

Project Documentation

Passive House at Life, Point Cook, Melbourne, Australia



Abstract



Photo credit: Australian Passive House Association 2022

Building data

Year of construction	2021		
U-value external wall U-Wert Außenwand	0,270 W/(m²K)	Space heating Heizwärmebedarf	13 kWh/(m²a)
U-value under slab U-Wert Kellerdecke	0,277 W/(m²K)	Primary Energy Renewable (PER) Erneuerbare Primärenergie (PER)	47 kWh/(m²a)
U-value roof U-Wert Dach	0,148 W/(m²K)	Generation of renewable Energy Erzeugung erneuerb. Energie	80 kWh/(m²a)
U-value window U-Wert Fenster	1,31 - 1,47 W/(m²K)	Non-renewable Primary Energy (PE) Nicht erneuerbare Primärenergie (PE)	104 kWh/(m²a)
Heat recovery Wärmerückgewinnung	74 %	Pressurization test n_{50} Drucktest n_{50}	0,6 h ⁻¹
Special features Besonderheiten	Solar panels (18 x 350W Hyundai SG Series panels), 11 kWh Battery Storage, IAQ sensors AWAIR Omni, Energy Monitors Watt Watchers		

Brief Description

Life, Point Cook, Melbourne, Australia

Life, Point Cook Passive House is a two-storey, four bedroom semi detached townhouse certified to Passivhaus Plus in 2021. It is built in Melbourne, Australia in a 'Warm' climate.

The building includes double-glazed windows with thermally broken aluminium clad timber frames, continuous thermal insulation, airtight membranes to reduce air leakage and minimal thermal bridging. The building also includes a 6.6 kWp rooftop renewable energy system of 18 solar photovoltaic panel and a 11 kWh battery for energy storage.

The project is a test in mass-market housing design with two seemingly identical homes built side-by-side with the same orientation and the same passive solar access, one to Passive House standards and the other to the Building Code. A 12-month trial collecting data on energy consumption, comfort levels and building performance is underway. It is hoped that the results will showcase the long-term energy savings, performance and comfort of Passive House design.

Responsible project participants Verantwortliche Projektbeteiligte

Architect Entwurfsverfasser	Fraser's Property Group https://www.frasersproperty.com.au/
Implementation planning Ausführungsplanung	Fraser's Property Group https://www.frasersproperty.com.au/
Building systems Haustechnik	Fraser's Property Group https://www.frasersproperty.com.au/
Structural engineering Baustatik	Fraser's Property Group https://www.frasersproperty.com.au/
Building physics Bauphysik	Grün Consulting https://grunconsulting.com/
Passive House project planning Passivhaus-Projektierung	Grün Consulting https://grunconsulting.com/
Construction management Bauleitung	Creation Homes https://creationhomes.com.au/

Certifying body Zertifizierungsstelle

Detail Green, Victoria, Australia <https://detailgreen.com.au/>
 Passivhaus Institut Darmstadt www.passiv.de

Certification ID Zertifizierungs ID

6970 Project-ID (www.passivehouse-database.org)
 Projekt-ID (www.passivhausprojekte.de)

Author of project documentation Verfasser der Gebäude-Dokumentation

Grün Consulting
<https://grunconsulting.com/>

Date
Datum

Signature
Unterschrift

4/02/2023



External photographs



North facing facade



West facing facade



South facing facade

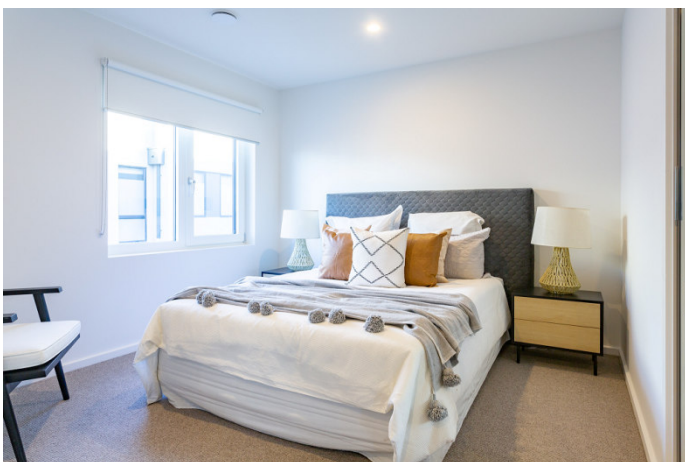


Bird's eye view.



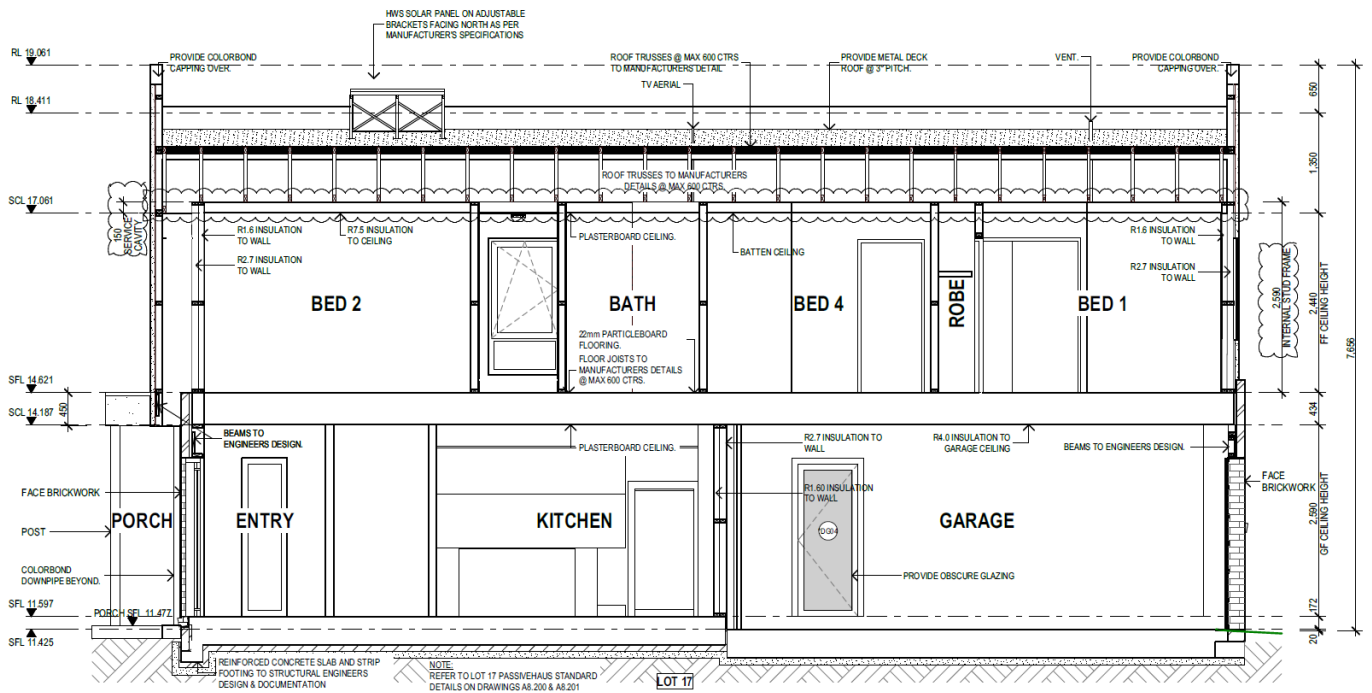
Garage, including inverter and battery

Internal photographs



Kitchen, living area, bedroom.

