ar/6	3.19	0.48	0.46	0.5

Window and glazed door *Schedule*

Location	Window ID	Window no.	Height (mm)	Width (mm)	Window type	Opening %	Orientation	Window shading device*
Bedroom 1	CAP-055-52 A	Opening 41	2700	2350	fixed	0.0	W	No
Bedroom 1	CAP-051-06 A	Opening 39	2700	2000	awning	10.0	S	No

* Refer to glossary.

Bedroom 2	CAP-051-06 A	Opening 38	2700	2000	awning	10.0	S	No
Kitchen/Living	CAP-057-13 A	Opening 40	2700	3850	sliding	45.0	W	No

Roof window *type and performance value*

Default* roof windows

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

Custom* roof windows

Window ID	Window description	Maximum U-value*	SHGC*	Substitution tolerance ranges	
				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*

Location	Height (mm)	Width (mm)	Opening %	Orientation
No Data Available				

External wall *type*

Wall ID	Wall type	Solar absorptance	Wall shade (colour)	Bulk insulation (R-value)	Reflective wall wrap*
1	EXCON	0.5	Medium	Rockwool batt: R2.5 (R2.5)	No
2	INTN	0.5	Medium	Glass fibre batt: R1.5 (R1.5)	No
3	FC	0.5	Medium	Rockwool batt: R2.5 (R2.5)	No

External wall *schedule*

Location	Wall ID	Height (mm)	Width (mm)	Orientation	Horizontal shading feature* maximum projection (mm)	Vertical shading feature (yes/no)
Bedroom 1	1	2700	3388	W	200	Yes
Bedroom 1	1	2700	3133	S	199	No

* Refer to glossary.

Bed 1 WIR	1	2700	1472	W	199	Yes
Bed 1 WIR	1	2700	1949	N	3878	Yes
Bed 1 Ensuite	1	2700	1597	S	244	No
Bedroom 2	1	2700	3571	S	200	No
Bedroom 2	1	2700	1797	E	3965	Yes
Bedroom 2	2	2700	1182	E	0	No
Bath	2	2700	1575	E	0	No
Kitchen/Living	3	2700	4066	W	2766	Yes
Kitchen/Living	1	2700	369	N	3878	Yes
Kitchen/Living	2	2700	4254	E	0	No
Kitchen/Living	2	2700	6113	N	0	No

Internal wall *type*

Wall ID	Wall type	Area (m²)	Bulk insulation
1	FR5 - Internal Plasterboard Stud Wall	53.5	

Floor *type*

Location	Construction	Area (m²)	Sub-floor ventilation	Added insulation (R-value)	Covering
Bedroom 1	CONPB	11.1	Enclosed	R0.0	Carpet
Bed 1 WIR	CONPB	2.6	Enclosed	R0.0	Carpet
Bed 1 Ensuite	CONPB	4.5	Enclosed	R0.0	Tiles
Bedroom 2	CONPB	10.6	Enclosed	R0.0	Carpet
Bath	CONPB	3.9	Enclosed	R0.0	Tiles
Kitchen/Living	CONPB	32.3	Enclosed	R0.0	Timber

Ceiling *type*

Location	Construction material/type	Bulk insulation R-value (may include edge batt values)	Reflective wrap*
No Data Available			

Ceiling *penetrations**

Location	Quantity	Type	Diameter (mm)	Sealed/unsealed
Bed 1 Ensuite	1	Exhaust Fans	250	Sealed
Bath	1	Exhaust Fans	250	Sealed
Kitchen/Living	1	Exhaust Fans	150	Sealed
Kitchen/Living	1	Exhaust Fans	250	Sealed

Ceiling *fans*

Location	Quantity	Diameter (mm)
No Data Available		

Roof *type*

Construction	Added insulation (R-value)	Solar absorptance	Roof shade

* Refer to glossary.

Slab:Slab - Suspended Slab : 200mm: 200mm Suspended Slab	0.0	0.5	Medium

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U-value	the rate of heat transfer through a window. The lower the U-value, the better the insulating ability.
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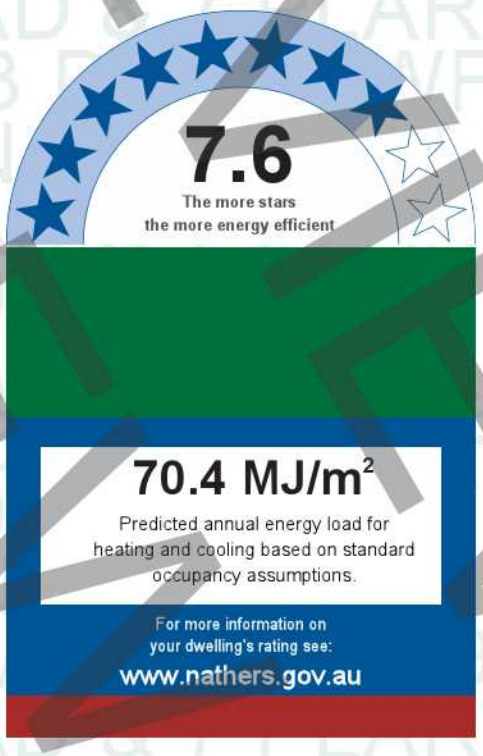

Property

Address	9, 5-9 Wellington Road & 7 Plar Street, Box Hill, VIC, 3128
Lot/DP	-
NCC Class*	Class 2
Type	New Home

Plans

Main plan	-
Prepared by	-

Construction and environment

Assessed floor area (m²)*	
Conditioned*	48.6
Unconditioned*	5.5
Total	54.1
Garage	-

Exposure type
open

NatHERS climate zone
62 Moorabbin Airport

Thermal performance

Heating	Cooling
59.7 MJ/m²	10.7 MJ/m²

About the rating
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Accredited assessor

Name	Margaret Turner
Business name	Ark Resources
Email	mt@arkresources.com.au
Phone	03 9636 0280
Accreditation No.	DMN/11/0194
Assessor Accrediting Organisation	-
Declaration of interest	Declaration completed: no conflicts

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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

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

Custom* windows

Window ID	Window description	Maximum U-value*	SHGC*	Substitution tolerance ranges	
				SHGC lower limit	SHGC upper limit
CAP-055-52 A	Capral 419 Flushline Fixed Window DG 6/12Ar/6EA	2.71	0.58	0.55	0.61
CAP-057-13 A	Capral 900 Sliding Door DG 6EA/12Ar/6	3.19	0.48	0.46	0.5

Window and glazed door *Schedule*

Location	Window ID	Window no.	Height (mm)	Width (mm)	Window type	Opening %	Orientation	Window shading device*
Bedroom 1	CAP-055-52 A	Opening 47	2700	2350	fixed	0.0	W	No
Bedroom 1	CAP-057-13 A	Opening 46	2700	2200	sliding	45.0	S	No
Kitchen/Living	CAP-057-13 A	Opening 45	2700	3278	sliding	30.0	W	No

* Refer to glossary.

Roof window *type and performance value*

Default* roof windows

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

Custom* roof windows

Window ID	Window description	Maximum U-value*	SHGC*	Substitution tolerance ranges	
				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*

Location	Height (mm)	Width (mm)	Opening %	Orientation
No Data Available				

External wall *type*

Wall ID	Wall type	Solar absorptance	Wall shade (colour)	Bulk insulation (R-value)	Reflective wall wrap*
1	EXCON	0.5	Medium	Rockwool batt: R2.5 (R2.5)	No
2	FC	0.5	Medium	Rockwool batt: R2.5 (R2.5)	No
3	INTN	0.5	Medium	Glass fibre batt: R1.5 (R1.5)	No
4	CONS	0.5	Medium	Glass fibre batt (k = 0.044 density = 12 kg/m3) (R0.6)	No

External wall *schedule*

Location	Wall ID	Height (mm)	Width (mm)	Orientation	Horizontal shading feature* maximum projection (mm)	Vertical shading feature (yes/no)
Bedroom 1	1	2700	2997	W	197	Yes
Bedroom 1	2	2700	2425	S	3440	Yes

* Refer to glossary.

Bedroom 1	3	2700	1961	N	0	No
Bedroom 1	1	2700	2118	N	0	Yes
Bath	3	2700	2790	E	0	No
Bath	3	2700	1967	N	0	No
Study	3	2700	2926	N	0	No
Kitchen/Living	2	2700	3368	W	2759	Yes
Kitchen/Living	3	2700	8004	S	0	No
Kitchen/Living	3	2700	924	E	0	No
Kitchen/Living	4	2700	2641	E	0	No
Kitchen/Living	3	2700	1216	N	0	No

Internal wall *type*

Wall ID	Wall type	Area (m²)	Bulk insulation
1	FR5 - Internal Plasterboard Stud Wall	32.9	

Floor *type*

Location	Construction	Area (m²)	Sub-floor ventilation	Added insulation (R-value)	Covering
Bedroom 1	CONPB	12.2	Enclosed	R0.0	Carpet
Bath	CONPB	5.5	Enclosed	R0.0	Tiles
Study	CONPB	5.1	Enclosed	R0.0	Timber
Kitchen/Living	CONPB	31.3	Enclosed	R0.0	Timber

Ceiling *type*

Location	Construction material/type	Bulk insulation R-value (may include edge batt values)	Reflective wrap*
No Data Available			

Ceiling *penetrations**

Location	Quantity	Type	Diameter (mm)	Sealed/unsealed
Bath	1	Exhaust Fans	250	Sealed
Study	1	Exhaust Fans	250	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
Slab:Slab - Suspended Slab : 200mm: 200mm Suspended Slab	0.0	0.5	Medium

* 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.

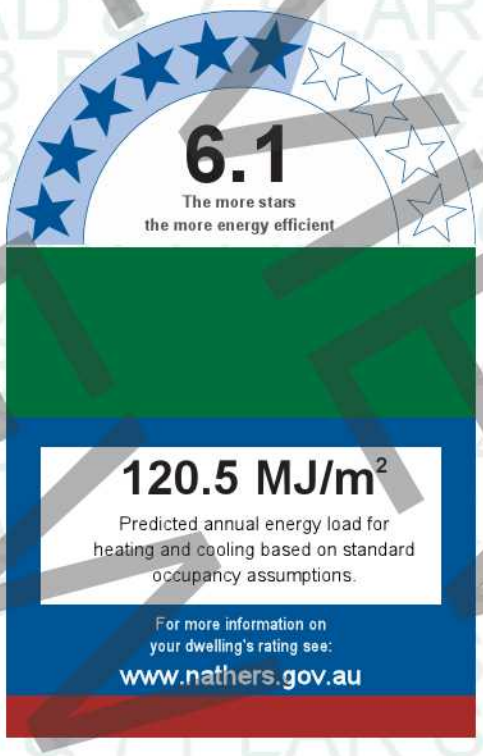
Glossary

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).

Nationwide House Energy Rating Scheme
NatHERS Certificate

Generated on 11 Jul 2023 using FirstRate5: 5.3.2b (3.21)



Property

Address	1, 5-9 Wellington Road & 7 Plar Street, Box Hill, VIC, 3128
Lot/DP	-
NCC Class*	Class 2
Type	New Home

Plans

Main plan	-
Prepared by	-

Construction and environment

Assessed floor area (m²)*	
Conditioned*	70
Unconditioned*	4
Total	74
Garage	-

Exposure type
exposed

NatHERS climate zone
62 Moorabbin Airport

Thermal performance

Heating	Cooling
100.8 MJ/m²	19.7 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	Margaret Turner
Business name	Ark Resources
Email	mt@arkresources.com.au
Phone	03 9636 0280
Accreditation No.	DMN/11/0194
Assessor Accrediting Organisation	-
Declaration of interest	Declaration completed: no conflicts

Verification

To verify this certificate, scan the QR code or visit 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

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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? Substituted values must be based on the Australian Fenestration Rating Council (AFRC) protocol.

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

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

Custom* windows

Window ID	Window description	Maximum U-value*	SHGC*	Substitution tolerance ranges	
				SHGC lower limit	SHGC upper limit
CAP-051-07 A	Capral 35 Awning in 400 Frame DG INSU564-Clr IGU	4.42	0.2	0.19	0.21
CAP-057-13 A	Capral 900 Sliding Door DG 6EA/12Ar/6	3.19	0.48	0.46	0.5
CAP-055-50 A	Capral 419 Flushline Fixed Window DG 838CPGy37/12Ar/6	2.7	0.26	0.25	0.27

Window and glazed door *Schedule*

Location	Window ID	Window no.	Height (mm)	Width (mm)	Window type	Opening %	Orientation	Window shading device*
Bedroom 1	CAP-051-07 A	Opening 10	2700	2050	awning	10.0	W	No
Bedroom 2	CAP-057-13 A	Opening 7	2700	2679	sliding	30.0	N	No

* Refer to glossary.

Kitchen/Living	CAP-055-50 A	Opening 9	2700	1825	fixed	0.0	N	No
Kitchen/Living	CAP-051-07 A	Opening 12	2700	1825	awning	10.0	N	No
Kitchen/Living	CAP-055-50 A	Opening 11	2700	4299	fixed	0.0	W	No
Kitchen/Living	CAP-057-13 A	Opening 8	2700	2350	sliding	30.0	E	No

Roof window *type and performance value*

Default* roof windows

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

Custom* roof windows

Window ID	Window description	Maximum U-value*	SHGC*	Substitution tolerance ranges	
				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*

Location	Height (mm)	Width (mm)	Opening %	Orientation
No Data Available				

External wall *type*

Wall ID	Wall type	Solar absorptance	Wall shade (colour)	Bulk insulation (R-value)	Reflective wall wrap*
1	EXCON	0.5	Medium	Rockwool batt: R2.5 (R2.5)	No
2	FC	0.5	Medium	Rockwool batt: R2.5 (R2.5)	No
3	INTN	0.5	Medium	Glass fibre batt: R1.5 (R1.5)	No

External wall *schedule*

Location	Wall ID	Height (mm)	Width (mm)	Orientation	Horizontal shading feature* maximum projection (mm)	Vertical shading feature (yes/no)

Bedroom 1	1	2700	3604	W	228	No
Bedroom 1	2	2700	2012	S	3975	Yes
Bedroom 1	3	2700	985	S	0	No
Bedroom 2	3	2700	3389	E	0	No
Bedroom 2	2	2700	3571	N	2943	Yes
Bed 2 Ensuite	3	2700	1672	E	0	No
Bath	3	2700	1597	E	0	No
Entry	3	2700	4803	S	0	No
Entry	3	2700	1391	E	0	No
Kitchen/Living	1	2700	4090	N	253	No
Kitchen/Living	1	2700	7240	W	222	No
Kitchen/Living	2	2700	2546	E	3795	Yes

Internal wall *type*

Wall ID	Wall type	Area (m²)	Bulk insulation
1	FR5 - Internal Plasterboard Stud Wall	65.3	

Floor *type*

Location	Construction	Area (m²)	Sub-floor ventilation	Added insulation (R-value)	Covering
Bedroom 1	CONPB	10.8	Enclosed	R0.0	Carpet
Bedroom 2	CONPB	12.1	Enclosed	R0.0	Carpet
Bed 2 Ensuite	CONPB	4.6	Enclosed	R0.0	Tiles
Bath	CONPB	4	Enclosed	R0.0	Tiles
Entry	CONPB	13.9	Enclosed	R0.0	Timber
Kitchen/Living	CONPB	28.6	Enclosed	R0.0	Timber

Ceiling *type*

Location	Construction material/type	Bulk insulation R-value (may include edge batt values)	Reflective wrap*
No Data Available			

Ceiling *penetrations**

Location	Quantity	Type	Diameter (mm)	Sealed/unsealed
Bed 2 Ensuite	1	Exhaust Fans	250	Sealed
Bath	1	Exhaust Fans	250	Sealed
Entry	1	Exhaust Fans	250	Sealed
Kitchen/Living	1	Exhaust Fans	150	Sealed

Ceiling *fans*

Location	Quantity	Diameter (mm)
No Data Available		

* Refer to glossary.

Roof *type*

Construction	Added insulation (R-value)	Solar absorptance	Roof shade
Slab:Slab - Suspended Slab : 200mm: 200mm Suspended Slab	0.0	0.5	Medium

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.
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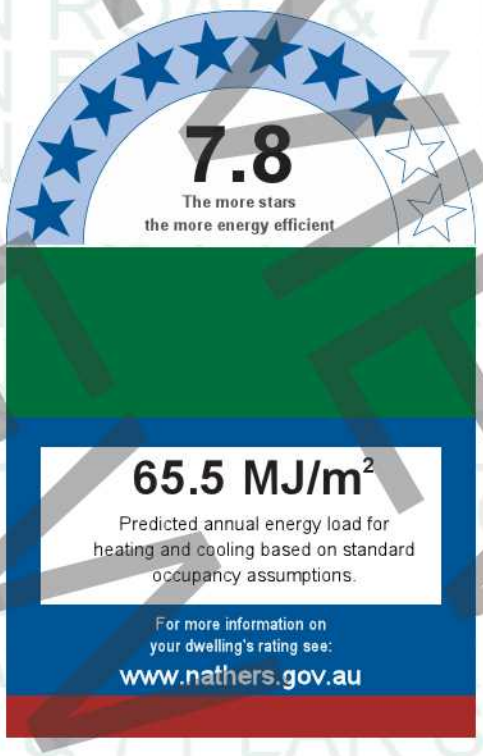
Nationwide House Energy Rating Scheme
NatHERS Certificate

Generated on 11 Jul 2023 using FirstRate5: 5.3.2b (3.21)



Property

Address	2, 5-9 Wellington Road & 7 Plar Street, Box Hill, VIC, 3128
Lot/DP	-
NCC Class*	Class 2
Type	New Home

Plans

Main plan	-
Prepared by	-

Construction and environment

Assessed floor area (m²)*	
Conditioned*	61
Unconditioned*	3.4
Total	64.4
Garage	-

Exposure type
exposed

NatHERS climate zone
62 Moorabbin Airport

Thermal performance

Heating	Cooling
53.5 MJ/m²	12 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	Margaret Turner
Business name	Ark Resources
Email	mt@arkresources.com.au
Phone	03 9636 0280
Accreditation No.	DMN/11/0194
Assessor Accrediting Organisation	-
Declaration of interest	Declaration completed: no conflicts

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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.

