

Abstract



Wonga park Drive, Waldara in Victoria Australia

Building data			
Year of construction Baujahr	2022	Space heating Heizwärmebedarf	14 kWh/(m²a)
U-value external wall U-Wert Außenwand	0,267 W/(m ² K)		
U-value floor slab U-Wert Bodenplatte	0,479 W/(m ² K)	Primary Energy Renewable (PER) Erneuerbare Primärenergie (PER)	38 kWh/(m ² a)
U-value roof U-Wert Dach	0,149 W/(m ² K)	Generation of renewable Energy Erzeugung erneuerb. Energie	0 kWh/(m ² a)
U-value window U-Wert Fenster	1,30 W/(m ² K)	Non-renewable Primary Energy (PE) Nicht erneuerbare Primärenergie (PE)	82 kWh/(m ² a)
Heat recovery Wärmerückgewinnung	84 %	Pressurization test n ₅₀ Drucktest n ₅₀	0,6 h ⁻¹
Special features Besonderheiten	Exterior blinds to prevent overheating in Summer		

Brief Description

Passive House Waldara Victoria

This detached dwelling in rural Victoria was commissioned by a doctor and his wife who were just starting a family. This house is to be their forever home to raise their children. Being in the Southern hemisphere the rear of this lot faces north, north west, which is close to ideal. The floor plan angles to the north and further to the north east taking full advantage of passive solar design. With very hot summers and blistering afternoons the garage and services rooms were positioned to the West, buffering the house from the hot afternoon sun. Exterior sun blinds are also to be used helping to reduce summer overheating in the house.

The garage and rear entertaining area are not within the passive house envelope; these are open areas that can be left open to the outdoors for covered entertaining and dirty work areas.

This passive house was designed for cost efficiency with minimal change to local construction techniques. The full insulation wrap to the concrete slab was slightly new to the builder, as was the air tight stud wrap. I changed the standard 90mm timber studs in the exterior walls to 140mm studs in order to achieve the adequate insulation rates for passive house in this climate. With the use of triple glazed PVC Deceuninck framed exterior doors and windows, the build went smoothly.

The family have been living in and enjoying this house.

Responsible project participants

Verantwortliche Projektbeteiligte

Architect Entwurfsverfasser	Stefan Huhn of 360 Plans https://360plans.com.au/
Implementation planning Ausführungsplanung	-
Building systems Haustechnik	Fantech https://www.energyrecovery.com.au/
Structural engineering Baustatik	Connex Group Pty Ltd https://connexgroup.com.au/
Building physics Bauphysik	Stefan Huhn of 360 Plans https://360plans.com.au/
Passive House project planning Passivhaus-Projektierung	Stefan Huhn of 360 Plans https://360plans.com.au/
Construction management Bauleitung	DKM Builders https://www.dkmbuilders.com.au/

Certifying body

Zertifizierungsstelle

Passivhaus Institut Darmstadt www.passiv.de	Detail Green https://www.detailgreen.com.au/
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Certification ID

Zertifizierungs ID

7914	Project-ID (www.passivehouse-database.org) Projekt-ID (www.passivhausprojekte.de)
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Author of project documentation

Verfasser der Gebäude-Dokumentation

Passivhaus Institut Darmstadt www.passiv.de	Stefan Huhn of 360 Plans https://360plans.com.au/
Date Datum	Signature Unterschrift
14.08.2025	