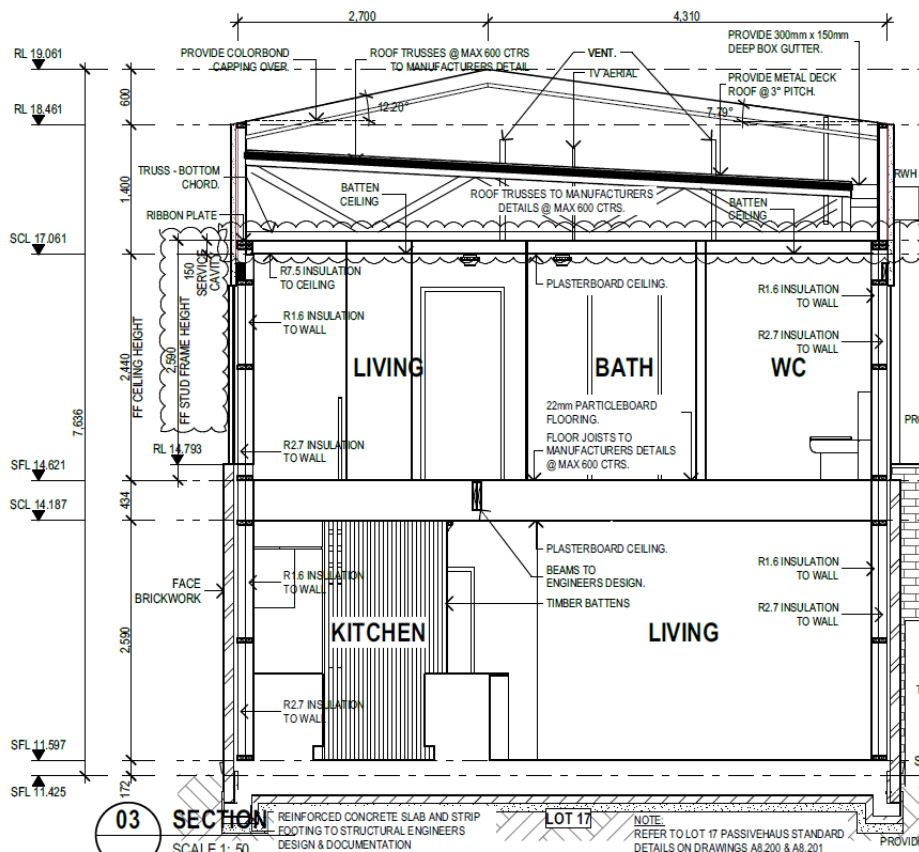
Section details



01 SECTION

SCALE 1: 50

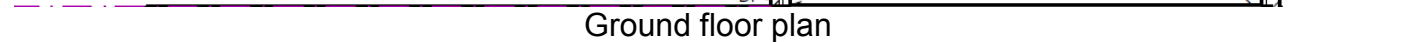
North-south cross section (north to left, south to the right)



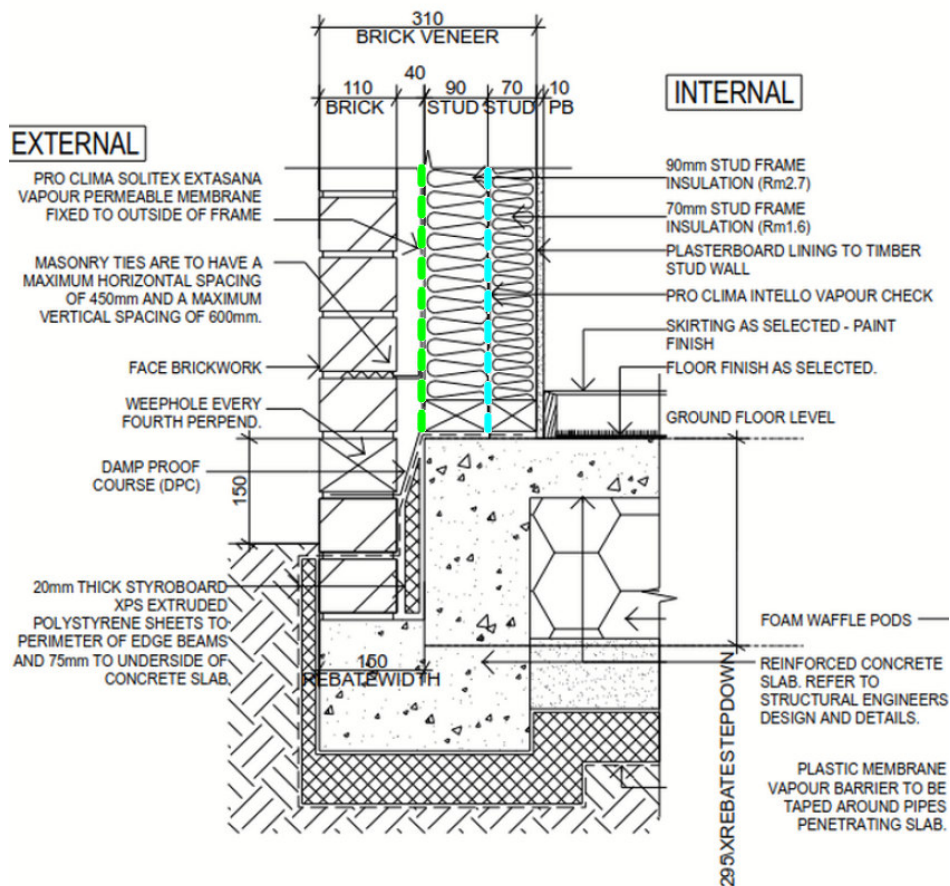
03 SECTION

SCALE 1: 50

East-west cross section (west to left, east to the right)



Floor slab detail



02

TYPICAL MASONRY REBATE

SCALE 1: 10

Assembly no.