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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? Substituted values must be based on the Australian Fenestration Rating Council (AFRC) protocol.

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

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

Custom* windows

Window ID	Window description	Maximum U-value*	SHGC*	Substitution tolerance ranges	
				SHGC lower limit	SHGC upper limit
CAP-057-13 A	Capral 900 Sliding Door DG 6EA/12Ar/6	3.19	0.48	0.46	0.5
CAP-055-52 A	Capral 419 Flushline Fixed Window DG 6/12Ar/6EA	2.71	0.58	0.55	0.61
CAP-051-06 A	Capral 35 Awning in 400 Frame DG 6EA/12Ar/6	4.42	0.41	0.39	0.43

Window and glazed door *Schedule*

Location	Window ID	Window no.	Height (mm)	Width (mm)	Window type	Opening %	Orientation	Window shading device*
Bedroom 1	CAP-057-13 A	Opening 19	2700	2900	sliding	30.0	W	No
Bedroom 1	CAP-055-52 A	Opening 23	2700	200	fixed	0.0	W	No

* Refer to glossary.

Bedroom 1	CAP-055-52 A	Opening 21	2700	2700	fixed	0.0	N	No
Bedroom 2	CAP-051-06 A	Opening 20	2700	1100	awning	10.0	N	No
Kitchen/Living	CAP-055-52 A	Opening 22	2700	900	fixed	0.0	E	No
Kitchen/Living	CAP-057-13 A	Opening 18	2700	3100	sliding	30.0	N	No

Roof window *type and performance value*

Default* roof windows

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

Custom* roof windows

Window ID	Window description	Maximum U-value*	SHGC*	Substitution tolerance ranges	
				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*

Location	Height (mm)	Width (mm)	Opening %	Orientation
No Data Available				

External wall *type*

Wall ID	Wall type	Solar absorptance	Wall shade (colour)	Bulk insulation (R-value)	Reflective wall wrap*
1	INTN	0.5	Medium	Glass fibre batt: R1.5 (R1.5)	No
2	EXCON	0.5	Medium	Rockwool batt: R2.5 (R2.5)	No
3	FC	0.5	Medium	Rockwool batt: R2.5 (R2.5)	No

External wall *schedule*

Location	Wall ID	Height (mm)	Width (mm)	Orientation	Horizontal shading feature* maximum projection (mm)	Vertical shading feature (yes/no)

Bedroom 1	1	2700	3008	W	5538	Yes
Bedroom 1	1	2700	4835	E	0	No
Bedroom 1	2	2700	2366	E	3650	Yes
Bedroom 1	2	2700	3398	N	198	No
Bed 1 Ensuite	1	2700	889	S	0	No
Bed 1 Ensuite	1	2700	460	W	0	No
Bed 1 Ensuite	1	2700	1490	S	0	No
Bed 1 Ensuite	1	2700	1701	E	0	No
Bedroom 2	3	2700	1918	N	3462	Yes
Bath	1	2700	2509	S	0	No
Bath	1	2700	454	E	0	No
Kitchen/Living	1	2700	3901	S	0	No
Kitchen/Living	3	2700	1066	E	1715	Yes
Kitchen/Living	3	2700	3584	N	2395	Yes
Kitchen/Living	2	2700	332	W	3648	Yes
Kitchen/Living	1	2700	6621	W	0	No

Internal wall *type*

Wall ID	Wall type	Area (m²)	Bulk insulation
1	FR5 - Internal Plasterboard Stud Wall	58.5	

Floor *type*

Location	Construction	Area (m²)	Sub-floor ventilation	Added insulation (R-value)	Covering
Bedroom 1	CONPB	17.7	Enclosed	R0.0	Carpet
Bed 1 Ensuite	CONPB	3.6	Enclosed	R0.0	Tiles
Bedroom 2	CONPB	10.7	Enclosed	R0.0	Carpet
Bath	CONPB	3.4	Enclosed	R0.0	Tiles
Hall	CONPB	3.7	Enclosed	R0.0	Timber
Kitchen/Living	CONPB	25.2	Enclosed	R0.0	Timber

Ceiling *type*

Location	Construction material/type	Bulk insulation R-value (may include edge batt values)	Reflective wrap*
No Data Available			

Ceiling *penetrations**

Location	Quantity	Type	Diameter (mm)	Sealed/unsealed
Bed 1 Ensuite	1	Exhaust Fans	250	Sealed
Bath	1	Exhaust Fans	250	Sealed
Hall	1	Exhaust Fans	250	Sealed
Kitchen/Living	1	Exhaust Fans	150	Sealed

* Refer to glossary.

Ceiling *fans*

Location	Quantity	Diameter (mm)
No Data Available		

Roof *type*

Construction	Added insulation (R-value)	Solar absorptance	Roof shade
Slab:Slab - Suspended Slab : 200mm: 200mm Suspended Slab	0.0	0.5	Medium

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.

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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.

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Glossary

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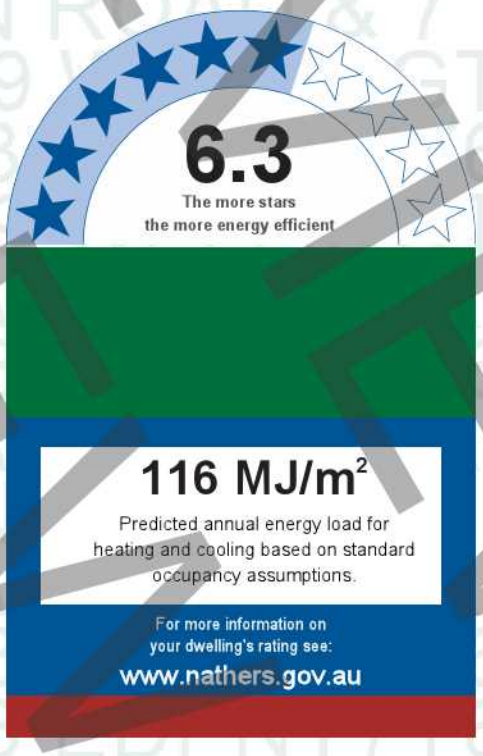
Ceiling penetrations	features that require a penetration to the ceiling, including downlights, vents, exhaust fans, rangehoods, chimneys and flues. Excludes fixtures attached to the ceiling with small holes through the ceiling for wiring, e.g. ceiling fans; pendant lights, and heating and cooling ducts.
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).

Nationwide House Energy Rating Scheme
NatHERS Certificate

Generated on 11 Jul 2023 using FirstRate5: 5.3.2b (3.21)



Property

Address	3, 5-9 Wellington Road & 7 Plar Street, Box Hill, VIC, 3128
Lot/DP	-
NCC Class*	Class 2
Type	New Home

Plans

Main plan	-
Prepared by	-

Construction and environment

Assessed floor area (m²)*	
Conditioned*	70
Unconditioned*	4
Total	74
Garage	-

Exposure type
exposed

NatHERS climate zone
62 Moorabbin Airport

Thermal performance

Heating	Cooling
99.5 MJ/m²	16.5 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	Margaret Turner
Business name	Ark Resources
Email	mt@arkresources.com.au
Phone	03 9636 0280
Accreditation No.	DMN/11/0194
Assessor Accrediting Organisation	-
Declaration of interest	Declaration completed: no conflicts

Verification

To verify this certificate, scan the QR code or visit 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.

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? Substituted values must be based on the Australian Fenestration Rating Council (AFRC) protocol.

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

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

Custom* windows

Window ID	Window description	Maximum U-value*	SHGC*	Substitution tolerance ranges	
				SHGC lower limit	SHGC upper limit
CAP-051-07 A	Capral 35 Awning in 400 Frame DG INSU564-Clr IGU	4.42	0.2	0.19	0.21
CAP-057-13 A	Capral 900 Sliding Door DG 6EA/12Ar/6	3.19	0.48	0.46	0.5
CAP-055-50 A	Capral 419 Flushline Fixed Window DG 838CPGy37/12Ar/6	2.7	0.26	0.25	0.27

Window and glazed door *Schedule*

Location	Window ID	Window no.	Height (mm)	Width (mm)	Window type	Opening %	Orientation	Window shading device*
Bedroom 1	CAP-051-07 A	Opening 10	2700	2037	awning	10.0	E	No
Bedroom 2	CAP-057-13 A	Opening 7	2700	2679	sliding	30.0	N	No

* Refer to glossary.

Kitchen/Living	CAP-057-13 A	Opening 8	2700	2300	sliding	30.0	W	No
Kitchen/Living	CAP-055-50 A	Opening 11	2700	4309	fixed	0.0	E	No
Kitchen/Living	CAP-055-50 A	Opening 9	2700	1825	fixed	0.0	N	No
Kitchen/Living	CAP-051-07 A	Opening 12	2700	1825	awning	10.0	N	No

Roof window *type and performance value*

Default* roof windows

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

Custom* roof windows

Window ID	Window description	Maximum U-value*	SHGC*	Substitution tolerance ranges	
				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*

Location	Height (mm)	Width (mm)	Opening %	Orientation
No Data Available				

External wall *type*

Wall ID	Wall type	Solar absorptance	Wall shade (colour)	Bulk insulation (R-value)	Reflective wall wrap*
1	INTN	0.5	Medium	Glass fibre batt: R1.5 (R1.5)	No
2	FC	0.5	Medium	Rockwool batt: R2.5 (R2.5)	No
3	EXCON	0.5	Medium	Rockwool batt: R2.5 (R2.5)	No

External wall *schedule*

Location	Wall ID	Height (mm)	Width (mm)	Orientation	Horizontal shading feature* maximum projection (mm)	Vertical shading feature (yes/no)

* Refer to glossary.

Bedroom 1	1	2700	510	S	0	No
Bedroom 1	2	2700	2487	S	3092	Yes
Bedroom 1	3	2700	3604	E	188	No
Bedroom 2	2	2700	3571	N	2925	Yes
Bedroom 2	1	2700	3389	W	0	No
Bed 2 Ensuite	1	2700	1672	W	0	No
Bath	1	2700	1597	W	0	No
Entry	1	2700	1391	W	0	No
Entry	1	2700	4803	S	0	No
Kitchen/Living	2	2700	2546	W	3795	Yes
Kitchen/Living	3	2700	7240	E	182	No
Kitchen/Living	3	2700	4090	N	235	No

Internal wall *type*

Wall ID	Wall type	Area (m²)	Bulk insulation
1	FR5 - Internal Plasterboard Stud Wall	65.3	

Floor *type*

Location	Construction	Area (m²)	Sub-floor ventilation	Added insulation (R-value)	Covering
Bedroom 1	CONPB	10.8	Enclosed	R0.0	Carpet
Bedroom 2	CONPB	12.1	Enclosed	R0.0	Carpet
Bed 2 Ensuite	CONPB	4.6	Enclosed	R0.0	Tiles
Bath	CONPB	4	Enclosed	R0.0	Tiles
Entry	CONPB	13.9	Enclosed	R0.0	Timber
Kitchen/Living	CONPB	28.6	Enclosed	R0.0	Timber

Ceiling *type*

Location	Construction material/type	Bulk insulation R-value (may include edge batt values)	Reflective wrap*
No Data Available			

Ceiling *penetrations**

Location	Quantity	Type	Diameter (mm)	Sealed/unsealed
Bed 2 Ensuite	1	Exhaust Fans	250	Sealed
Bath	1	Exhaust Fans	250	Sealed
Entry	1	Exhaust Fans	250	Sealed
Kitchen/Living	1	Exhaust Fans	150	Sealed

Ceiling *fans*

Location	Quantity	Diameter (mm)
No Data Available		

* Refer to glossary.

Roof *type*

Construction	Added insulation (R-value)	Solar absorptance	Roof shade
Slab:Slab - Suspended Slab : 200mm: 200mm Suspended Slab	0.0	0.5	Medium

Explanatory Notes

About this report

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U-value	the rate of heat transfer through a window. The lower the U-value, the better the insulating ability.
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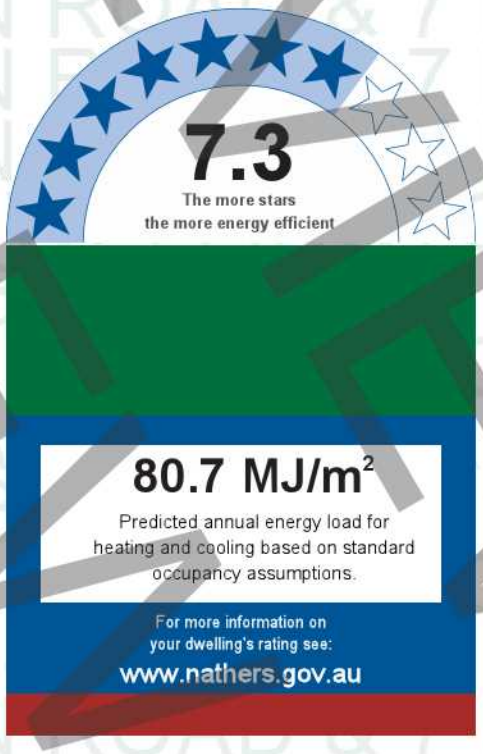
Nationwide House Energy Rating Scheme
NatHERS Certificate

Generated on 11 Jul 2023 using FirstRate5: 5.3.2b (3.21)



Property

Address	4, 5-9 Wellington Road & 7 Plar Street, Box Hill, VIC, 3128
Lot/DP	-
NCC Class*	Class 2
Type	New Home

Plans

Main plan	-
Prepared by	-

Construction and environment

Assessed floor area (m²)*	
Conditioned*	46.3
Unconditioned*	6.4
Total	52.7
Garage	-

Exposure type
exposed

NatHERS climate zone
62 Moorabbin Airport

Thermal performance

Heating	Cooling
60.6 MJ/m²	20.1 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	Margaret Turner
Business name	Ark Resources
Email	mt@arkresources.com.au
Phone	03 9636 0280
Accreditation No.	DMN/11/0194
Assessor Accrediting Organisation	-
Declaration of interest	Declaration completed: no conflicts

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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?

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Does the installed window meet the substitution tolerances (SHGC and U-value) and window type, of the window shown on this Certificate? Substituted values must be based on the Australian Fenestration Rating Council (AFRC) protocol.

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

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

Custom* windows

Window ID	Window description	Maximum U-value*	SHGC*	Substitution tolerance ranges	
				SHGC lower limit	SHGC upper limit
CAP-057-13 A	Capral 900 Sliding Door DG 6EA/12Ar/6	3.19	0.48	0.46	0.5
CAP-055-52 A	Capral 419 Flushline Fixed Window DG 6/12Ar/6EA	2.71	0.58	0.55	0.61

Window and glazed door *Schedule*

Location	Window ID	Window no.	Height (mm)	Width (mm)	Window type	Opening %	Orientation	Window shading device*
Bedroom 1	CAP-057-13 A	Opening 15	2700	2350	sliding	45.0	E	No
Kitchen/Living	CAP-055-52 A	Opening 17	2700	3250	fixed	0.0	E	No
Kitchen/Living	CAP-057-13 A	Opening 16	2700	2470	sliding	45.0	N	No

* Refer to glossary.

Roof window *type and performance value*

Default* roof windows

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

Custom* roof windows

Window ID	Window description	Maximum U-value*	SHGC*	Substitution tolerance ranges	
				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*

Location	Height (mm)	Width (mm)	Opening %	Orientation
No Data Available				

External wall *type*

Wall ID	Wall type	Solar absorptance	Wall shade (colour)	Bulk insulation (R-value)	Reflective wall wrap*
1	FC	0.5	Medium	Rockwool batt: R2.5 (R2.5)	No
2	INTN	0.5	Medium	Glass fibre batt: R1.5 (R1.5)	No
3	EXCON	0.5	Medium	Rockwool batt: R2.5 (R2.5)	No

External wall *schedule*

Location	Wall ID	Height (mm)	Width (mm)	Orientation	Horizontal shading feature* maximum projection (mm)	Vertical shading feature (yes/no)
Bedroom 1	1	2700	2996	E	3047	Yes
Bedroom 1	2	2700	4025	N	0	No
Bath	2	2700	2185	W	0	No
Bath	2	2700	2491	N	0	No

* Refer to glossary.

Kitchen/Living	2	2700	2328	W	0	No
Kitchen/Living	2	2700	1319	S	0	No
Kitchen/Living	2	2700	2374	W	0	No
Kitchen/Living	2	2700	2526	S	0	No
Kitchen/Living	3	2700	5499	S	0	Yes
Kitchen/Living	3	2700	3893	E	196	No
Kitchen/Living	1	2700	2710	N	3101	Yes

Internal wall *type*

Wall ID	Wall type	Area (m²)	Bulk insulation
1	FR5 - Internal Plasterboard Stud Wall	27.3	

Floor *type*

Location	Construction	Area (m²)	Sub-floor ventilation	Added insulation (R-value)	Covering
Bedroom 1	CONPB	12.1	Enclosed	R0.0	Carpet
Bath	CONPB	6.4	Enclosed	R0.0	Tiles
Kitchen/Living	CONPB	34.2	Enclosed	R0.0	Timber

Ceiling *type*

Location	Construction material/type	Bulk insulation R-value (may include edge batt values)	Reflective wrap*
No Data Available			

Ceiling *penetrations**

Location	Quantity	Type	Diameter (mm)	Sealed/unsealed
Bath	1	Exhaust Fans	250	Sealed
Kitchen/Living	1	Exhaust Fans	250	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
Slab:Slab - Suspended Slab : 200mm: 200mm Suspended Slab	0.0	0.5	Medium

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).

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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.

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Disclaimer

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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.