1. Exterior photos

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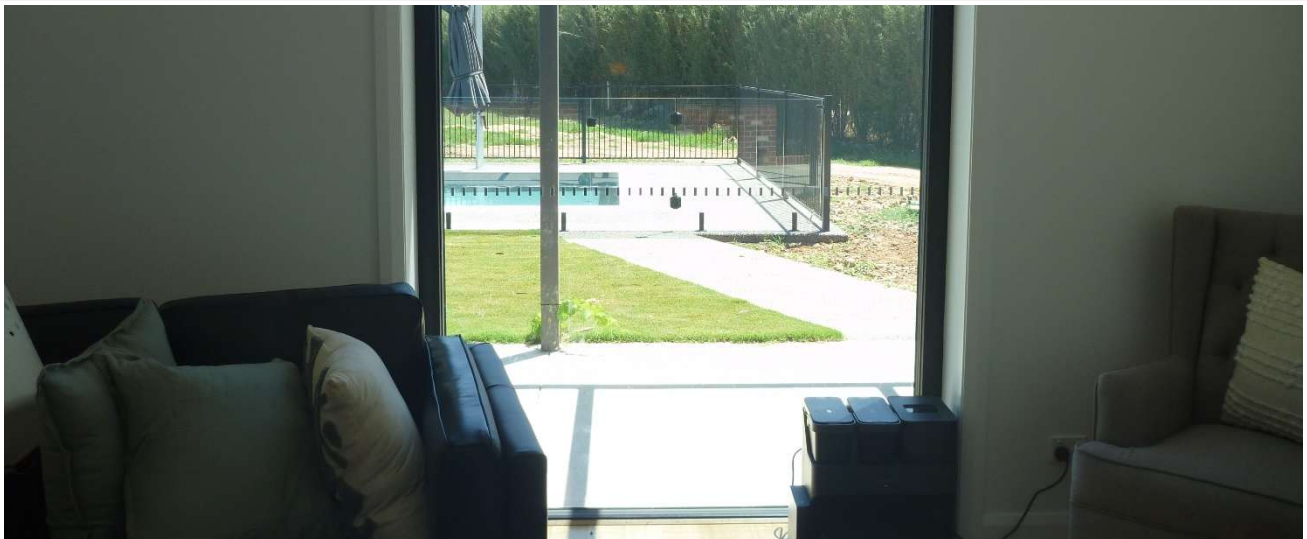


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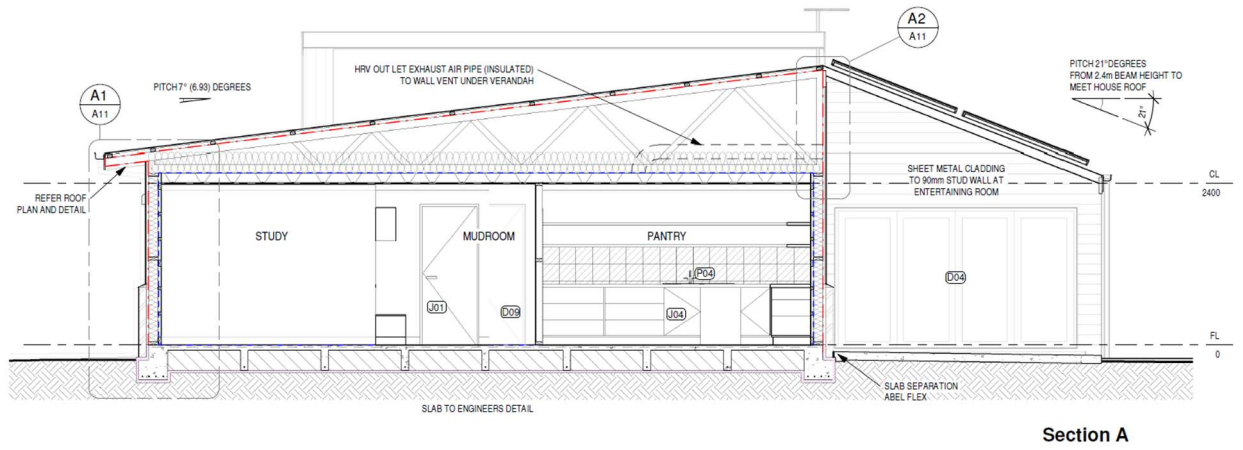
North-West