09ud

CSOG

Interior insulation?

Orientation of building element

3-Floor

Heat transmission resistance $[m^2K/W]$

interior R_{si}

0.17

R-value $[m^2K/W]$

3.61

Adjacent to

2-Ground

exterior R_{se}

0.00

Area section 1

λ $[W/(mK)]$

Area section 2 (optional)

λ $[W/(mK)]$

Area section 3 (optional)

λ $[W/(mK)]$

Thickness [mm]

Floor finish	0.600				
Concrete	2.100				
Top part of waffle pods	0.040	Concrete	2.100		
Waffle Pod (Unipoly EPS)	0.040	Concrete	2.100	Air	1.100
FOAMEX Styroboard XPS 75mm	0.028				

Total
47.0 cm

Percentage of sec. 1
28%

Percentage of sec. 2
17.5%

Percentage of sec. 3
55.0%

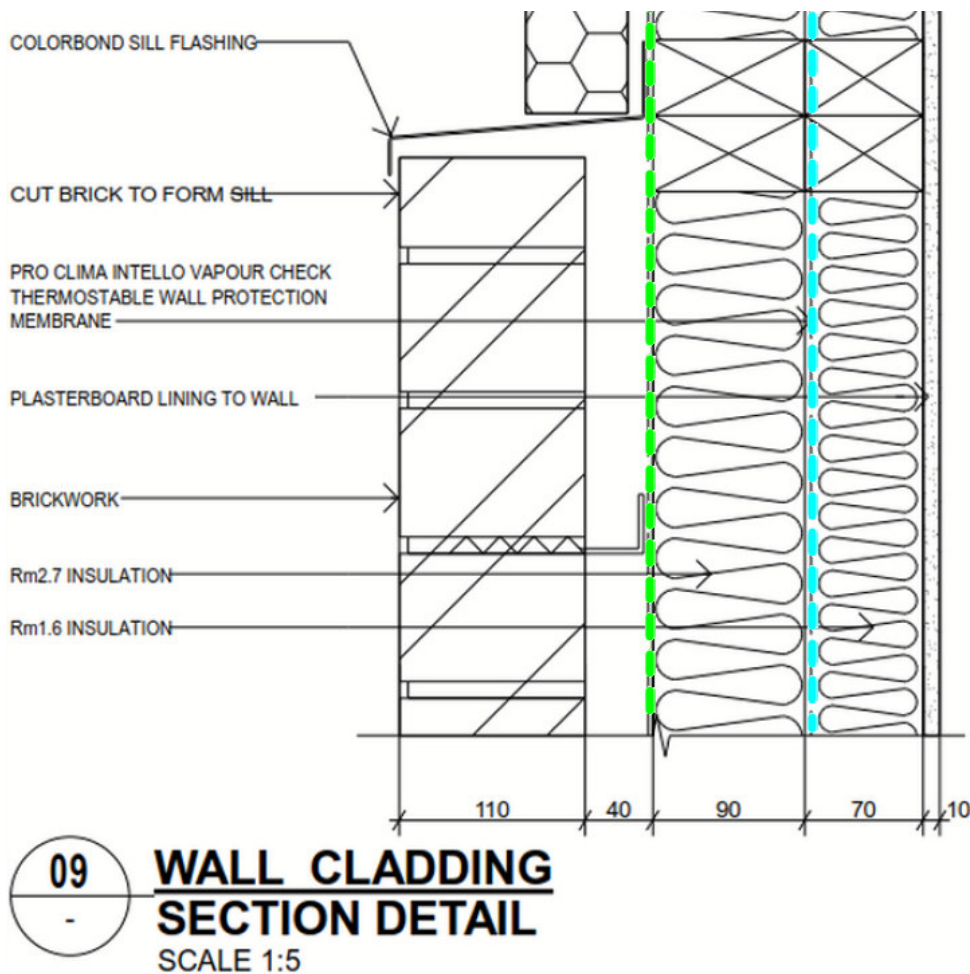
U-value supplement

$W/(m^2K)$

U-value: 0.277

$W/(m^2K)$

External wall detail – brick veneer



Assembly no.

10ud	Wall - Face Brick	Heat transmission resistance $[m^2K/W]$	R-value $[m^2K/W]$ 3.70
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Interior insulation?

☐

Orientation of building element

2-Wall

Adjacent to

1-Outdoor air

Heat transmission resistance $[m^2K/W]$

interior R_{si}

0.13

exterior R_{se}

0.04

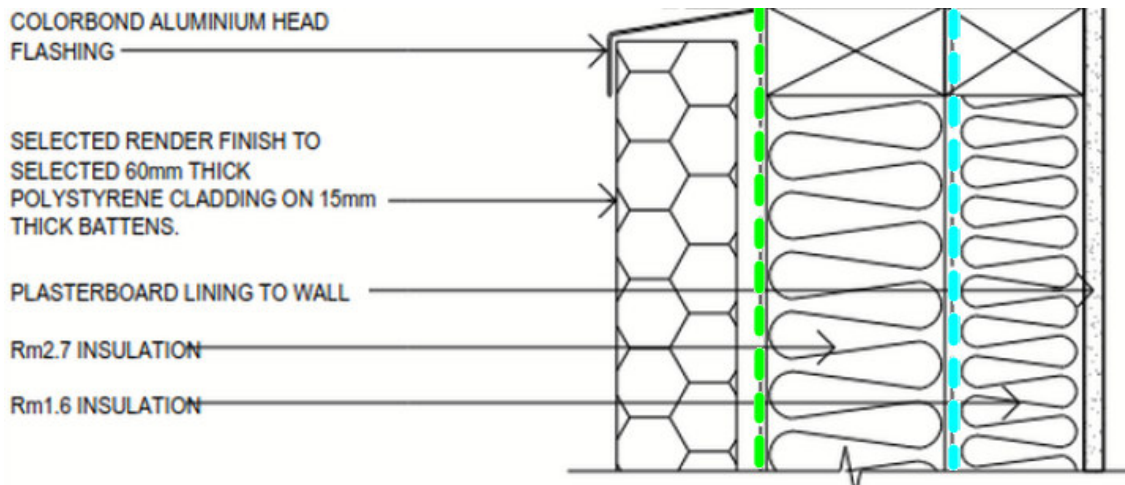
Area section 1	λ $[W/(mK)]$	Area section 2 (optional)	λ $[W/(mK)]$	Area section 3 (optional)	λ $[W/(mK)]$	Thickness [mm]
110mm Brick veneer	0.600					0
Air cavity 35mm	0.190	Timber batten	0.150			0
Vapour Permeable Layer	1.000					0
Bradford Gold Wall batt (R2.7)	0.033	Timber stud	0.150			90
Airtightness Wrap	1.000					0
Bradford Soundscreen (R1.6)	0.044	Timber stud	0.150			70
Airgap	0.070	Timber batten	0.150			10
Plasterboard	0.170					10
Percentage of sec. 1 90%		Percentage of sec. 2 10.0%		Percentage of sec. 3		Total 18.0 cm

U-value supplement

$W/(m^2K)$

U-value: 0.270 $W/(m^2K)$

External wall detail – foam render



09 WALL CLADDING SECTION DETAIL SCALE 1:5

Assembly no.