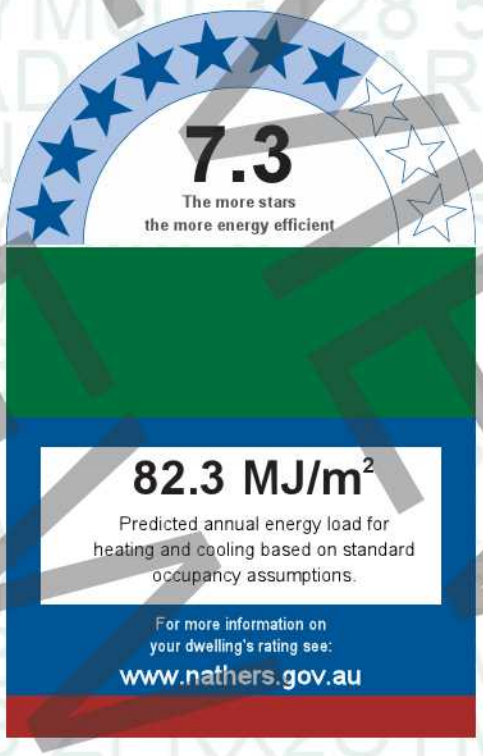
Glossary

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).

Nationwide House Energy Rating Scheme
NatHERS Certificate

Generated on 11 Jul 2023 using FirstRate5: 5.3.2b (3.21)



Property

Address	5, 5-9 Wellington Road & 7 Plar Street, Box Hill, VIC, 3128
Lot/DP	-
NCC Class*	Class 2
Type	New Home

Plans

Main plan	-
Prepared by	-

Construction and environment

Assessed floor area (m²)*	
Conditioned*	46.3
Unconditioned*	6.4
Total	52.7
Garage	-

Exposure type
exposed

NatHERS climate zone
62 Moorabbin Airport

Thermal performance

Heating	Cooling
64.8 MJ/m²	17.5 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	Margaret Turner
Business name	Ark Resources
Email	mt@arkresources.com.au
Phone	03 9636 0280
Accreditation No.	DMN/11/0194
Assessor Accrediting Organisation	-
Declaration of interest	Declaration completed: no conflicts

Verification

To verify this certificate, scan the QR code or visit 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.

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? Substituted values must be based on the Australian Fenestration Rating Council (AFRC) protocol.

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

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

Custom* windows

Window ID	Window description	Maximum U-value*	SHGC*	Substitution tolerance ranges	
				SHGC lower limit	SHGC upper limit
CAP-057-13 A	Capral 900 Sliding Door DG 6EA/12Ar/6	3.19	0.48	0.46	0.5
CAP-055-52 A	Capral 419 Flushline Fixed Window DG 6/12Ar/6EA	2.71	0.58	0.55	0.61

Window and glazed door *Schedule*

Location	Window ID	Window no.	Height (mm)	Width (mm)	Window type	Opening %	Orientation	Window shading device*
Bedroom 1	CAP-057-13 A	Opening 15	2700	2900	sliding	45.0	E	No
Kitchen/Living	CAP-057-13 A	Opening 16	2700	2050	sliding	45.0	S	No
Kitchen/Living	CAP-055-52 A	Opening 17	2700	3250	fixed	0.0	E	No

* Refer to glossary.

Roof window *type and performance value*

Default* roof windows

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

Custom* roof windows

Window ID	Window description	Maximum U-value*	SHGC*	Substitution tolerance ranges	
				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*

Location	Height (mm)	Width (mm)	Opening %	Orientation
No Data Available				

External wall *type*

Wall ID	Wall type	Solar absorptance	Wall shade (colour)	Bulk insulation (R-value)	Reflective wall wrap*
1	INTN	0.5	Medium	Glass fibre batt: R1.5 (R1.5)	No
2	FC	0.5	Medium	Rockwool batt: R2.5 (R2.5)	No
3	EXCON	0.5	Medium	Rockwool batt: R2.5 (R2.5)	No

External wall *schedule*

Location	Wall ID	Height (mm)	Width (mm)	Orientation	Horizontal shading feature* maximum projection (mm)	Vertical shading feature (yes/no)
Bedroom 1	1	2700	4025	S	0	No
Bedroom 1	2	2700	2996	E	3047	Yes
Bath	1	2700	2491	S	0	No
Bath	1	2700	2185	W	0	No

* Refer to glossary.

Kitchen/Living	2	2700	2710	S	3101	Yes
Kitchen/Living	3	2700	3893	E	196	No
Kitchen/Living	3	2700	5499	N	0	Yes
Kitchen/Living	1	2700	2526	N	0	No
Kitchen/Living	1	2700	2374	W	0	No
Kitchen/Living	1	2700	1319	N	0	No
Kitchen/Living	1	2700	2328	W	0	No

Internal wall *type*

Wall ID	Wall type	Area (m²)	Bulk insulation
1	FR5 - Internal Plasterboard Stud Wall	27.3	

Floor *type*

Location	Construction	Area (m²)	Sub-floor ventilation	Added insulation (R-value)	Covering
Bedroom 1	CONPB	12.1	Enclosed	R0.0	Carpet
Bath	CONPB	6.4	Enclosed	R0.0	Tiles
Kitchen/Living	CONPB	34.2	Enclosed	R0.0	Timber

Ceiling *type*

Location	Construction material/type	Bulk insulation R-value (may include edge batt values)	Reflective wrap*
No Data Available			

Ceiling *penetrations**

Location	Quantity	Type	Diameter (mm)	Sealed/unsealed
Bath	1	Exhaust Fans	250	Sealed
Kitchen/Living	1	Exhaust Fans	250	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
Slab:Slab - Suspended Slab : 200mm: 200mm Suspended Slab	0.0	0.5	Medium

* Refer to glossary.

Explanatory Notes

About this report

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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.
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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.
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U-value	the rate of heat transfer through a window. The lower the U-value, the better the insulating ability.
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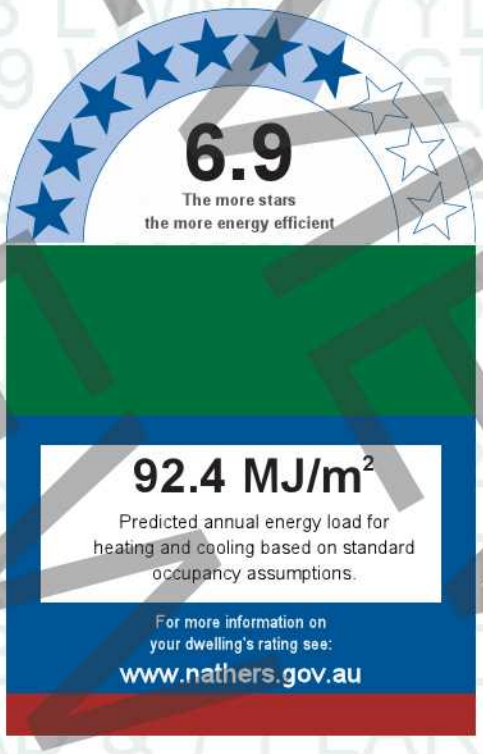
Nationwide House Energy Rating Scheme
NatHERS Certificate

Generated on 11 Jul 2023 using FirstRate5: 5.3.2b (3.21)



Property

Address	6, 5-9 Wellington Road & 7 Plar Street, Box Hill, VIC, 3128
Lot/DP	-
NCC Class*	Class 2
Type	New Home

Plans

Main plan	-
Prepared by	-

Construction and environment

Assessed floor area (m²)*	
Conditioned*	63
Unconditioned*	3.9
Total	66.9
Garage	-

Exposure type
exposed

NatHERS climate zone
62 Moorabbin Airport

Thermal performance

Heating	Cooling
79.1 MJ/m²	13.3 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	Margaret Turner
Business name	Ark Resources
Email	mt@arkresources.com.au
Phone	03 9636 0280
Accreditation No.	DMN/11/0194
Assessor Accrediting Organisation	-
Declaration of interest	Declaration completed: no conflicts

Verification

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National Construction Code (NCC) requirements

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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.

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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? Substituted values must be based on the Australian Fenestration Rating Council (AFRC) protocol.

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

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

Custom* windows

Window ID	Window description	Maximum U-value*	SHGC*	Substitution tolerance ranges	
				SHGC lower limit	SHGC upper limit
CAP-051-06 A	Capral 35 Awning in 400 Frame DG 6EA/12Ar/6	4.42	0.41	0.39	0.43
CAP-055-52 A	Capral 419 Flushline Fixed Window DG 6/12Ar/6EA	2.71	0.58	0.55	0.61
CAP-057-13 A	Capral 900 Sliding Door DG 6EA/12Ar/6	3.19	0.48	0.46	0.5

Window and glazed door *Schedule*

Location	Window ID	Window no.	Height (mm)	Width (mm)	Window type	Opening %	Orientation	Window shading device*
Bedroom 1	CAP-051-06 A	Opening 24	2700	2000	awning	10.0	S	No
Bedroom 2	CAP-051-06 A	Opening 25	2700	2000	awning	10.0	S	No

* Refer to glossary.

Bedroom 2	CAP-055-52 A	Opening 26	2700	2350	fixed	0.0	E	No
Kitchen/Living	CAP-057-13 A	Opening 23	2700	3840	sliding	45.0	E	No

Roof window *type and performance value*

Default* roof windows

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

Custom* roof windows

Window ID	Window description	Maximum U-value*	SHGC*	Substitution tolerance ranges	
				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*

Location	Height (mm)	Width (mm)	Opening %	Orientation
No Data Available				

External wall *type*

Wall ID	Wall type	Solar absorptance	Wall shade (colour)	Bulk insulation (R-value)	Reflective wall wrap*
1	INTN	0.5	Medium	Glass fibre batt: R1.5 (R1.5)	No
2	EXCON	0.5	Medium	Rockwool batt: R2.5 (R2.5)	No
3	FC	0.5	Medium	Rockwool batt: R2.5 (R2.5)	No

External wall *schedule*

Location	Wall ID	Height (mm)	Width (mm)	Orientation	Horizontal shading feature* maximum projection (mm)	Vertical shading feature (yes/no)
Bedroom 1	1	2700	2978	W	0	No
Bedroom 1	2	2700	3580	S	206	No

* Refer to glossary.

Bedroom 2	2	2700	3146	S	200	No
Bedroom 2	2	2700	3391	E	193	No
Bed 2 Ensuite	2	2700	1559	S	199	No
Bed 2 WIR	2	2700	1474	E	197	No
Bed 2 WIR	2	2700	2074	N	3822	Yes
Bath	1	2700	125	N	0	No
Bath	1	2700	1579	W	0	No
Kitchen/Living	1	2700	1809	W	0	No
Kitchen/Living	1	2700	919	S	0	No
Kitchen/Living	1	2700	2437	W	0	No
Kitchen/Living	3	2700	4060	E	2547	Yes
Kitchen/Living	2	2700	280	N	2976	Yes
Kitchen/Living	1	2700	6848	N	0	No

Internal wall *type*

Wall ID	Wall type	Area (m²)	Bulk insulation
1	FR5 - Internal Plasterboard Stud Wall	52.8	

Floor *type*

Location	Construction	Area (m²)	Sub-floor ventilation	Added insulation (R-value)	Covering
Bedroom 1	CONPB	10.7	Enclosed	R0.0	Carpet
Bedroom 2	CONPB	10.7	Enclosed	R0.0	Carpet
Bed 2 Ensuite	CONPB	4.1	Enclosed	R0.0	Tiles
Bed 2 WIR	CONPB	3.1	Enclosed	R0.0	Carpet
Bath	CONPB	3.9	Enclosed	R0.0	Tiles
Kitchen/Living	CONPB	34.5	Enclosed	R0.0	Timber

Ceiling *type*

Location	Construction material/type	Bulk insulation R-value (may include edge batt values)	Reflective wrap*
No Data Available			

Ceiling *penetrations**

Location	Quantity	Type	Diameter (mm)	Sealed/unsealed
Bed 2 Ensuite	1	Exhaust Fans	250	Sealed
Bath	1	Exhaust Fans	250	Sealed
Kitchen/Living	1	Exhaust Fans	250	Sealed
Kitchen/Living	1	Exhaust Fans	150	Sealed

Ceiling *fans*

Location	Quantity	Diameter (mm)
No Data Available		

* Refer to glossary.

Roof *type*

Construction	Added insulation (R-value)	Solar absorptance	Roof shade
Slab:Slab - Suspended Slab : 200mm: 200mm Suspended Slab	0.0	0.5	Medium

Explanatory Notes

About this report

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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.

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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.
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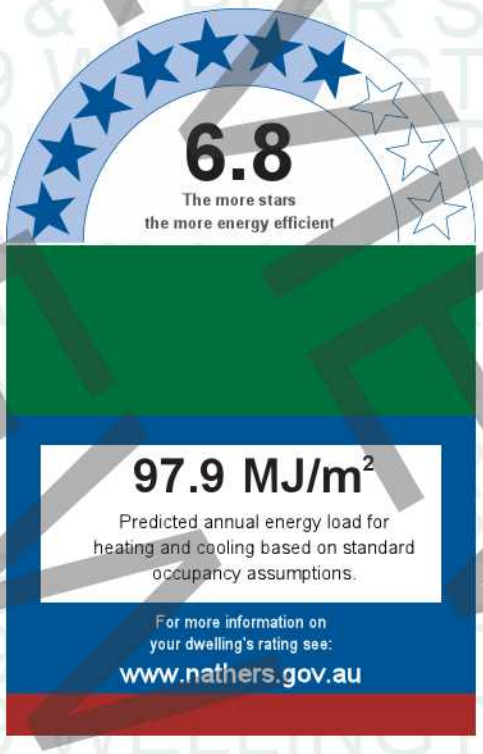
Exposure category - open	terrain with few obstructions at a similar height e.g. grasslands with few well scattered obstructions below 10m, farmland with scattered sheds, lightly vegetated bush blocks, elevated units (e.g. above 3 floors).
Exposure category - suburban	terrain with numerous, closely spaced 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).

Nationwide House Energy Rating Scheme
NatHERS Certificate

Generated on 11 Jul 2023 using FirstRate5: 5.3.2b (3.21)



Property

Address	7, 5-9 Wellington Road & 7 Plar Street, Box Hill, VIC, 3128
Lot/DP	-
NCC Class*	Class 2
Type	New Home

Plans

Main plan	-
Prepared by	-

Construction and environment

Assessed floor area (m²)*	
Conditioned*	39.2
Unconditioned*	4.4
Total	43.6
Garage	-

Exposure type
exposed

NatHERS climate zone
62 Moorabbin Airport

Thermal performance

Heating	Cooling
77 MJ/m²	20.9 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	Margaret Turner
Business name	Ark Resources
Email	mt@arkresources.com.au
Phone	03 9636 0280
Accreditation No.	DMN/11/0194
Assessor Accrediting Organisation	-
Declaration of interest	Declaration completed: no conflicts

Verification

To verify this certificate, scan the QR code or visit 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.

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

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? Substituted values must be based on the Australian Fenestration Rating Council (AFRC) protocol.

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

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

Custom* windows

Window ID	Window description	Maximum U-value*	SHGC*	Substitution tolerance ranges	
				SHGC lower limit	SHGC upper limit
CAP-057-13 A	Capral 900 Sliding Door DG 6EA/12Ar/6	3.19	0.48	0.46	0.5
CAP-055-52 A	Capral 419 Flushline Fixed Window DG 6/12Ar/6EA	2.71	0.58	0.55	0.61

Window and glazed door *Schedule*

Location	Window ID	Window no.	Height (mm)	Width (mm)	Window type	Opening %	Orientation	Window shading device*
Bedroom 1	CAP-057-13 A	Opening 30	2700	3400	sliding	30.0	S	No
Kitchen/Living	CAP-057-13 A	Opening 31	2700	1800	sliding	45.0	W	No
Kitchen/Living	CAP-055-52 A	Opening 32	2700	3604	fixed	0.0	S	No

* Refer to glossary.

Roof window *type and performance value*

Default* roof windows

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

Custom* roof windows

Window ID	Window description	Maximum U-value*	SHGC*	Substitution tolerance ranges	
				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*

Location	Height (mm)	Width (mm)	Opening %	Orientation
No Data Available				

External wall *type*

Wall ID	Wall type	Solar absorptance	Wall shade (colour)	Bulk insulation (R-value)	Reflective wall wrap*
1	INTN	0.5	Medium	Glass fibre batt: R1.5 (R1.5)	No
2	FC	0.5	Medium	Rockwool batt: R2.5 (R2.5)	No
3	EXCON	0.5	Medium	Rockwool batt: R2.5 (R2.5)	No

External wall *schedule*

Location	Wall ID	Height (mm)	Width (mm)	Orientation	Horizontal shading feature* maximum projection (mm)	Vertical shading feature (yes/no)
Bedroom 1	1	2700	2996	W	0	No
Bedroom 1	2	2700	3977	S	2341	Yes
Bath	1	2700	2490	N	0	No
Bath	1	2700	1777	W	0	No

* Refer to glossary.

Ldry	1	2700	1355	N	0	No
Kitchen/Living	2	2700	2001	W	4105	Yes
Kitchen/Living	3	2700	3604	S	199	No
Kitchen/Living	2	2700	6891	E	0	No
Kitchen/Living	1	2700	3601	N	0	No

Internal wall *type*

Wall ID	Wall type	Area (m²)	Bulk insulation
1	FR5 - Internal Plasterboard Stud Wall	28.1	

Floor *type*

Location	Construction	Area (m²)	Sub-floor ventilation	Added insulation (R-value)	Covering
Bedroom 1	CONPB	11.9	Enclosed	R0.0	Carpet
Bath	CONPB	4.4	Enclosed	R0.0	Tiles
Ldry	CONPB	2.4	Enclosed	R0.0	Timber
Kitchen/Living	CONPB	24.8	Enclosed	R0.0	Timber

Ceiling *type*

Location	Construction material/type	Bulk insulation R-value (may include edge batt values)	Reflective wrap*
No Data Available			

Ceiling *penetrations**

Location	Quantity	Type	Diameter (mm)	Sealed/unsealed
Bath	1	Exhaust Fans	250	Sealed
Ldry	1	Exhaust Fans	250	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
Slab:Slab - Suspended Slab : 200mm: 200mm Suspended Slab	0.0	0.5	Medium

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Explanatory Notes

About this report

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U-value	the rate of heat transfer through a window. The lower the U-value, the better the insulating ability.
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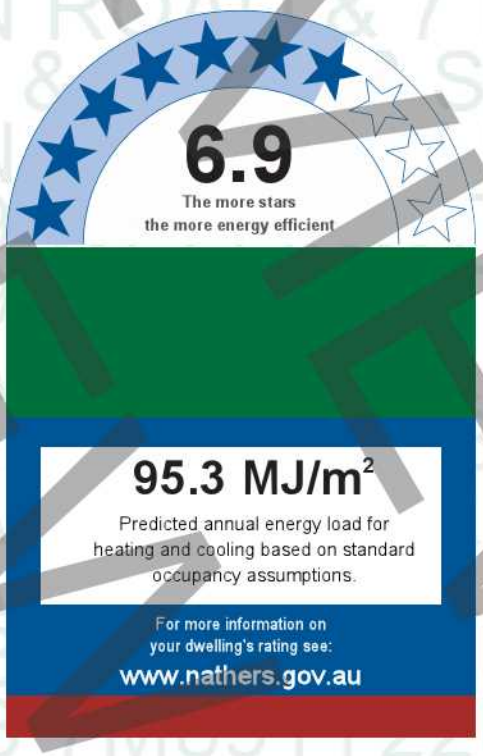
Nationwide House Energy Rating Scheme
NatHERS Certificate

Generated on 11 Jul 2023 using FirstRate5: 5.3.2b (3.21)



Property

Address	8, 5-9 Wellington Road & 7 Plar Street, Box Hill, VIC, 3128
Lot/DP	-
NCC Class*	Class 2
Type	New Home

Plans

Main plan	-
Prepared by	-

Construction and environment

Assessed floor area (m²)*	
Conditioned*	61.1
Unconditioned*	3.9
Total	65
Garage	-

Exposure type
exposed

NatHERS climate zone
62 Moorabbin Airport

Thermal performance

Heating	Cooling
79.6 MJ/m²	15.7 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	Margaret Turner
Business name	Ark Resources
Email	mt@arkresources.com.au
Phone	03 9636 0280
Accreditation No.	DMN/11/0194
Assessor Accrediting Organisation	-
Declaration of interest	Declaration completed: no conflicts

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Does the installed window meet the substitution tolerances (SHGC and U-value) and window type, of the window shown on this Certificate? Substituted values must be based on the Australian Fenestration Rating Council (AFRC) protocol.

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

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

Custom* windows

Window ID	Window description	Maximum U-value*	SHGC*	Substitution tolerance ranges	
				SHGC lower limit	SHGC upper limit
CAP-055-52 A	Capral 419 Flushline Fixed Window DG 6/12Ar/6EA	2.71	0.58	0.55	0.61
CAP-051-06 A	Capral 35 Awning in 400 Frame DG 6EA/12Ar/6	4.42	0.41	0.39	0.43
CAP-057-13 A	Capral 900 Sliding Door DG 6EA/12Ar/6	3.19	0.48	0.46	0.5

Window and glazed door *Schedule*

Location	Window ID	Window no.	Height (mm)	Width (mm)	Window type	Opening %	Orientation	Window shading device*
Bedroom 1	CAP-055-52 A	Opening 41	2700	2350	fixed	0.0	W	No
Bedroom 1	CAP-051-06 A	Opening 39	2700	2000	awning	10.0	S	No

* Refer to glossary.

Bedroom 2	CAP-051-06 A	Opening 38	2700	2000	awning	10.0	S	No
Kitchen/Living	CAP-057-13 A	Opening 40	2700	3850	sliding	45.0	W	No

Roof window *type and performance value*

Default* roof windows

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

Custom* roof windows

Window ID	Window description	Maximum U-value*	SHGC*	Substitution tolerance ranges	
				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*

Location	Height (mm)	Width (mm)	Opening %	Orientation
No Data Available				

External wall *type*

Wall ID	Wall type	Solar absorptance	Wall shade (colour)	Bulk insulation (R-value)	Reflective wall wrap*
1	EXCON	0.5	Medium	Rockwool batt: R2.5 (R2.5)	No
2	INTN	0.5	Medium	Glass fibre batt: R1.5 (R1.5)	No
3	FC	0.5	Medium	Rockwool batt: R2.5 (R2.5)	No

External wall *schedule*

Location	Wall ID	Height (mm)	Width (mm)	Orientation	Horizontal shading feature* maximum projection (mm)	Vertical shading feature (yes/no)
Bedroom 1	1	2700	3388	W	200	No
Bedroom 1	1	2700	3133	S	199	No

* Refer to glossary.

Bed 1 WIR	1	2700	1472	W	199	No
Bed 1 WIR	1	2700	1949	N	3878	Yes
Bed 1 Ensuite	1	2700	1597	S	244	No
Bedroom 2	1	2700	3571	S	200	No
Bedroom 2	1	2700	1797	E	3965	Yes
Bedroom 2	2	2700	1182	E	0	No
Bath	2	2700	1575	E	0	No
Kitchen/Living	3	2700	4066	W	2766	Yes
Kitchen/Living	1	2700	369	N	3878	Yes
Kitchen/Living	2	2700	4254	E	0	No
Kitchen/Living	2	2700	6113	N	0	No

Internal wall *type*

Wall ID	Wall type	Area (m²)	Bulk insulation
1	FR5 - Internal Plasterboard Stud Wall	53.5	

Floor *type*

Location	Construction	Area (m²)	Sub-floor ventilation	Added insulation (R-value)	Covering
Bedroom 1	CONPB	11.1	Enclosed	R0.0	Carpet
Bed 1 WIR	CONPB	2.6	Enclosed	R0.0	Carpet
Bed 1 Ensuite	CONPB	4.5	Enclosed	R0.0	Tiles
Bedroom 2	CONPB	10.6	Enclosed	R0.0	Carpet
Bath	CONPB	3.9	Enclosed	R0.0	Tiles
Kitchen/Living	CONPB	32.3	Enclosed	R0.0	Timber

Ceiling *type*

Location	Construction material/type	Bulk insulation R-value (may include edge batt values)	Reflective wrap*
No Data Available			

Ceiling *penetrations**

Location	Quantity	Type	Diameter (mm)	Sealed/unsealed
Bed 1 Ensuite	1	Exhaust Fans	250	Sealed
Bath	1	Exhaust Fans	250	Sealed
Kitchen/Living	1	Exhaust Fans	150	Sealed
Kitchen/Living	1	Exhaust Fans	250	Sealed

Ceiling *fans*

Location	Quantity	Diameter (mm)
No Data Available		

Roof *type*

Construction	Added insulation (R-value)	Solar absorptance	Roof shade

* Refer to glossary.

Slab:Slab - Suspended Slab : 200mm: 200mm Suspended Slab	0.0	0.5	Medium

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.

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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).

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Disclaimer

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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.

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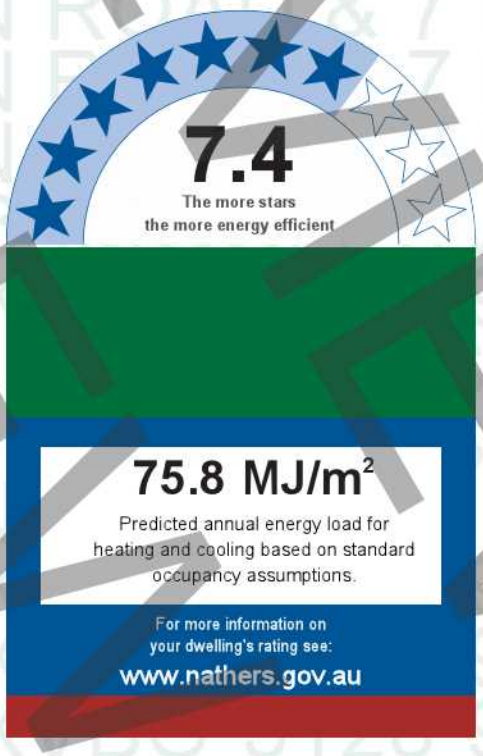
Glossary

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).

Nationwide House Energy Rating Scheme
NatHERS Certificate

Generated on 11 Jul 2023 using FirstRate5: 5.3.2b (3.21)



Property

Address	9, 5-9 Wellington Road & 7 Plar Street, Box Hill, VIC, 3128
Lot/DP	-
NCC Class*	Class 2
Type	New Home

Plans

Main plan	-
Prepared by	-

Construction and environment

Assessed floor area (m²)*	
Conditioned*	48.6
Unconditioned*	5.5
Total	54.1
Garage	-

Exposure type
exposed

NatHERS climate zone
62 Moorabbin Airport

Thermal performance

Heating	Cooling
61.4 MJ/m²	14.4 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	Margaret Turner
Business name	Ark Resources
Email	mt@arkresources.com.au
Phone	03 9636 0280
Accreditation No.	DMN/11/0194
Assessor Accrediting Organisation	-
Declaration of interest	Declaration completed: no conflicts

Verification

To verify this certificate, scan the QR code or visit 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.

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? Substituted values must be based on the Australian Fenestration Rating Council (AFRC) protocol.

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

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

Custom* windows

Window ID	Window description	Maximum U-value*	SHGC*	Substitution tolerance ranges	
				SHGC lower limit	SHGC upper limit
CAP-055-52 A	Capral 419 Flushline Fixed Window DG 6/12Ar/6EA	2.71	0.58	0.55	0.61
CAP-057-13 A	Capral 900 Sliding Door DG 6EA/12Ar/6	3.19	0.48	0.46	0.5

Window and glazed door *Schedule*

Location	Window ID	Window no.	Height (mm)	Width (mm)	Window type	Opening %	Orientation	Window shading device*
Bedroom 1	CAP-055-52 A	Opening 47	2700	2350	fixed	0.0	W	No
Bedroom 1	CAP-057-13 A	Opening 46	2700	2200	sliding	45.0	S	No
Kitchen/Living	CAP-057-13 A	Opening 45	2700	3278	sliding	30.0	W	No

* Refer to glossary.

Roof window *type and performance value*

Default* roof windows

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

Custom* roof windows

Window ID	Window description	Maximum U-value*	SHGC*	Substitution tolerance ranges	
				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*

Location	Height (mm)	Width (mm)	Opening %	Orientation
No Data Available				

External wall *type*

Wall ID	Wall type	Solar absorptance	Wall shade (colour)	Bulk insulation (R-value)	Reflective wall wrap*
1	EXCON	0.5	Medium	Rockwool batt: R2.5 (R2.5)	No
2	FC	0.5	Medium	Rockwool batt: R2.5 (R2.5)	No
3	INTN	0.5	Medium	Glass fibre batt: R1.5 (R1.5)	No
4	CONS	0.5	Medium	Glass fibre batt (k = 0.044 density = 12 kg/m3) (R0.6)	No

External wall *schedule*

Location	Wall ID	Height (mm)	Width (mm)	Orientation	Horizontal shading feature* maximum projection (mm)	Vertical shading feature (yes/no)
Bedroom 1	1	2700	2997	W	197	Yes
Bedroom 1	2	2700	2425	S	3440	Yes

* Refer to glossary.

Bedroom 1	3	2700	1961	N	0	No
Bedroom 1	1	2700	2118	N	0	Yes
Bath	3	2700	2790	E	0	No
Bath	3	2700	1967	N	0	No
Study	3	2700	2926	N	0	No
Kitchen/Living	2	2700	3368	W	2759	Yes
Kitchen/Living	3	2700	8004	S	0	No
Kitchen/Living	3	2700	924	E	0	No
Kitchen/Living	4	2700	2641	E	0	No
Kitchen/Living	3	2700	1216	N	0	No

Internal wall *type*

Wall ID	Wall type	Area (m²)	Bulk insulation
1	FR5 - Internal Plasterboard Stud Wall	32.9	

Floor *type*

Location	Construction	Area (m²)	Sub-floor ventilation	Added insulation (R-value)	Covering
Bedroom 1	CONPB	12.2	Enclosed	R0.0	Carpet
Bath	CONPB	5.5	Enclosed	R0.0	Tiles
Study	CONPB	5.1	Enclosed	R0.0	Timber
Kitchen/Living	CONPB	31.3	Enclosed	R0.0	Timber

Ceiling *type*

Location	Construction material/type	Bulk insulation R-value (may include edge batt values)	Reflective wrap*
No Data Available			

Ceiling *penetrations**

Location	Quantity	Type	Diameter (mm)	Sealed/unsealed
Bath	1	Exhaust Fans	250	Sealed
Study	1	Exhaust Fans	250	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
Slab:Slab - Suspended Slab : 200mm: 200mm Suspended Slab	0.0	0.5	Medium

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Explanatory Notes

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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.
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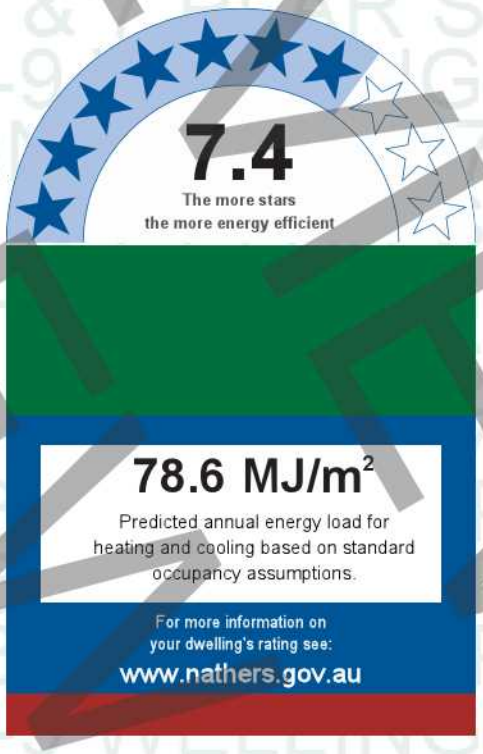
Nationwide House Energy Rating Scheme
NatHERS Certificate

Generated on 11 Jul 2023 using FirstRate5: 5.3.2b (3.21)



Property

Address	10, 5-9 Wellington Road & 7 Plar Street, Box Hill, VIC, 3128
Lot/DP	-
NCC Class*	Class 2
Type	New Home

Plans

Main plan	-
Prepared by	-

Construction and environment

Assessed floor area (m²)*	
Conditioned*	74
Unconditioned*	3
Total	77
Garage	-

Exposure type
exposed

NatHERS climate zone
62 Moorabbin Airport

Thermal performance

Heating	Cooling
66.3 MJ/m²	12.3 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	Margaret Turner
Business name	Ark Resources
Email	mt@arkresources.com.au
Phone	03 9636 0280
Accreditation No.	DMN/11/0194
Assessor Accrediting Organisation	-
Declaration of interest	Declaration completed: no conflicts

Verification

To verify this certificate, scan the QR code or visit When using either link, ensure you are visiting www.FR5.com.au.

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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? Substituted values must be based on the Australian Fenestration Rating Council (AFRC) protocol.

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

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

Custom* windows

Window ID	Window description	Maximum U-value*	SHGC*	Substitution tolerance ranges	
				SHGC lower limit	SHGC upper limit
CAP-051-06 A	Capral 35 Awning in 400 Frame DG 6EA/12Ar/6	4.42	0.41	0.39	0.43
CAP-055-52 A	Capral 419 Flushline Fixed Window DG 6/12Ar/6EA	2.71	0.58	0.55	0.61
CAP-057-13 A	Capral 900 Sliding Door DG 6EA/12Ar/6	3.19	0.48	0.46	0.5

Window and glazed door *Schedule*

Location	Window ID	Window no.	Height (mm)	Width (mm)	Window type	Opening %	Orientation	Window shading device*
Bedroom 1	CAP-051-06 A	Opening 54	2700	1700	awning	10.0	W	No
Bedroom 2	CAP-055-52 A	Opening 57	2700	2350	fixed	0.0	W	No

* Refer to glossary.

Bedroom 2	CAP-057-13 A	Opening 55	2700	2050	sliding	45.0	N	No
Kitchen/Living	CAP-057-13 A	Opening 56	2700	3800	sliding	45.0	W	No

Roof window *type and performance value*

Default* roof windows

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

Custom* roof windows

Window ID	Window description	Maximum U-value*	SHGC*	Substitution tolerance ranges	
				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*

Location	Height (mm)	Width (mm)	Opening %	Orientation
No Data Available				

External wall *type*

Wall ID	Wall type	Solar absorptance	Wall shade (colour)	Bulk insulation (R-value)	Reflective wall wrap*
1	FC	0.5	Medium	Rockwool batt: R2.5 (R2.5)	No
2	INTN	0.5	Medium	Glass fibre batt: R1.5 (R1.5)	No
3	CONS	0.5	Medium	Glass fibre batt (k = 0.044 density = 12 kg/m3) (R0.6)	No
4	EXCON	0.5	Medium	Rockwool batt: R2.5 (R2.5)	No

External wall *schedule*

Location	Wall ID	Height (mm)	Width (mm)	Orientation	Horizontal shading feature* maximum projection (mm)	Vertical shading feature (yes/no)

* Refer to glossary.