11ud	Wall- Foam Rendered
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Interior insulation?

☐

Orientation of building element

2-Wall

Adjacent to

1-Outdoor air

Heat transmission resistance $[m^2KW]$

interior R_{si} 0.13

exterior R_{se} 0.04

R-value $[m^2KW]$

3.70

Area section 1	λ $[W/(mK)]$	Area section 2 (optional)	λ $[W/(mK)]$	Area section 3 (optional)	λ $[W/(mK)]$	Thickness [mm]
Exsulte Panel (R1.56)						
Air gap						
Vapour Permeable Layer						
Bradford Gold Wall batt (R2.7)	0.033	1st timber stud	0.150			90
Airtightness Wrap	1.000					0
Bradford Soundscreen (R1.6)	0.044	2nd timber stud	0.150			70
Airgap	0.070	2nd timber stud	0.150			10
Plasterboard	0.170					10
Percentage of sec. 1 90%		Percentage of sec. 2 10.0%		Percentage of sec. 3		Total 18.0 cm

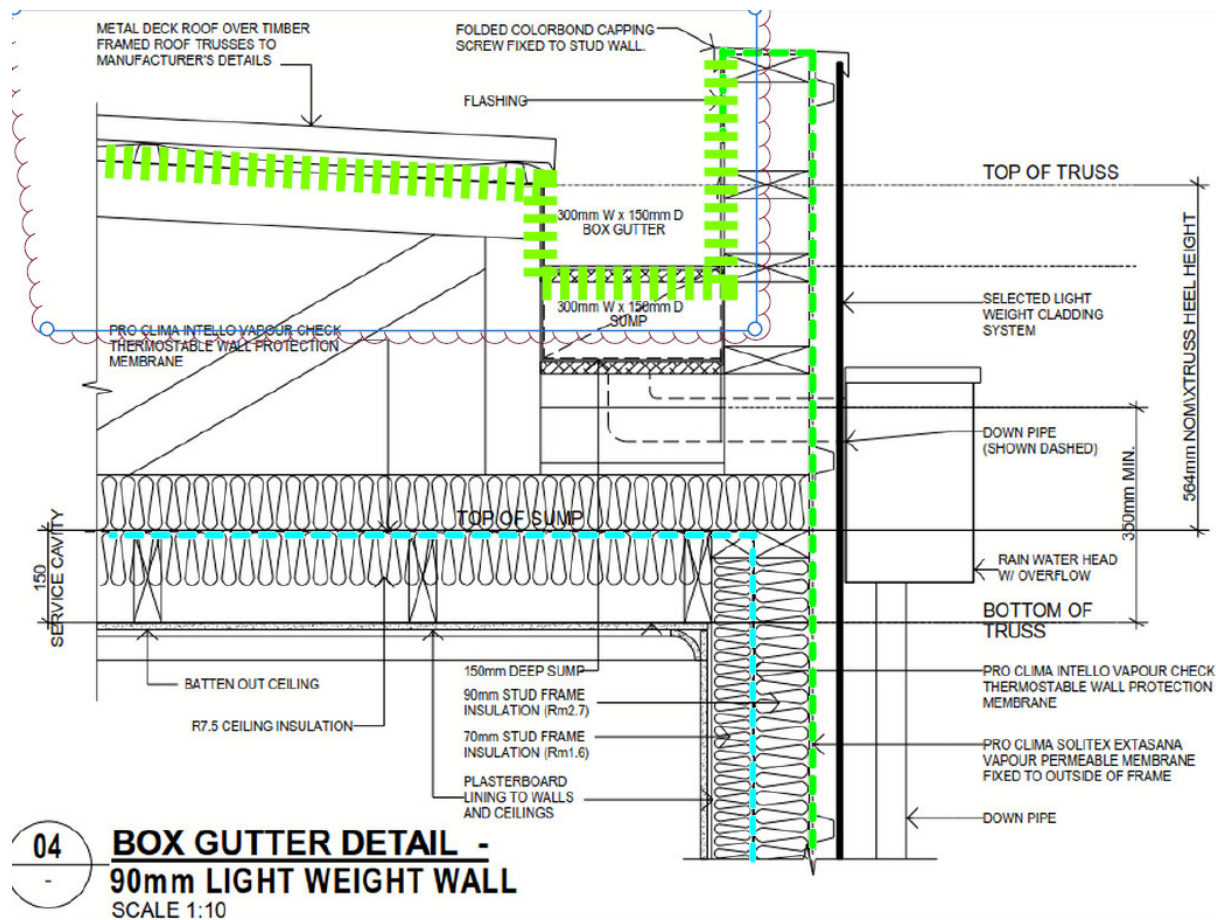
U-value supplement

$W/(m^2K)$

U-value: 0.270

$W/(m^2K)$

Roof detail



Assembly no.		12ud		Roof		Heat transmission resistance $[m^2K/W]$		R-value $[m^2K/W]$		6.77		Interior insulation?	
Orientation of building element		1-Roof		interior R_{si}		0.10		exterior R_{se}		0.04			
Adjacent to		1-Outdoor a											

Area section 1	λ $[W/(mK)]$	Area section 2 (optional)	λ $[W/(mK)]$	Area section 3 (optional)	λ $[W/(mK)]$	Thickness [mm]
Colourbond 5m	60.000					0
Air cavity 35mm	0.080	Timber batten	0.150			0
Vapour Permeable Layer	1.000					0
Glasswool Bradford (R2.5)	0.056	Rafter	0.150			140
Glasswool Bradford (R5.0)	0.052	Rafter	0.150			260
Airtightness Wrap	1.000					0
Service cavity	0.210	Timber batten	0.150			35
Plasterboard	0.170					10
Percentage of sec. 1		Percentage of sec. 2		Percentage of sec. 3		Total
90%		10.0%				44.5 cm
U-value supplement		U-value:		0.148		$W/(m^2K)$