Bedroom 1	1	2700	1758	W	0	Yes
Bedroom 1	2	2700	4792	S	0	No
Bed 1 WIR	2	2700	1511	S	0	No
Bed 1 Ensuite	2	2700	1628	S	0	No
Bed 1 Ensuite	3	2700	2776	E	0	No
Bedroom 2	4	2700	2996	W	262	No
Bedroom 2	4	2700	2311	S	0	Yes
Bedroom 2	1	2700	2248	N	4018	Yes
Ldry	3	2700	1689	E	0	No
Kitchen/Living	2	2700	359	W	0	No
Kitchen/Living	2	2700	5961	N	0	No
Kitchen/Living	1	2700	3898	W	2640	Yes
Kitchen/Living	3	2700	2863	E	0	No
Kitchen/Living	3	2700	1680	E	0	No
Kitchen/Living	2	2700	2143	N	0	No

Internal wall *type*

Wall ID	Wall type	Area (m²)	Bulk insulation
1	FR5 - Internal Plasterboard Stud Wall	65.9	

Floor *type*

Location	Construction	Area (m²)	Sub-floor ventilation	Added insulation (R-value)	Covering
Bedroom 1	CONPB	13.2	Enclosed	R0.0	Carpet
Bed 1 WIR	CONPB	3.6	Enclosed	R0.0	Carpet
Bed 1 Ensuite	CONPB	4.5	Enclosed	R0.0	Tiles
Bath	CONPB	4.1	Enclosed	R0.0	Tiles
Bedroom 2	CONPB	10.8	Enclosed	R0.0	Carpet
Ldry	CONPB	3	Enclosed	R0.0	Timber
Kitchen/Living	CONPB	37.9	Enclosed	R0.0	Timber

Ceiling *type*

Location	Construction material/type	Bulk insulation R-value (may include edge batt values)	Reflective wrap*
No Data Available			

Ceiling *penetrations**

Location	Quantity	Type	Diameter (mm)	Sealed/unsealed
Bed 1 Ensuite	1	Exhaust Fans	250	Sealed
Bath	1	Exhaust Fans	250	Sealed
Ldry	1	Exhaust Fans	250	Sealed
Kitchen/Living	1	Exhaust Fans	150	Sealed

* Refer to glossary.

Ceiling *fans*

Location	Quantity	Diameter (mm)
No Data Available		

Roof *type*

Construction	Added insulation (R-value)	Solar absorptance	Roof shade
Slab:Slab - Suspended Slab : 200mm: 200mm Suspended Slab	0.0	0.5	Medium

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.

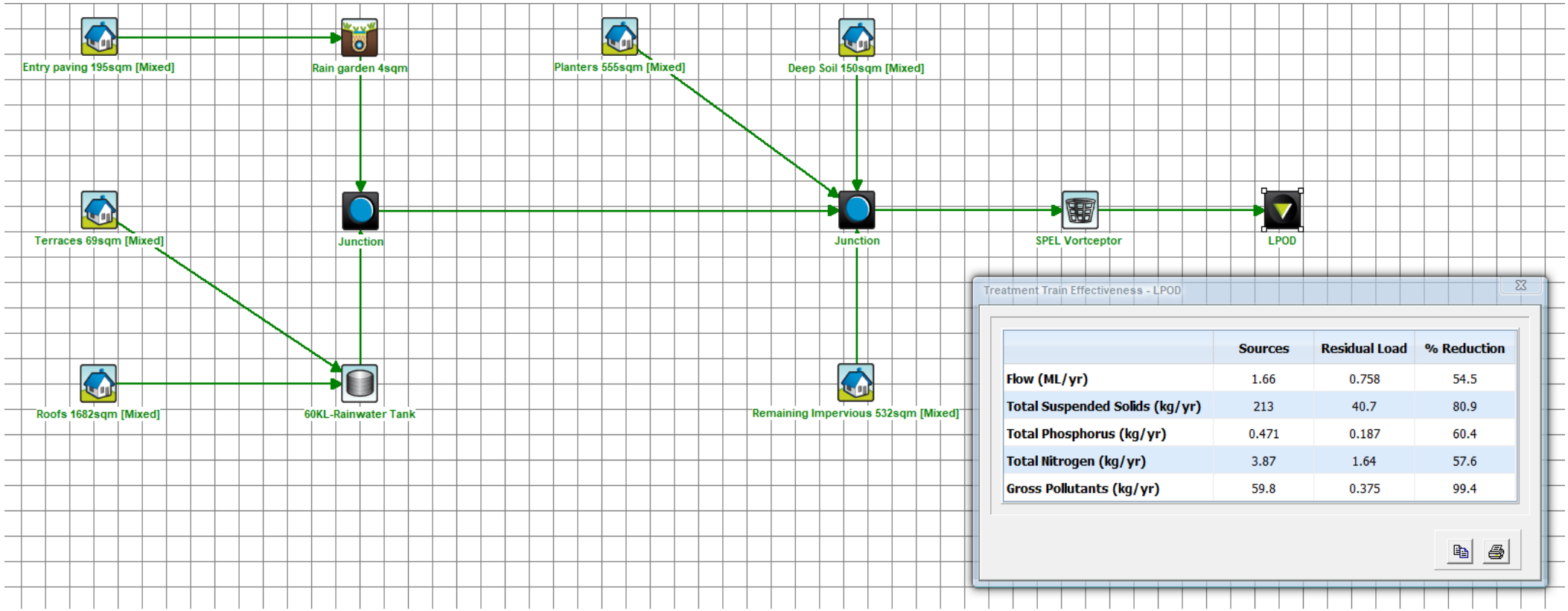
Glossary

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).

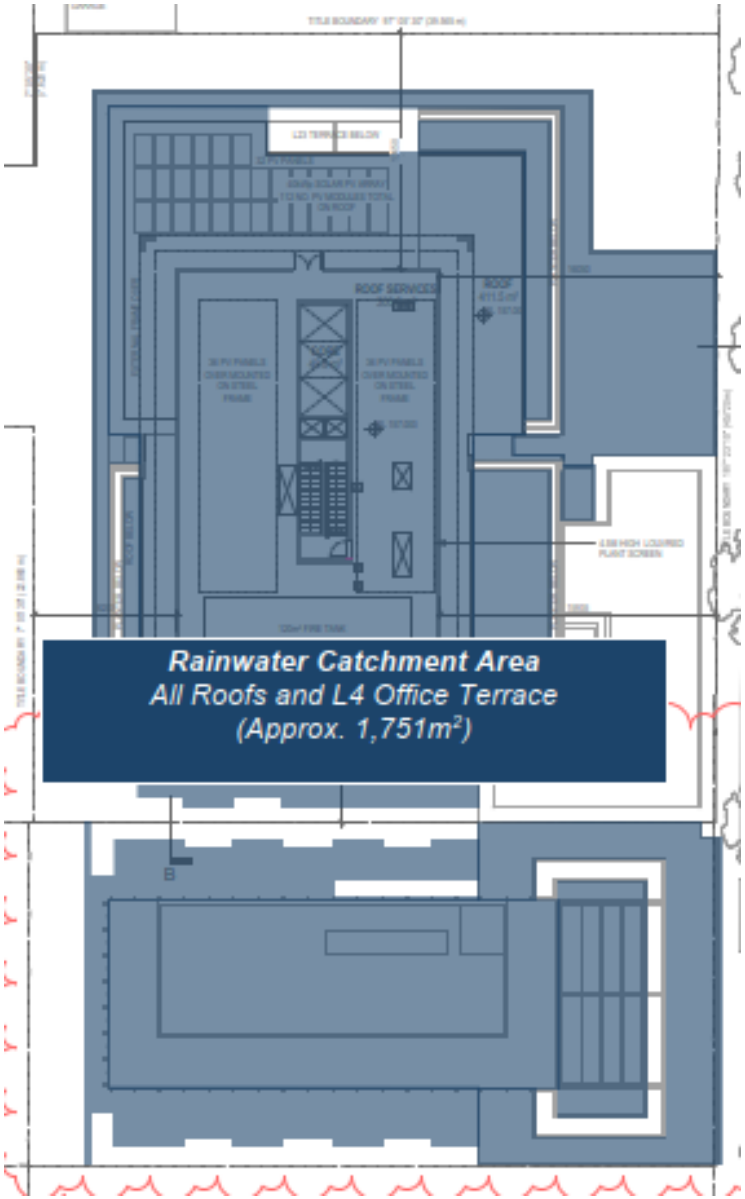
Appendix B. MUSIC Modelling

B.1 MUSIC Schematic

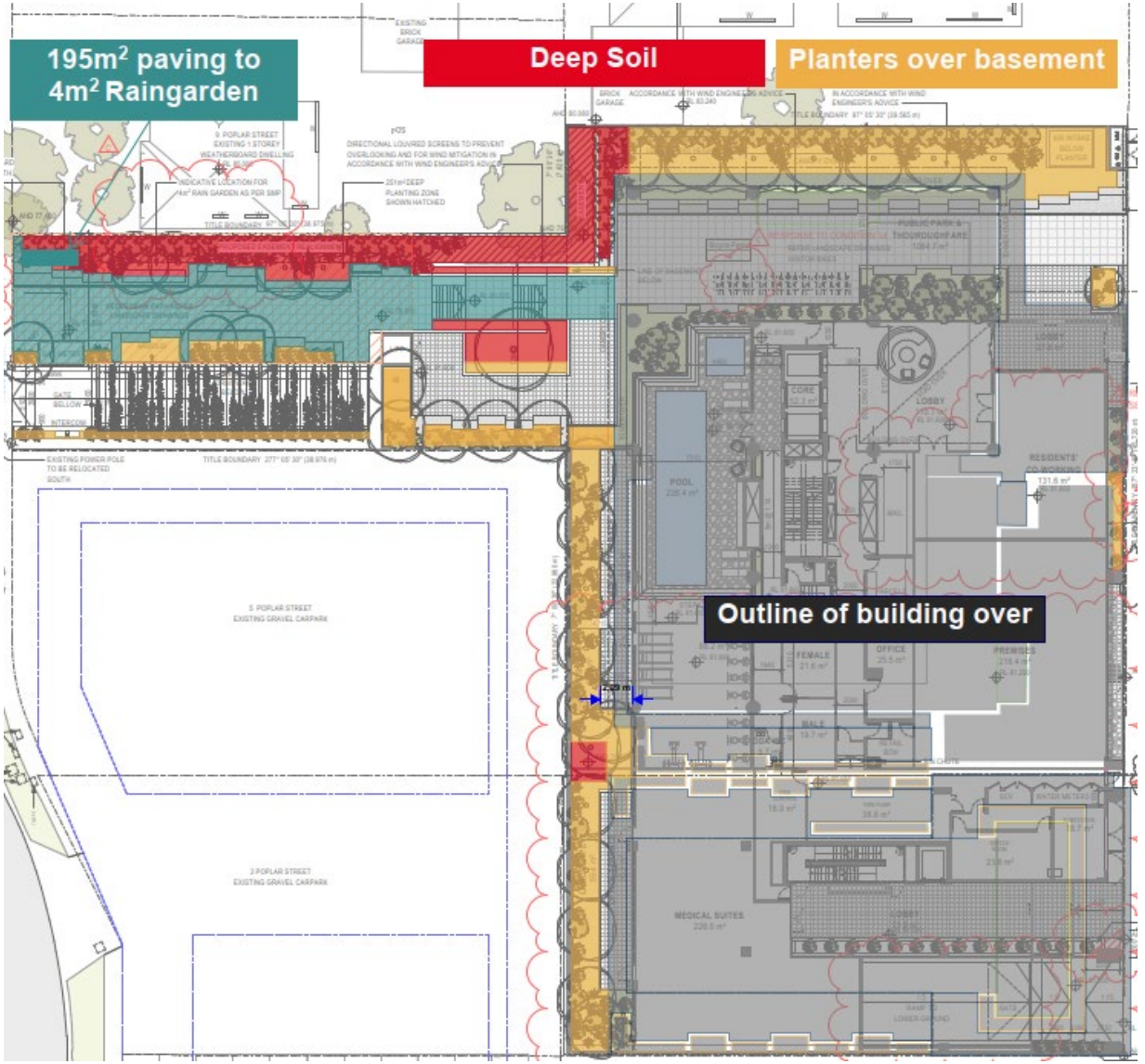


	Sources	Residual Load	% Reduction
Flow (ML/yr)	1.66	0.758	54.5
Total Suspended Solids (kg/yr)	213	40.7	80.9
Total Phosphorus (kg/yr)	0.471	0.187	60.4
Total Nitrogen (kg/yr)	3.87	1.64	57.6
Gross Pollutants (kg/yr)	59.8	0.375	99.4

B.2 Rainwater Catchment Areas



B.3 Landscaped Areas



B.4 MUSIC Modelling Assumptions and Inputs

Area Name	Area [m^2]
Total Areas to Rainwater Tank	1,751
All roofs	1,682
Level 4 Office Terrace	69
Paving Areas to Rain gardens	195
Poplar Entry Paaving	195
Pervious Landscape Areas	705
Deep Landscaping	150
Planters & Landcaping over Basement	555
Remaining Area	533
Total Site Area	**3,184**

Treatment Devices Features	
RWT	60 kL
Est. daily water demand for TF	7.6 kL/day
Toilets supplied from RWT	All residential and commercial toilets
Est. annual demand for irrigation	273 kL/yr
*Total RG surface area	4 m^2
**Primary Treatment System 1 (GPT)	SPEL Vortceptor 22L/s (or equivalent)

NOTES:

* RGs vegetated with Effective Nutrient Removal Plants. Further specification to be undertaken in Detailed Design.

**Nutrient reduction (Phosphorous and Nitrogen) not attributed to GPT as per Melbourne Water MUSIC guidelines.

Acronyms

RWT: Rain Water Tank

RG: Rain Garden

TF: Toilet Flushing

GPT: Gross Pollutant Trap

Rainfall data	
Rainfall Range & Station Name	C - Melbourne City (650-750mm)
10 Year Period	B - 1971-1980
Mean annual rainfall	B - 575mm
Evapotranspiration	B - 1041
Time step	6 minutes
Estimation method	Stochastically generated

Soil properties - Melbourne	
Soil store capacity	120mm
Field capacity	50mm

Rain Garden	
Filter Depth	500mm
Extended Detention Depth	200mm
Saturated Hydraulic Conductivity	100mm/hour
Underdrain present?	Yes

GPT Pollutant Removal Rates (SPEL Vortceptor)	
Total Suspended Solids	70%
Total Nitrogen	0%
Total Phosphorous	30%
Gross Pollutants	98%
Validation report	CRC for Catchment Hydrology

B.5 MUSIC Results

Pollutant	MUSIC Model Results	Green Star Targets (Column B)	Melbourne Water Targets
Reduction in Total Suspended Solids (TSS)	80.9%	80.0%	80.0%
Reduction in Total Phosphorus (TP)	60.4%	60.0%	45.0%
Reduction in Total Nitrogen (TN)	57.6%	45.0%	45.0%
Reduction in Total Gross Pollutants	99.4%	90.0%	70.0%
Compliance with targets		**YES**	**YES**

B.6 Rainwater Harvesting and Tank Reliability

Propert 7 Poplar St & 3-9 Wellington St

Version

Inputs:

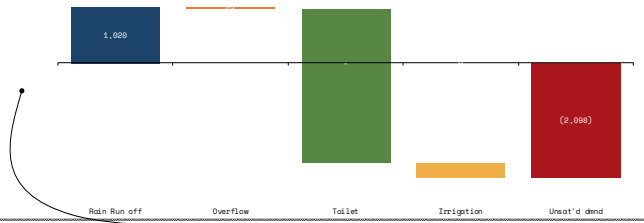
Commercial	Floor Area - NLA (m2)	1965	
	PPL [M / F]	98	98
	Flush/Person/Day [M - Urin	2	
	Flush/Person/Day [M / F -	0.3	2.3
	Litres/Flush [Urinal / WC]	1	3.3
	Total Daily usage (litres)	1039	
Residential	PPL	332	
	Flush/Person/Day	5	
	Litres/Flush	4	
	Total Daily usage (litres)	6640	
Development	Total Daily usage (litres)	7679	
	Roof area (m2)	1751	
	Collection Evaporation	5%	
	Tank Capacity (litres)	70000	
	Irrigation Area (m2)	706	
	T'off if Total Rain (mm)	10	
	in the last	5	days

Recalc, update pivots, table and graphs

Irrigation Schedule

	1 /m2	S	M	T	W	Th	Fr	S
Jan	10		y			y		
Feb	10		y			y		
Mar	10		y			y		
Apr	5		y					
May	5			y				
Jun	5			y				
Jul	5				y			
Aug	5				y			
Sep	5					y		
Oct	5					y		
Nov	10						y	
Dec	10		y				y	

System components (kls per year)



System components (kls per year) based on 12 years of actual historical daily rainfall

12 years of Averages

(k l)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Rain Run off	69	71	62	106	86	88	79	89	85	79	110	95	1,020
Overflow	(1)	(9)	(3)	(8)	-	(3)	-	-	(1)	(3)	(6)	(8)	(42)
Rain Water saved	67	62	60	98	86	85	79	89	85	76	104	87	978
Toilet	(238)	(217)	(238)	(230)	(238)	(230)	(238)	(238)	(230)	(238)	(230)	(237)	(2,813)
(Shortfall)/Surplus before Irrigation	(171)	(155)	(178)	(132)	(152)	(145)	(159)	(149)	(146)	(162)	(126)	(150)	(1,825)
Irrigation	(48)	(44)	(50)	(10)	(10)	(10)	(11)	(11)	(11)	(10)	(18)	(39)	(272.9)
Unsatisfied Demand	(219)	(199)	(228)	(142)	(162)	(155)	(171)	(160)	(157)	(171)	(144)	(189)	(2,098)

Actual Years

(k l)

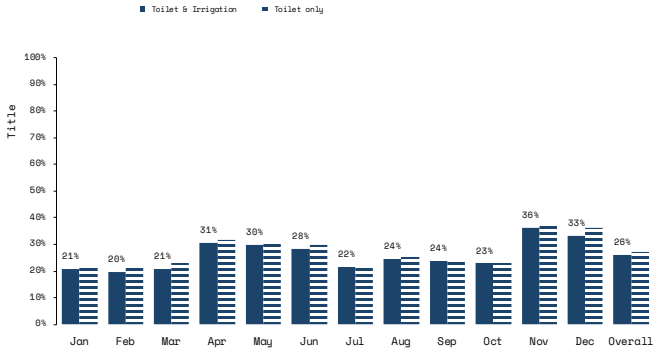
	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	Total
Rain Run off	833	1,298	1,288	1,047	1,128	789	811	1,122	1,038	930	695	1,268	12,247
Overflow	(50)	(68)	(178)	-	(35)	-	-	-	(64)	(40)	-	(67)	(503)
Rain Water saved	783	1,230	1,110	1,047	1,092	789	811	1,122	974	891	695	1,200	11,743
Toilet	(2,803)	(2,803)	(2,803)	(2,811)	(2,803)	(2,803)	(2,803)	(2,811)	(2,803)	(2,803)	(2,803)	(2,795)	(33,644)
(Shortfall)/Surplus before Irrigation	(2,020)	(1,573)	(1,693)	(1,764)	(1,711)	(2,014)	(1,992)	(1,689)	(1,829)	(1,912)	(2,108)	(1,595)	(21,900)
Irrigation	(300)	(247)	(254)	(268)	(265)	(286)	(275)	(261)	(265)	(293)	(332)	(229)	(3,276)
Unsatisfied Demand	(2,320)	(1,821)	(1,947)	(2,032)	(1,975)	(2,300)	(2,267)	(1,950)	(2,094)	(2,205)	(2,440)	(1,824)	(25,176)

box 4

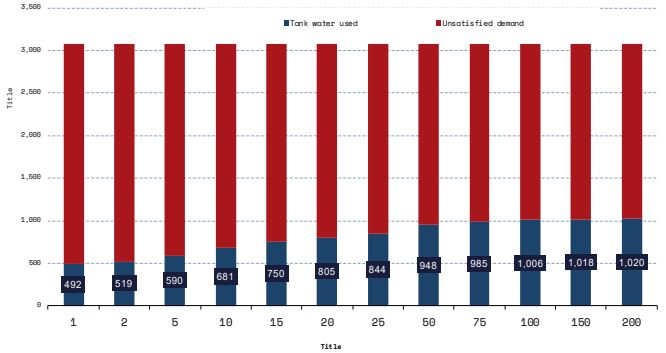
Reliability of supply (daily demand met)- Tank size what ifs

Tank	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Overall
1K	21%	21%	21%	21%	21%	21%	21%	21%	21%	21%	21%	21%	26%
2K	21%	21%	21%	21%	21%	21%	21%	21%	21%	21%	21%	21%	26%
5K	21%	21%	21%	21%	21%	21%	21%	21%	21%	21%	21%	21%	26%
10K	21%	21%	21%	21%	21%	21%	21%	21%	21%	21%	21%	21%	26%
20K	21%	21%	21%	21%	21%	21%	21%	21%	21%	21%	21%	21%	26%
50K	21%	21%	21%	21%	21%	21%	21%	21%	21%	21%	21%	21%	26%
100K	21%	21%	21%	21%	21%	21%	21%	21%	21%	21%	21%	21%	26%
200K	21%	21%	21%	21%	21%	21%	21%	21%	21%	21%	21%	21%	26%

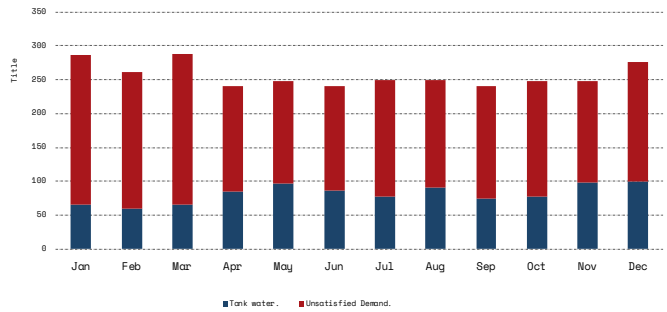
Graph 2 - Reliability of supply from tank (average across 12 years)



Graph 3 -Tank water used (per year) V Tank size
Kls per year



Graph 4 - Tank water used v unsatisfied demand
by month (kls per month)



Appendix C. WSUD Maintenance Programs

Rainwater Harvesting System

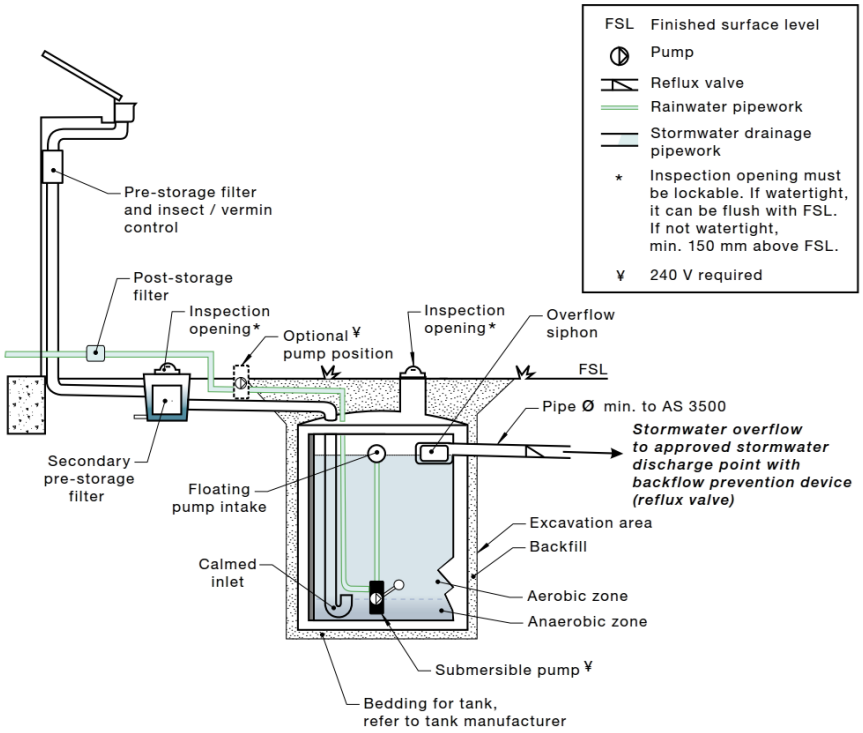
Once installed, a systematic maintenance program will be implemented by the owner's corporation maintenance contractor to ensure the rainwater harvesting system operates as designed and water quality is maintained.

The scope of the maintenance program will include inspection and rectification of issues associated with:

- Roof gutters and downpipes
- First flush screens and filtration devices
- Pumps
- Distribution pipework and reticulation systems
- Overflow systems

Inspections of the system and any maintenance works required will be undertaken on a quarterly basis or as per manufacturers guidelines.

The rainwater harvesting system will be installed in accordance with the guidelines set out in the Rainwater Design & Installation Handbook published by the National Water Commission[2]. A schematic diagram of the rainwater tank installation is provided below.



[2] Rainwater Design & Installation Handbook, National Water Commission, 2008

Rainwater Tank Element	Inspection Item	Y/N	Likely Maintenance Task
Roof gutters and downpipes	Is there leaf litter or debris in the gutters?		Remove by hand and dispose responsibly
First flush diverter	Is there anything blocking the first flush diverter (Leaves etc.)?		Remove by hand and dispose responsibly
Potable mains back up device	Is the potable mains back up switch operating correctly?		Repair or replace devise. Consider a manual switching device.
Mesh cover	Has the mesh cover deteriorated or have any holes in is?		Replace mesh cover.
Tank volume	Is there large amounts of sediment or debris sitting in the bottom of the tank, reducing the volume available in the tank to store water?		Remove sediment and dispose responsibly.
Pump	Is the pump working effectively? Have you heard it on a regular basis?		Check the potable mains back up is not permanently on. Repair or replace pump.
Pipes and taps	Are pipes and taps leaking?		Repair as needed.
Overflow	Is the overflow clear and connected to the storm water network?		Remove blockages and/or restore connections to stormwater network.

Maintenance Frequency												
	J	F	M	A	M	J	J	A	S	O	N	D
All tasks	X			X			X			X		

Rain Gardens

Once installed, a systematic maintenance program will be implemented by the owner's corporation maintenance contractor to ensure the raingarden operates as designed.

Design, construction and planting of raingardens shall be implemented in accordance with the relevant Instruction Sheet published by Melbourne Water and the Victorian state government:

Inground raingardens: - https://www.melbournewater.com.au/media/447/download

Infiltration raingardens - https://www.melbournewater.com.au/media/446/download

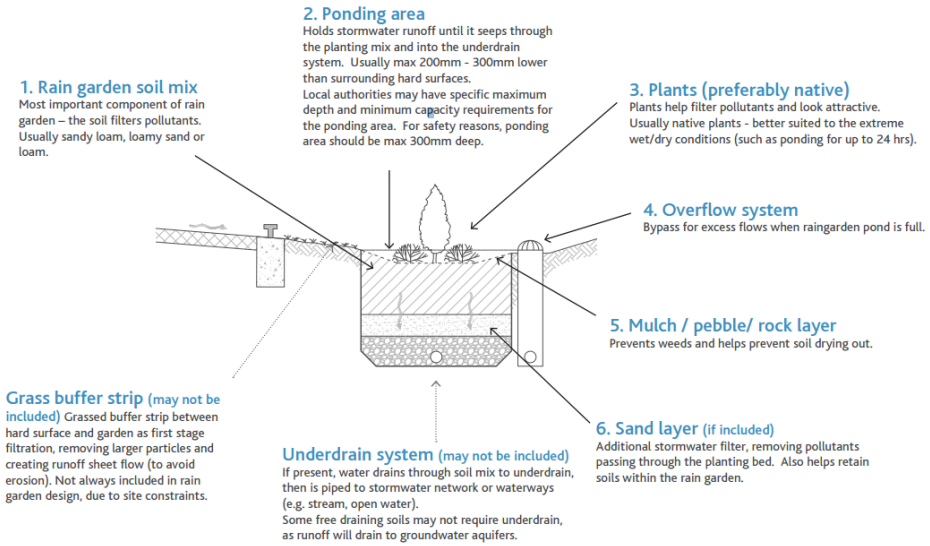
Further guidelines for raingarden planning, design, construction and maintenance guidelines have been developed by the Cooperative Research Centre for Water Sensitive Cities, with support from Melbourne Water:

https://watersensitivecities.org.au/content/stormwater-biofilter-design/

The scope of the maintenance program will include inspection and rectification of issues associated with:

- Raingarden soil mix
- Ponding area
- Plants
- Overflow system
- Mulch/ pebble/ rock layer
- Underdrain system (where applicable)

A cross-sectional diagram of a typical raingarden is provided below.



Inspections of the raingarden system and any maintenance works required will be undertaken as outlined in the maintenance schedule below.

Component	Maintenance Action
AFTER STORM EVENTS	
Ponding Area	Check raingarden inlet for sediment, rubbish and leaves and remove as required. Check for erosion or scour and repair. Check and ensure that the garden is infiltrating effectively. Check and re-profile topsoil as necessary – ensure level is below surrounding hard surface and overflow.
Kerb, Paved Area, or Grass Filter Strip (if included)	Remove rubbish, leaves and other debris from surrounding areas
Mulch	Check and redistribute/add mulch as necessary – particularly at the raingarden inlets.
3 MONTHLY	
Ponding area	Check raingarden inlets for sediment build up, litter and leaves. Check for erosion or scour and repair if necessary.
Mulch Layer	Remove litter, leaves and other debris. Redistribute/add mulch if necessary.
Overflow system	Check for any blockages and remove as necessary.
Plants	Check plant health and replace dead plants as necessary. Remove weeds – do not use herbicides, pesticides and fertilisers as the chemicals may infiltrate through the rain garden and pollute the stormwater runoff.
ANNUALLY	
Mulch Layer	Check for sediment build up – remove and replace as required.
Ponding Area	Check all water has drained 24 hours after heavy rain – remove and replace the crust from the top of raingarden if drainage not effective. Check for litter, leaves and sediment build up and remove as necessary. Check for erosion and gouging and repair where necessary.
Raingarden Soil Mix	Check soil level is below surrounding hard surface level and the overflow
Underdrain System	If underdrain present, flush underdrain and check for blockages – repair if necessary.

Gross Pollutant Trap (GPT)

Once installed, a systematic maintenance program will be implemented by the landowner to ensure the GPT operates as designed and water quality is maintained.

Cleaning and maintenance will be carried out in accordance with the manufacturer's written guidelines. Maintenance requirements and frequencies are dependent on the pollutant load characteristics.

The scope of the maintenance program will include inspection and rectification of issues associated with:

- Manhole cover
- Inlet pipe
- Outlet
- Screening area
- Collection area

Inspections of the GPT and any maintenance works required will be undertaken as outlined as a guide in the maintenance schedule below. Manufacturer's guidelines will take precedence.

Maintenance Action
3-6 MONTHLY
– Check components for damage. – Check that the inlet and outlet are free from debris or obstructions. – Remove large floating pollutants. – Measure sediment depth.
12-24 MONTHLY (or as guided by sediment depth)
– Removal of accumulated sediment and gross pollutants. – Inspection of screen and cleaning if required.

Appendix D. Solar Photovoltaics

During the construction phase, high-efficiency solar PV modules with a total capacity of 40 kWp will be installed at roof level as per the preliminary layout indicated below.

PV modules should be oriented in pairs to the east and west at 10-15° tilt and have at least 400Wp capacity (i.e. over 33% more efficient than traditional 300Wp 60-cell modules). High-efficiency modules deliver more compact arrays with inherently lower embodied ecological impact per unit of generation than standard efficiency modules.

The undulating east-west configuration prevents self-shadowing of the array and provides a low-profile installation with maximised packing factor. It also helps maximise self-consumption due to its flatter and broader power output yield profile.

Total yield of this array will be approximately 46 MWh per annum equating to an estimated annual carbon emissions offset of 43 tonnes CO2-e per annum.

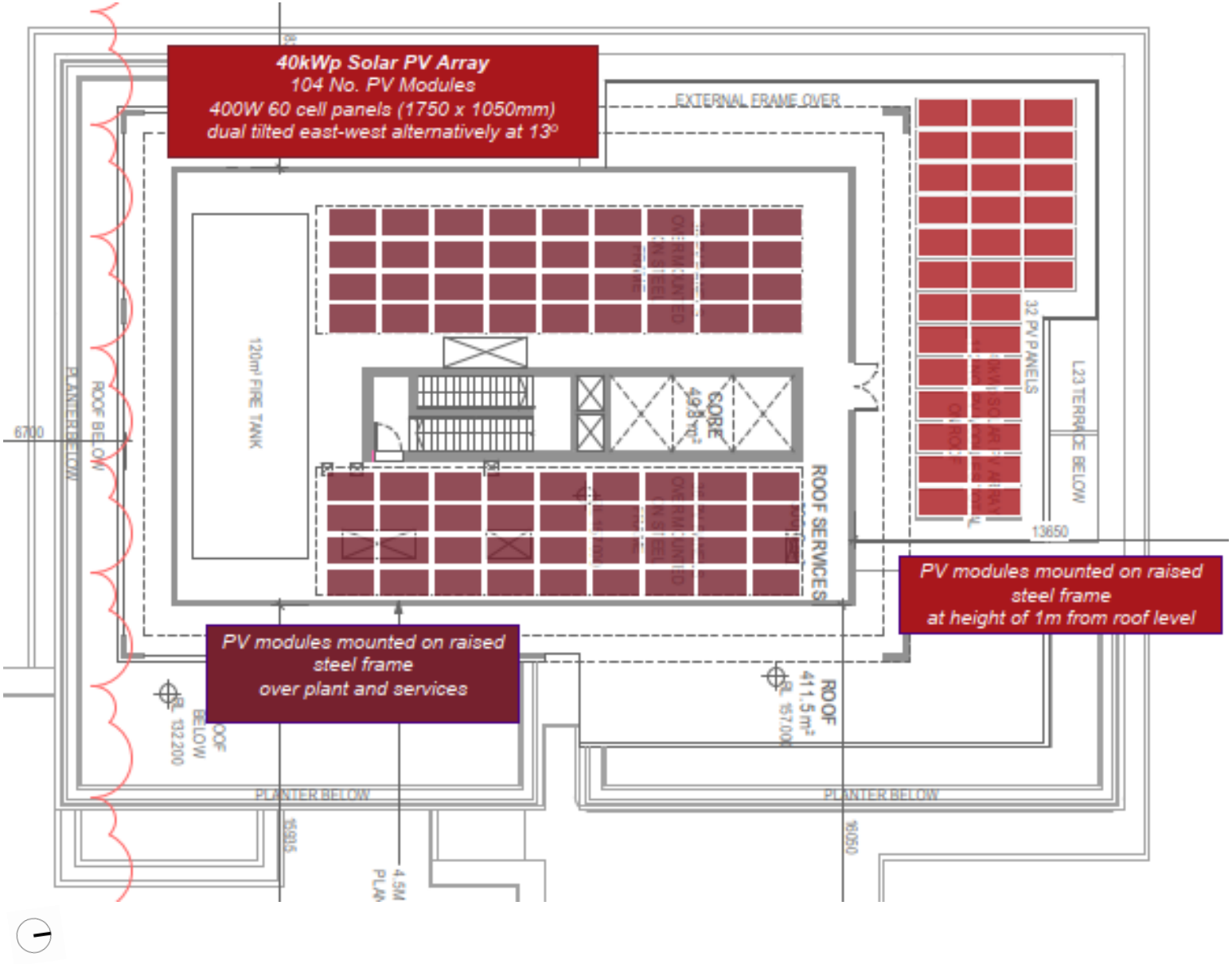


Figure 1 Indicative Solar Photovoltaic array layout

East facing array output

RESULTS

Print Results

23,314 kWh/Year*

Month	Solar Radiation (kWh / m^2 / day)	AC Energy (kWh)
January	6.74	3,127
February	5.99	2,546
March	4.62	2,186
April	3.38	1,572
May	2.10	1,017
June	1.88	882
July	2.03	1,002
August	2.59	1,278
September	3.76	1,788
October	4.87	2,340
November	5.45	2,513
December	6.60	3,063
Annual	4.17	23,314

West facing array output

RESULTS

Print Results

23,381 kWh/Year*

Month	Solar Radiation (kWh / m^2 / day)	AC Energy (kWh)
January	6.83	3,182
February	6.00	2,550
March	4.60	2,175
April	3.35	1,550
May	2.11	1,021
June	1.88	879
July	1.96	960
August	2.49	1,219
September	3.83	1,821
October	5.00	2,397
November	5.59	2,580
December	6.57	3,048
Annual	4.18	23,382

Appendix E. Site Management Plan

During the construction phase, the key pollutants at risk of entering the stormwater system include:

- Sediments (soil, sand, gravel and concrete washings); and
- Litter, debris etc.