Window product

The building includes double-glazed windows with thermally broken aluminium clad timber frames provided by the supplier Logikhaus. The frame installed is the LogikWin 68 series Alu/Pine pine jointed timber frame (0.11 W/(mK)) with aluminium facing. The properties of the windows are as follows:

Window data	
Window frame description	LogikWin 68 series Alu/Pine Aluminium clad, pine jointed timber frame.
U-value of the window frame U_f	1,38
	W/(m ² K)
Glazing description	PressGlass Silverstar 6/14Ar/6 Includes eurofloat 6mm / 14mm Argon 90 / EN2plus coating on eurofloat 6mm
U-value of the window glazing U_g	1,15
	W/(m ² K)
g-value of the glazing	0,63
	W/(m ² K)

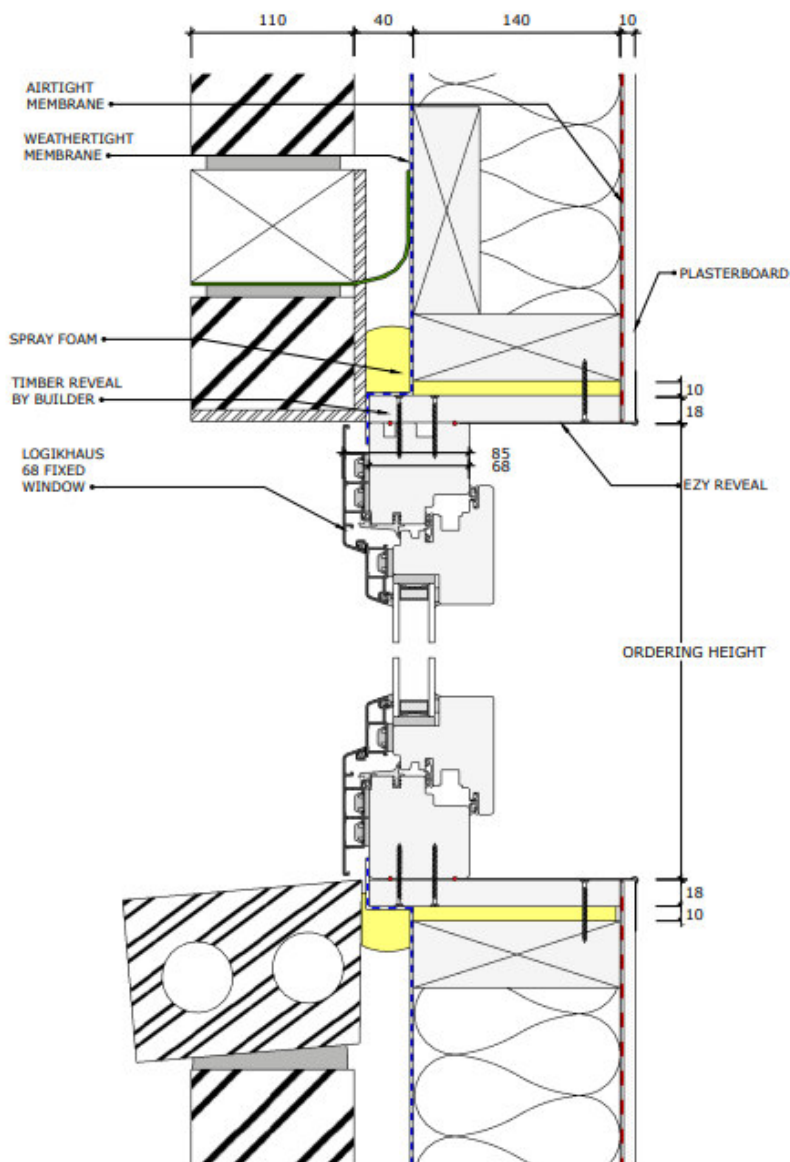


68mm Frame

Double and Triple glazed windows
Thermal Transmittance U_w 1.20 and 0.87 W/m²K
Sound reduction 31 dBA (42 dBA with acoustic glass)
Airtightness class 4
Average Price \$1200 – \$1500/m² plus GST
Passive House certified for warm climates
BAL 29 Bushfire rated

Window frame diagram (Logikhaus 2022)

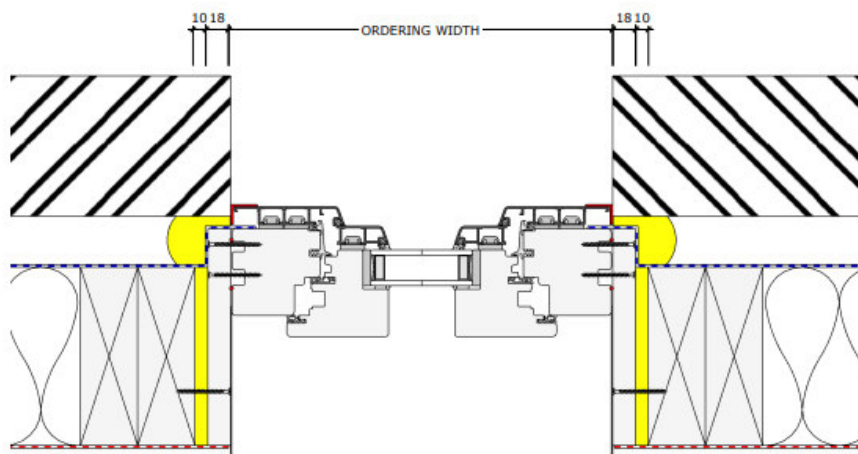
Window installation details



Notes:

Material, density, thermal conductivity
Source: ISO 10077-2: 2012

	Aluminium, 2800 kg/m ³ , 160 W/mK
	Spruce, 0.11 W/mK Pine, Meranti, Larch, 0.13 W/mK Oak, 0.18 W/mK
	EPDM, 1150 kg/m ³ , 0.25 W/mK
	Silica gel (desiccant), 720 kg/m ³ , 0.13 W/mK
	Polyamide (Nylon), 1150 kg/m ³ , 0.25 W/mK
	ABS, 1050 kg/m ³ , 0.20 W/mK
	Polysulfide, 1700 kg/m ³ , 0.40 W/mK
	PVC-U, 1390 kg/m ³ , 0.17 W/mK
	Silicone, pure, 1200 kg/m ³ , 0.35 W/mK
	Soda lime glass, 2500 kg/m ³ , 1.00 W/mK
	Hardwood flooring, 750 kg/m ³ , 0.18 W/mK
	Softwood plywood, 600 kg/m ³ , 0.13 W/mK
	Reinforced concrete, 2400 kg/m ³ , 2.5 W/mK
	PIR foam, 30kg/m ³ , 0.024 W/mK XPS foam 300 kPa, 40kg/m ³ , 0.030 W/mK EPS foam SL-grade, 14kg/m ³ , 0.044 W/mK
	Polyester Batts, 0.038W/mK
	Steel, 8000 kg/m ³ , 50 W/mK
	Windtight surface
	Airtight surface



System: Aluclad Timber 68 Pine jointed
colour: PAINT, Satin Paint RAL colour
glass: 4/4 (26) Sandblasted
window U (W/m²K)= 1.31
Frame: 68x69mm
Sash: 68x80mm
Fitting: tilt&turn tilt first
alu-clad type: Classic 86mm
alu-clad colour: ACC4
hinge caps: R01.1 Aluminium silver
Handle: Roto keyed F1

Airtight building envelope

The method of providing an airtight construction included the use of:

- Proclima Intello Vapour check thermostable membrane to the internal walls and ceiling;
- Proclima Solitex Extasana vapour permeable membrane to the external walls and roof;
- Concrete waffle pod slab provided airtightness to the floor, with Tescon Vana all-round adhesive tape to all penetrations to the slab, and connection of the Intello internal wrap to the slab.

The final airtightness pressure test was carried out by the airtightness professionals at Efficiency Matrix on 9th June 2021 after the final airtight wrap was installed and completed.



Proclima Intello Vapour check wrap (white) installed to the internal walls and ceiling with blue Tescon vana tape to all edges and slab (left photo) and the blower door fan installed to the First Floor WC room window (right photo).

Registered Certificate of Air Tightness Test (Low Energy Certificate)



Test Credentials									
Issued by:		Efficiency Matrix							
Address:		14 Ondine Drive Wheelers Hill Australia VIC 3150	Technician:		Joseph Cheung				
			Registration No:		4003				
			Qualification:		1	2	3	PH	EA
					✓	✓		✓	✓
			For clarification on technician qualifications please visit https://www.bcta.group/attma/members						
Telephone:		00434 195792							
Email:		john@efficiencymatrix.com							
Report reference:		R-509-T2106							

Building Details				
Building identifier:				
Address: Lot 17 , 45 Parkwood Drive, Point Cook, 3030				
Type:	Dwelling	Description:	Flat – Ground Floor	
Construction:	Traditional	Warm roof:	No	
Size:	Footprint (m²)	Envelope (m²)	Volume (m³)	Storey
	153	473	384	2
Ventilation:	System 1 - Background ventilators with intermittent extractors			
Primary heating:	None	Air conditioning:	None	
Mastic sealing:	None			

Test Details			
Date:	09/06/2021		
Retest:	No	Lodgement Type:	Final
Data acquisition:	Auto	Test Type:	Whole building
	Positive:	Negative:	
Temporary sealing:			
Deviations:			
Notifications:			

Test Results					
This is to certify that the above name building has been tested by a registered provider in accordance with ATTMA TSL4, subject to the above statements regarding temporary sealing and deviations from these test standards This certificate is a short form report. If a full compliant report is required please contact the company that issued the certificate. Enquiries about this certificate should be made to: Scheme Manager, ATTMA, First Floor, Flint Barn Court, Church Street, Amersham, Buckinghamshire, England, HP7 0DB or visit www.bcta.group/attma					
Results	Positive	Negative	Average	Target	
UPRN:	10956739	10956738			
Air Permeability (AP ₅₀):	0.48 m³.h⁻¹.m²@50Pa	0.51 m³.h⁻¹.m²@50Pa	0.49 m³.h⁻¹.m²@50Pa	1.0	m³.h⁻¹.m²@50Pa
Air Changes (N ₅₀):	0.59 m³.h⁻¹.m³@50Pa	0.63 m³.h⁻¹.m³@50Pa	0.61 m³.h⁻¹.m³@50Pa	0.6	m³.h⁻¹.m³@50Pa
Air Flow Coefficient (C _{env}):	17.551	15.254	Notifications:		
Air Flow Exponent (n):	0.65	0.70			
Air Leakage at 50 Pa (Q ₅₀):	233.190	233.190			
Coefficient of Determination(r²):	0.987	0.998			



ATTMA is part of the Building Compliance Testers Association (BCTA). The BCTA is a trade association for companies that conduct on-site testing and operate within controlled, audited schemes.

Enquiries should be made to: BCTA, First Floor, Flint Barn Court, Church Street, Amersham, Buckinghamshire, England, HP7 0DB or visit www.bcta.group

Ventilation system

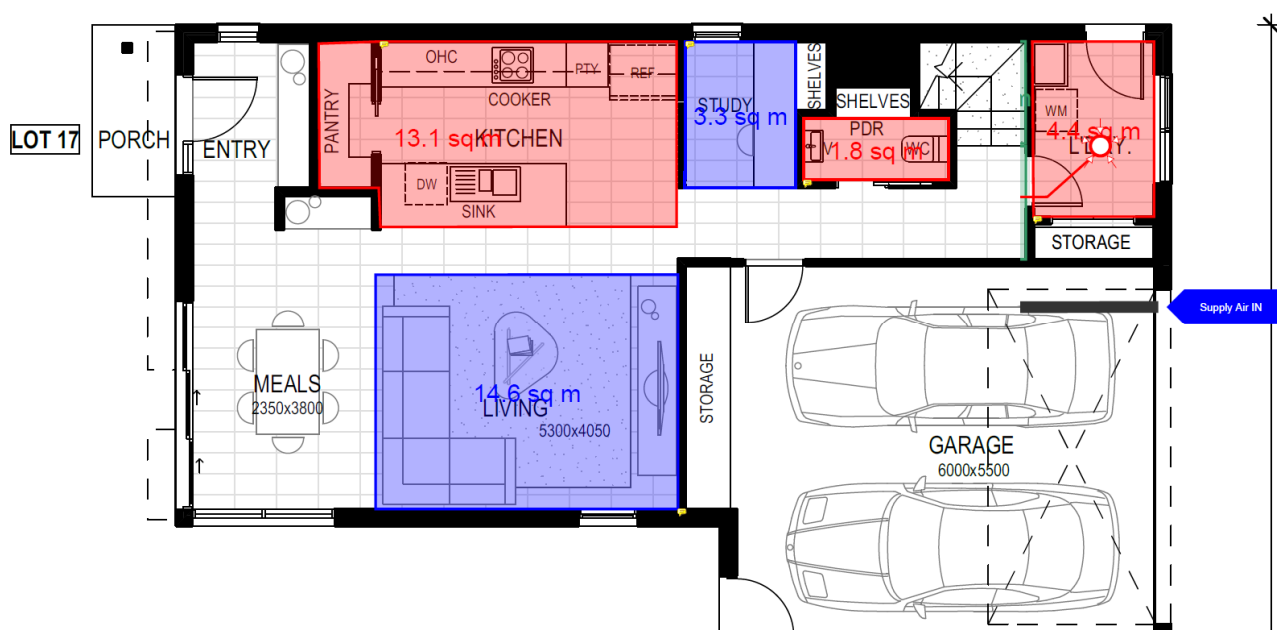
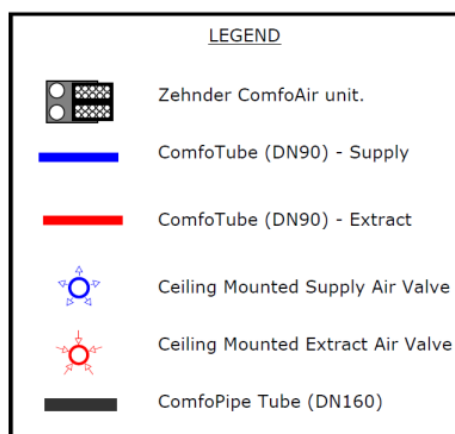
The heat recovery ventilation is provided by a Zehnder, Comfo Air & Comfort Vent Q350 HRV System which supplies air to the living spaces and bedrooms and extracts air from the kitchen, powder rooms, toilets and bathrooms through ceiling mounted supply and extract valves.