These pollutants arise from factors such as dirt from construction vehicles, stockpiles located close to surface runoff flow paths, and surface runoff from disturbed areas during earthmoving and construction works. It is therefore important to have measures that either prevent or minimise the pollutant loads entering stormwater system during construction.

In order to mitigate the impacts of the above pollutants on the stormwater system, the following stormwater management strategies will be implemented during the construction phase as appropriate:

- Installation of onsite erosion and sediment control measures. All installed control measures shall be regularly inspected & maintained to ensure their effectiveness. Such measures may include (but not limited to):
  - Silt fences
  - sediment traps
  - hay bales
  - geotextile fabrics
- Where possible, litter bins with a lid will be used to prevent litter from getting blown away and potentially entering stormwater drains.

Additionally, the following work practices shall be adopted to reduce stormwater pollution:

- Site induction by the head contractor/ builder to make personnel aware of stormwater management measures in place
- Employ suitable measures to reduce mud being carried off-site into the roadways such as installing a rumble grid/ gravel/ crushed-rock driveway (or equivalent measure) to provide clean access for delivery vehicles, removing mud from vehicle tyres with a shovel etc.
- Safe handling and storage of chemicals, paints, oils and other elements that could wash off site to prevent them from entering stormwater drains.
- Where practicable, stockpiles will be covered, located within the site's fence and away from the lowest point of the site where surface runoff will drain to. This initiative will minimise erosion.

Accordingly, the measures presented above are considered appropriate for the proposed development at this stage of the project. The measures will reduce the pollutants entering stormwater system from the site during construction works thereby protecting waterways.

Furthermore, the initiatives are consistent with the Application Requirements set out in Clause 53.18 of the City of Whitehorse Planning Scheme.

Appendix F. Daylight Modelling

Daylight modelling has been undertaken to determine internal daylight levels within the medical centre as well as apartment living areas and bedrooms on levels 1, 2, 5 and 10.

When the results of the daylight modelling from the lower levels are extrapolated to the upper levels with improved daylight access, it is confirmed that:

The daylight modelling confirms that:

Kitchen/living areas meet the Best Practice standard

80.4%

Bedrooms meet the Best Practice standard

95.5%

Results of daylight assessment are based on the BESS standard for daylight modelling as follows:

Residential developments:

- At least 80% of dwellings achieve a daylight factor greater than 1% to 90% of the floor area of each living area, including kitchens;
- At least 80% of dwellings achieve a daylight factor greater than 0.5% to 90% of the floor area in all bedrooms.

The modelling results and software input assumptions are provided below.

F.1 Model Images

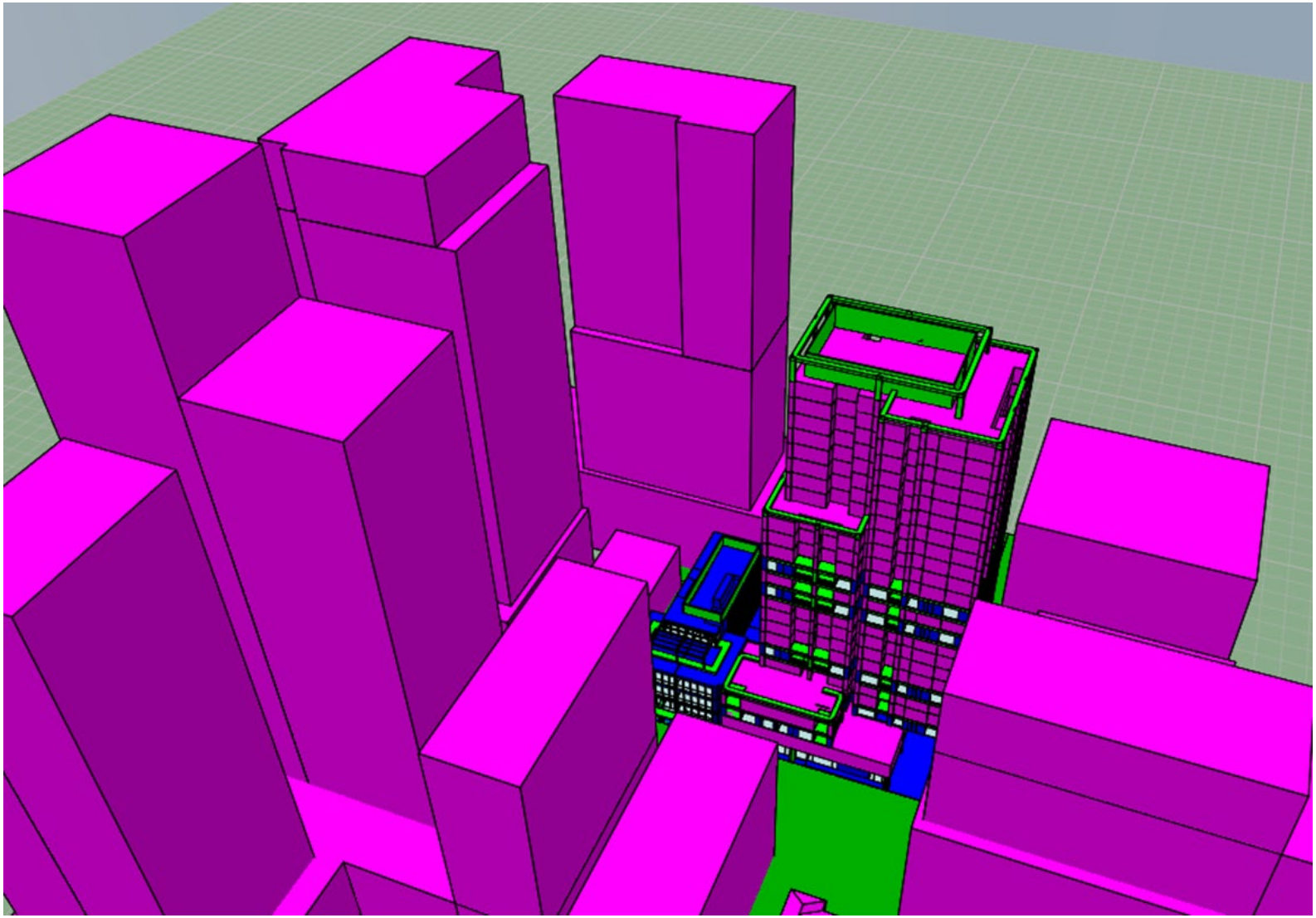


Figure 4 Model view from West

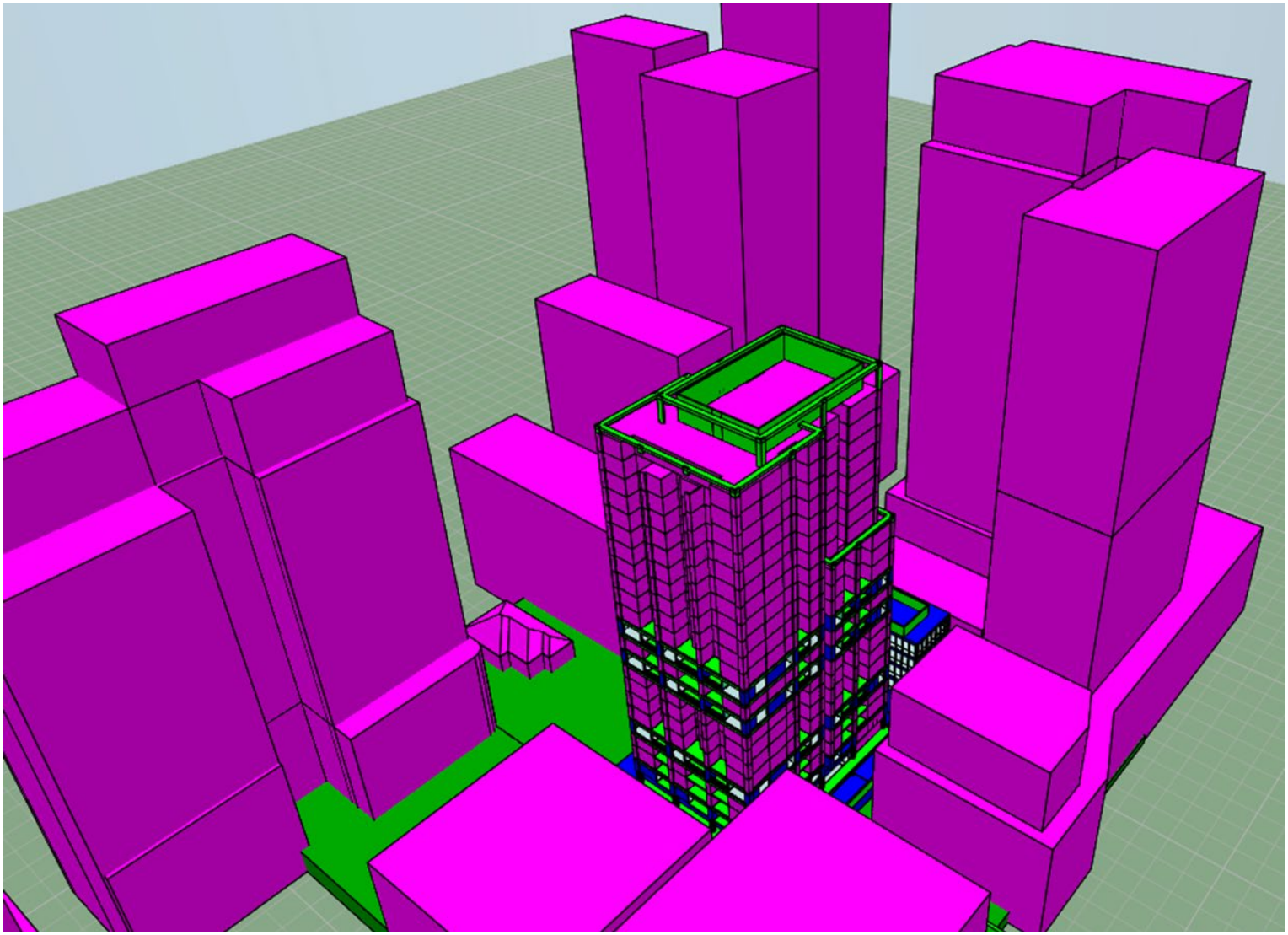


Figure 4 Model view from North-East

F.2 Summary of Results

F.2.1 Living/Kitchen Areas

Level(s)	Number of rooms	Number of rooms achieving 'Best Practice'
L01	5	2
L02	11	4
L03	11	5*
L04	10	5*
L05	10	5
L06	10	5*
L07	10	8*
L08	10	8*
L09	10	9*
L10	10	9
L11	10	9*
L12	10	10*
L13	10	10*
L14	10	10*
L15	10	10*
L16	6	6*
L17	6	6*
L18	6	6*
L19	6	6*
L20	6	6*

L21	6	6*
L22	6	6*
L23	5	5*
Total	**194**	**156**
	Percentage of Total	**80.4%**

* Indicates extrapolated result.

F.2.2 Bedrooms

Level(s)	Number of rooms	Number of rooms achieving 'Best Practice'
L01	8	5
L02	18	13
L03	18	13*
L04	16	15*
L05	16	15
L06	16	16*
L07	16	16*
L08	16	16*
L09	16	16*
L10	16	16*
L11	16	16*
L12	16	16*
L13	16	16*
L14	16	16*

L15	16	16*
L16	12	12*
L17	12	12*
L18	12	12*
L19	12	12*
L20	12	12*
L21	12	12*
L22	12	12*
L23	12	12*
Total	**332**	**317**
	Percentage of Total	**95.5%**

* Indicates extrapolated result.