The Zehnder Comfo Air system is installed in the garage outside the thermal envelope and ductwork is run centrally through the house to each room.

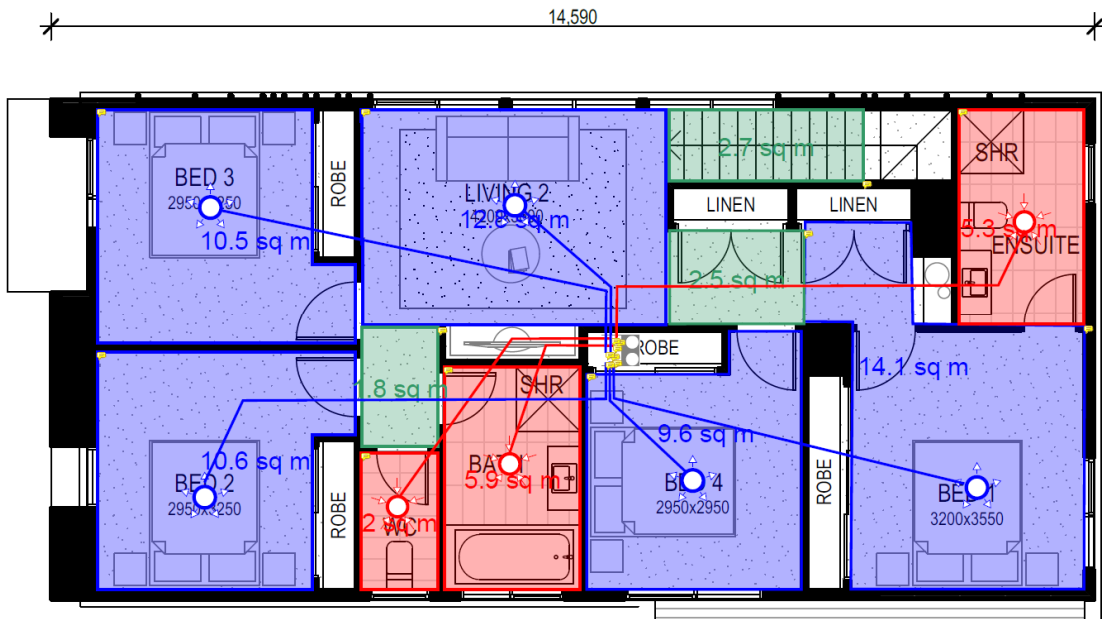
The Zehnder Comfo Air Q350 HRV is a Passive House Certified Component with the following specifications:

Ventilation system data	
Effective heat recovery	75%
Electrical efficiency	0.45 Wh/m ³

Air is being supplied to the Zehnder HRV System, and air is being extracted, as shown in the diagrams below. Rooms coloured in red are have air extracted while rooms coloured in blue are supplied with fresh air from the ventilation system.



LOT 17



Heating and cooling supply

Heating and cooling is provided through a Daikin Multi head 10 kW System that comprises of 3 indoor units, as shown in the diagram below.

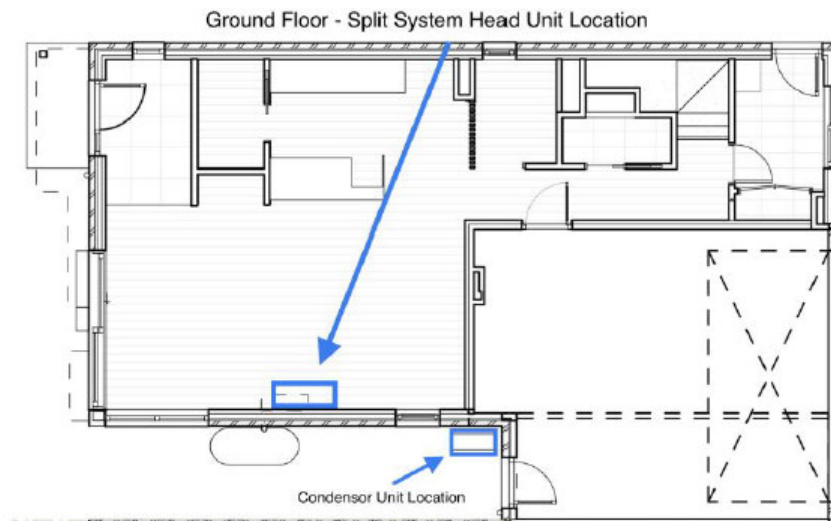
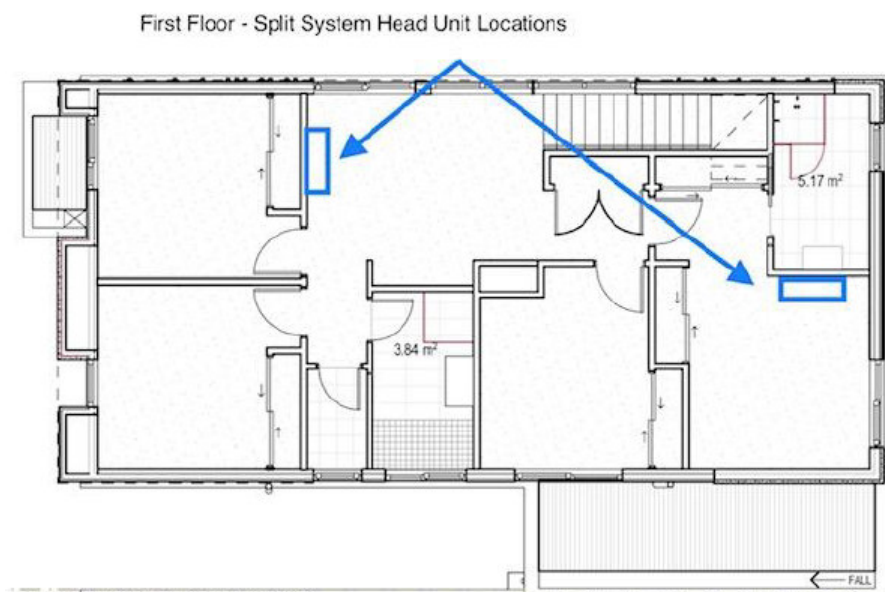


Figure 2



Passivhaus Planning Package

Passive House Verification



Architecture: **Fraser's Property Group**

Street: **Level 9, 484 St Kilda Rd**

Postcode/City: **3004 Melbourne**

Province/Country: **Victoria AU-Australia**

Energy consultancy: **Grün Consulting**

Street: **Citic House, Level 6/99 King St**

Postcode/City: **3000 Melbourne**

Province/Country: **VIC AU-Australia**

Year of construction: **2021**

No. of dwelling units: **1**

No. of occupants: **2.9**

Building:	Parkwood- Lot 17		
Street:	360-438 Point Cook Rd		
Postcode/City:	3030	Point Cook	
Province/Country:	Victoria	AU-Australia	
Building type:	Dwelling		
Climate data set:	ud-01-Melbourne NEW		
Climate zone:	5: Warm	Altitude of location:	14 m
Home owner / Client:	Fraser's Property Group		
Street:	Level 9, 484 St Kilda Rd		
Postcode/City:	3004	Melbourne	
Province/Country:	Victoria	AU-Australia	
Builder:	Creation Homes		
Street:	Level 12, 484 St Kilda Rd		
Postcode/City:	3004	Melbourne	
Province/Country:	Victoria	Australia	
Certification:	Detail Green		
Street:	18 Fletcher Rd		
Postcode/City:	3747	Beechworth	
Province/Country:	Victoria	Australia	
Interior temperature winter [°C]:	20.0	Interior temp. summer [°C]:	25.0
Internal heat gains (IHG) heating case [W/m²]:	2.4	IHG cooling case [W/m²]:	3.3
Specific capacity [Wh/K per m² TFA]:	84	Mechanical cooling:	x

Specific building characteristics with reference to the treated floor area

				Alternative criteria		Fullfilled? ²
				Criteria		
Space heating	Treated floor area m²	146.0				yes
	Heating demand kWh/(m²a)	13.0	≤	15	-	
	Heating load W/m²	14	≤	-	10	
Space cooling	Cooling & dehum. demand kWh/(m²a)	14.0	≤	15	15	yes
	Cooling load W/m²	23	≤	-	10	
	Frequency of overheating (> 25 °C) %	-	≤	-		-
	Frequency of excessively high humidity (> 12 g/kg) %	0	≤	10		yes
	Airtightness	Pressurization test result n ₅₀ 1/h	0.6	≤	0.6	
Non-renewable Primary Energy (PE)	PE demand kWh/(m²a)	104	≤	-		-
Primary Energy Renewable (PER)	PER demand kWh/(m²a)	47	≤	45	47	yes
	Generation of renewable energy (in relation to projected building footprint area)	80	≥	60	63	

² Empty field: Data missing; '-': No requirement

I confirm that the values given herein have been determined following the PHPP methodology and based on the characteristic values of the building. The PHPP calculations are attached to this verification.

Task:	First name:	Surname:	Passive House Plus?
2-Certifier	Luc	Plowman	yes
Certificate ID:	Issued on:	City:	Signature:
	30/09/21	Beechworth	

Project data imported from **designPH 1.5.01**

PHPP9 display.code:

689913149_211015_DPOAU_en09

Certification

Certificate

Certified Passive House Plus



Authorised
by:



Dr. Wolfgang Feist
64283 Darmstadt
Germany

Lot 17, 45 Parkwood Terrace, 3030 Point Cook, Australia



Client	Frasers Property Group Level 9, 484 St Kilda Rd 3004 Melbourne, AU-Australia
Architect	Frasers Property Group Level 9, 484 St Kilda Rd 3004 Melbourne, Australia
Builder	Creation Homes Level 12, 484 St Kilda Rd 3004 Melbourne, Australia
Energy Consultant	Grün Consulting Citic House, Level 6/99 King St 3000 Melbourne, Australia

Passive House buildings offer excellent thermal comfort and very good air quality all year round. Due to their high energy efficiency, energy costs as well as greenhouse gas emissions are extremely low.

The design of the above-mentioned building meets the criteria defined by the Passive House Institute for the 'Passive House Plus' standard:

Building quality		This building	Criteria	Alternative criteria
Heating	Heating demand [kWh/(m²a)]	13	≤ 15	-
	Heating load [W/m²]	14	≤ -	10
Cooling	Cooling + dehumidification demand [kWh/(m²a)]	14	≤ 15	15
	Cooling load [W/m²]	23	≤ -	10
Airtightness	Pressurization test result (n ₅₀) [1/h]	0.6	≤ 0.6	
Renewable primary energy (PER)	PER-demand [kWh/(m²a)]	47	≤ 45	47
	Generation (reference to ground area) [kWh/(m²a)]	80	≥ 60	63

The associated certification booklet contains more characteristic values for this building.

30th September 2021, Beechworth
Certifier: Luc Plowman, Detail Green

Publications

Australian Passive House Association

<https://passivehouseaustralia.org/APHA/Certified-Projects/Passive%20House%20at%20Life%20Point%20Cook.aspx>

Fraser's Property promotional video

<https://www.youtube.com/watch?v=IBMndTRAXhg&t=13s>

Fraser's Property article

<https://www.frasersproperty.com.au/VIC/Point-Cook/Explore/Passivhaus>