F.4 Daylight Contour Plots

Residential

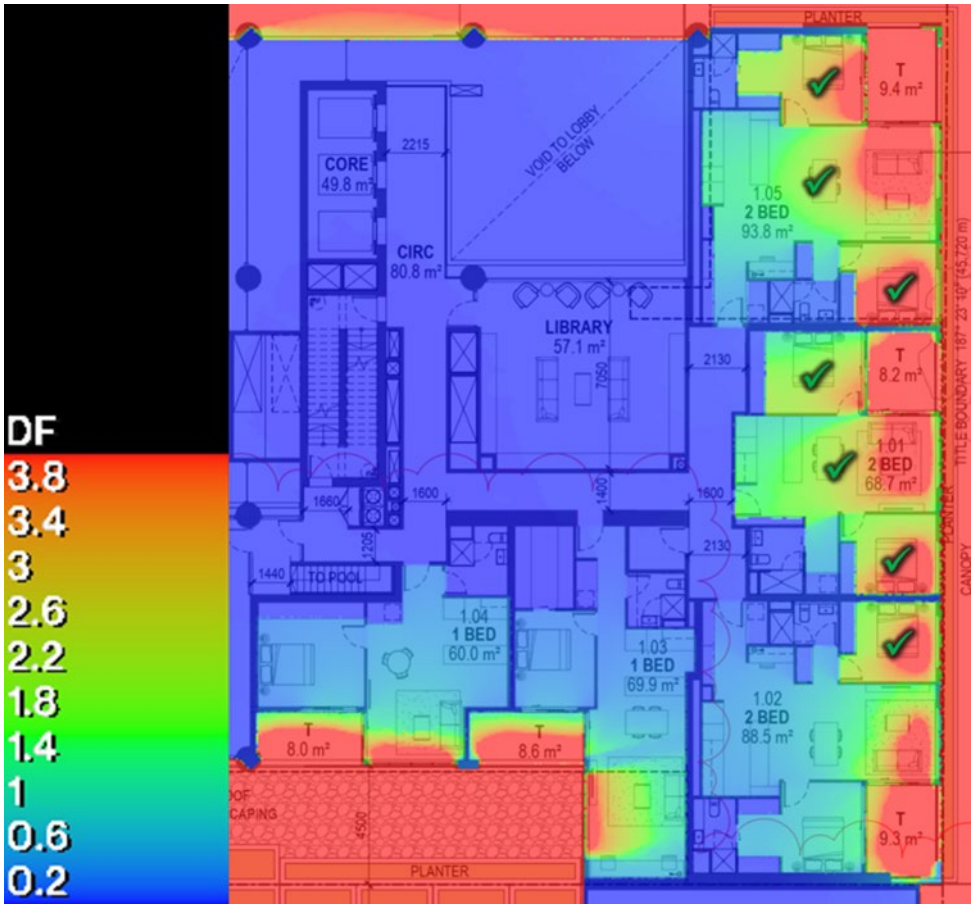


Figure 6 Level 1

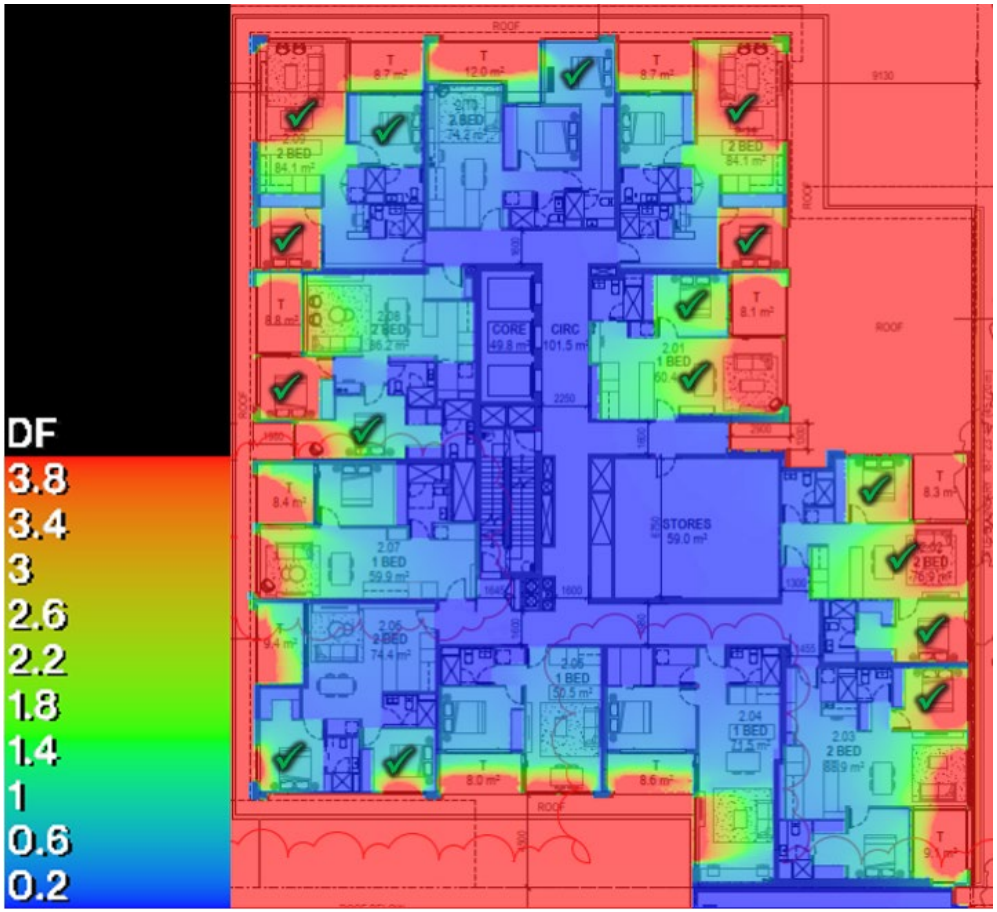


Figure 7 Level 2

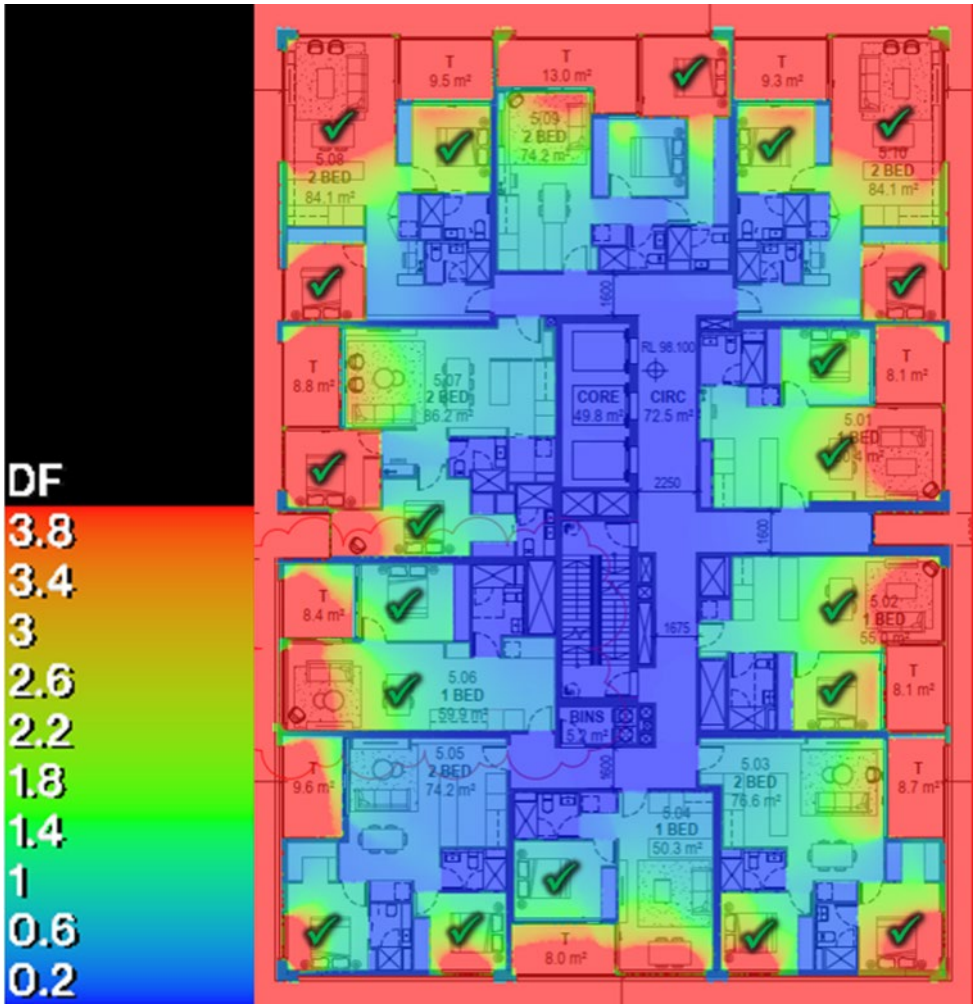


Figure 8 Level 5

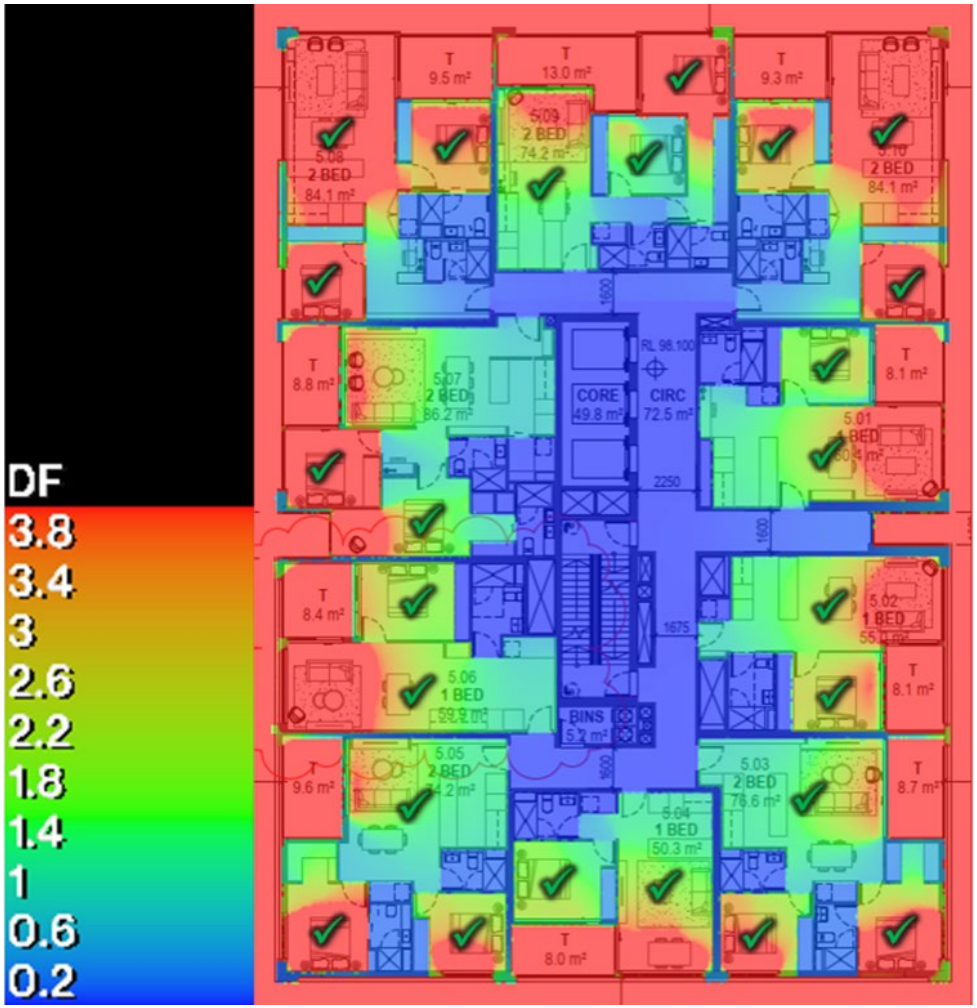


Figure 9 Level 10

Commercial

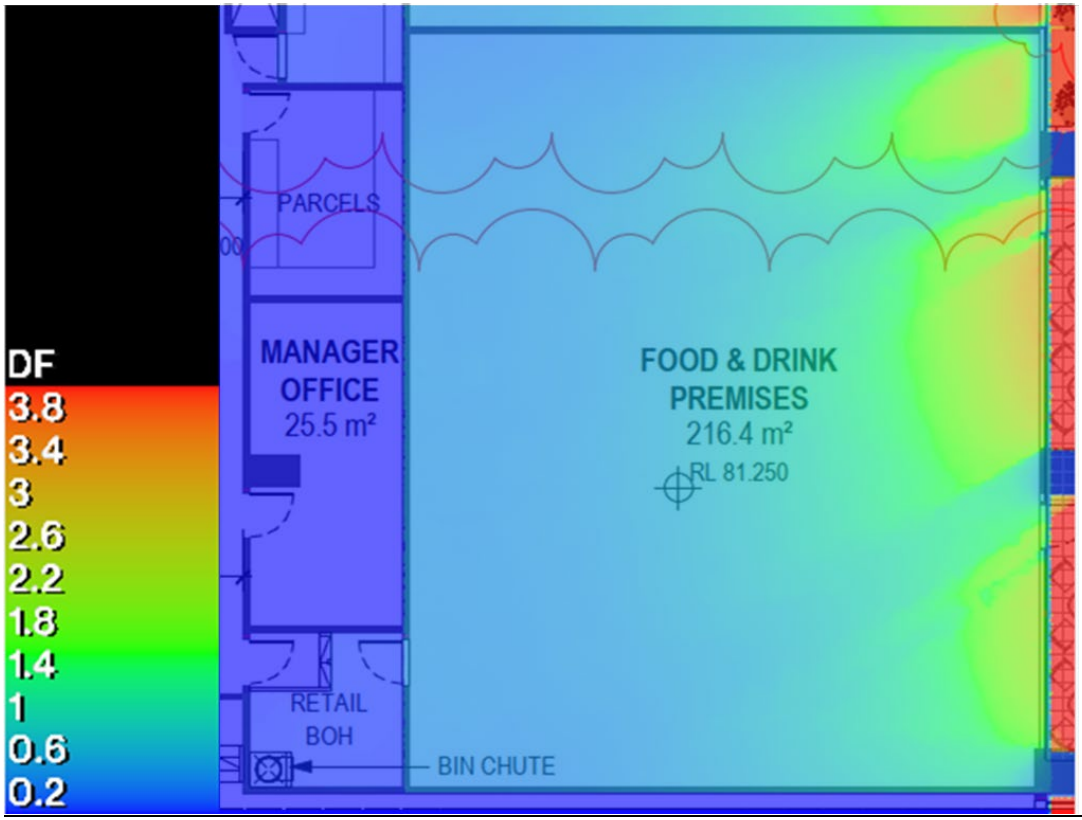


Figure 10 Ground Floor F&B

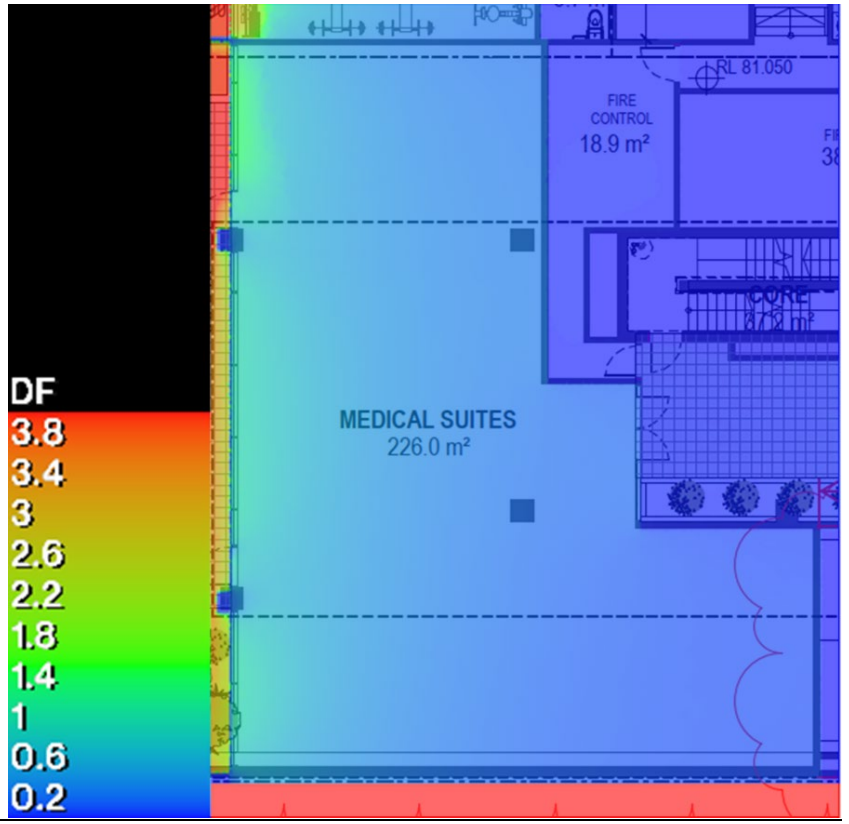


Figure 11 Ground Floor Medical Suites

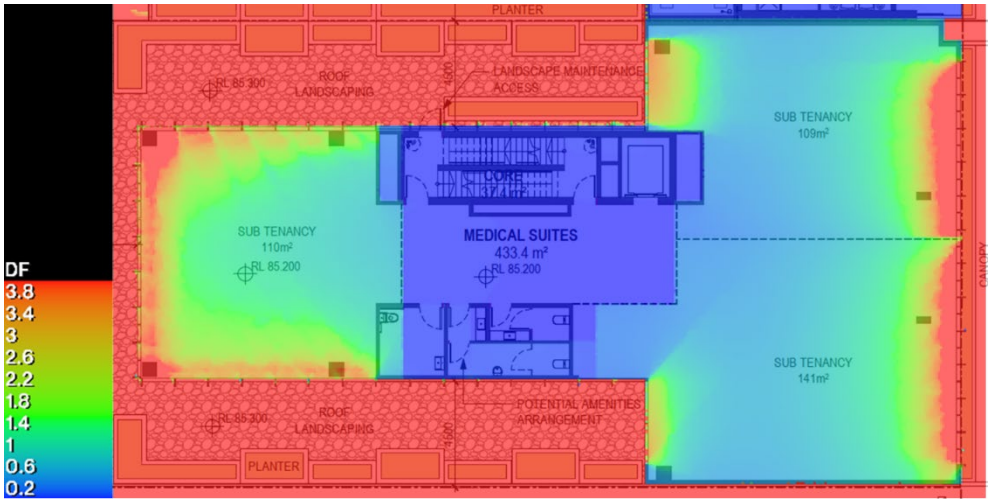


Figure 12 Level 01

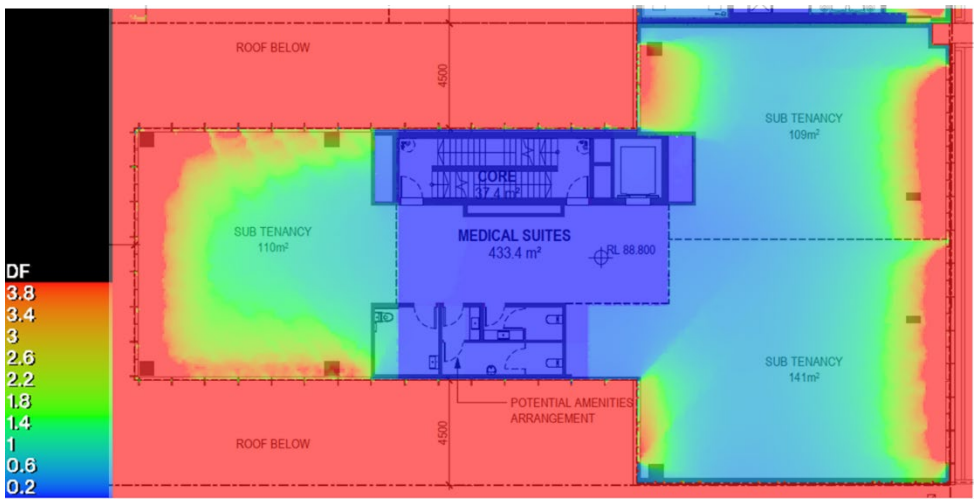


Figure 13 Level 02

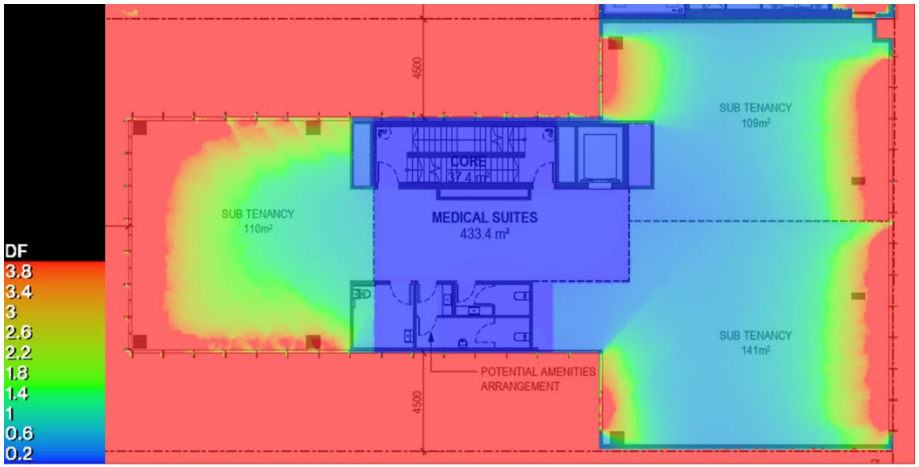


Figure 14 Level 03

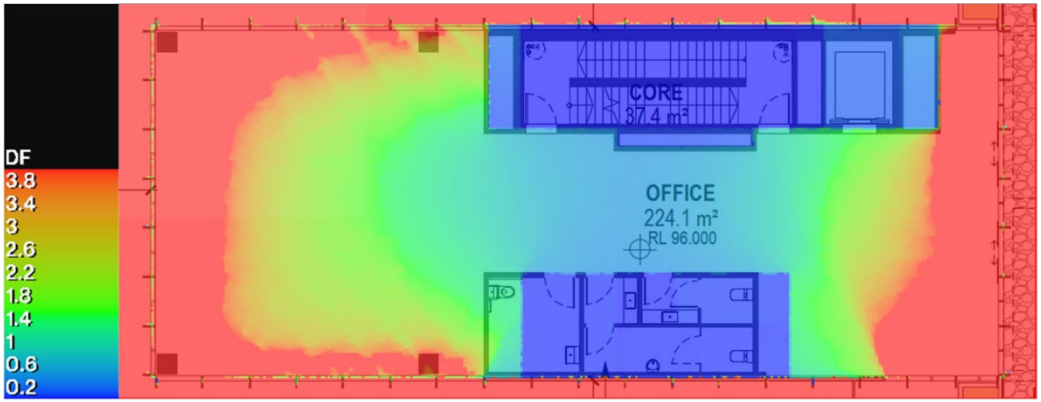


Figure 15 Level 04

F.5 Assumptions

The following assumptions have been made for the Visible Light Transmittance (VLT) values for all glazing applicable to this analysis:

Assumed Glazing Visual Light Transmittance

Glazing Type	Visible Light Transmittance (VLT)
	%
External Glazing – Clear, Double Glazing (GL01)	70

Assumed Surface Reflectances

Construction Element	Reflectance (%)	Description
Internal floors	30	Assumes a medium-coloured carpet
Balcony pavers	40	Assumes light concrete/ tile finish
Balcony walls & soffits	70	White finish
Internal walls (Residential)	94	Dulux Vivid White paint
Internal walls (Commercial)	70	Assumes White paint
Internal Ceilings (Residential)	94	Dulux Vivid White paint
Internal Ceilings (Commercial)	80	Assumes White paint
External ground	10	Asphalt
Roof	60	Assumes light coloured finish
Concrete finish (CF01)	30	Earth tone
Textured concrete (CF02)	40	Mid grey
Concrete finish (CF03)	40	Mid grey
Vertical battens (CS01)	40	Mid grey
Vertical battens (CS02)	30	Timber look
Metal Cladding (MC01)	15	Dark Grey
Metal Finish (MF01)	15	Dark Grey
Spandrel glazing (GT02)	70	White finish
Equitable buildings	40	Medium colour finish
Adjacent concrete buildings	40	Concrete finish
Adjacent brick buildings	30	Red brick finish

Sky conditions: 10K Lux CIE overcast s

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