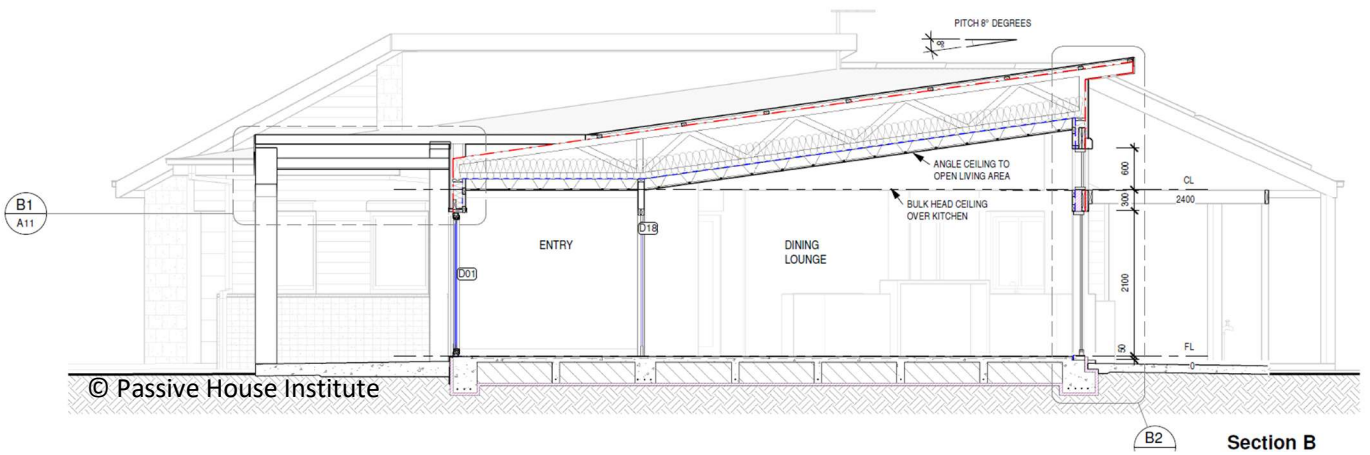
2. Interior photo



3. Sectional Drawings



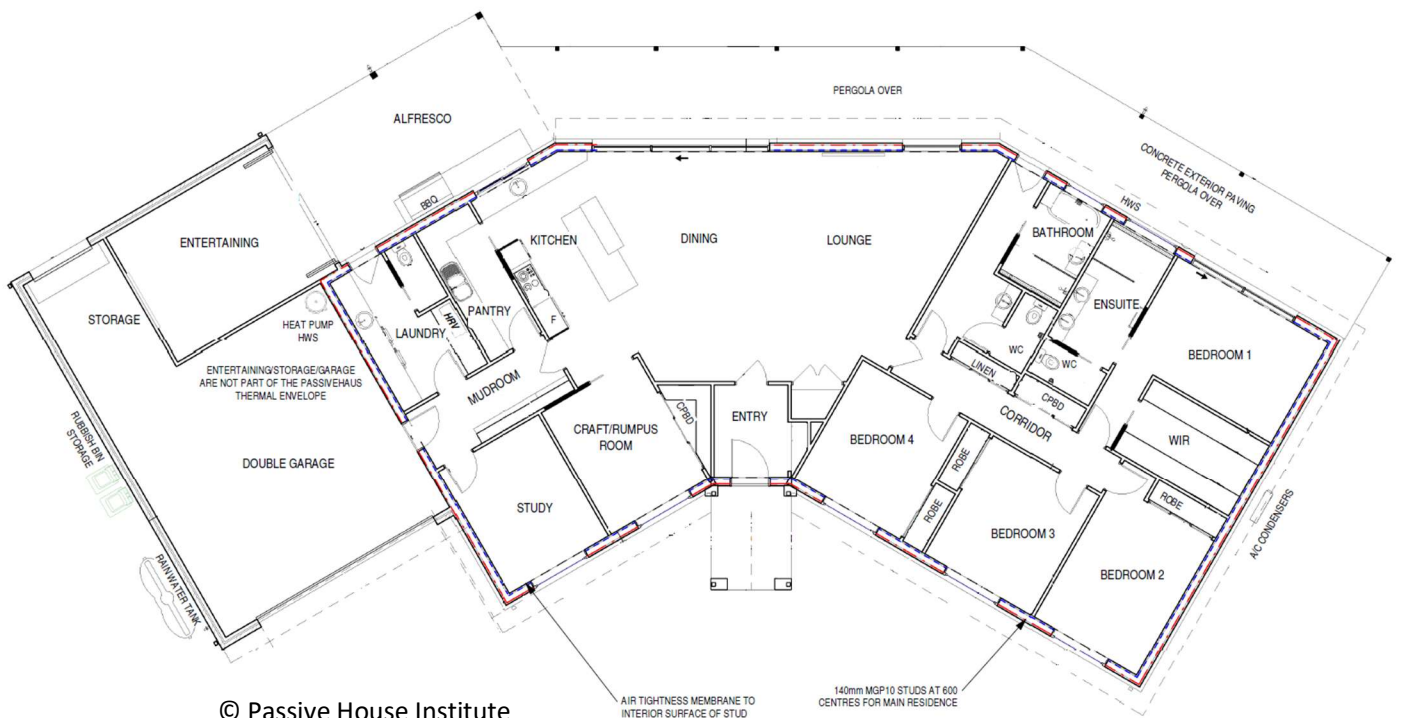
Section A



Section B

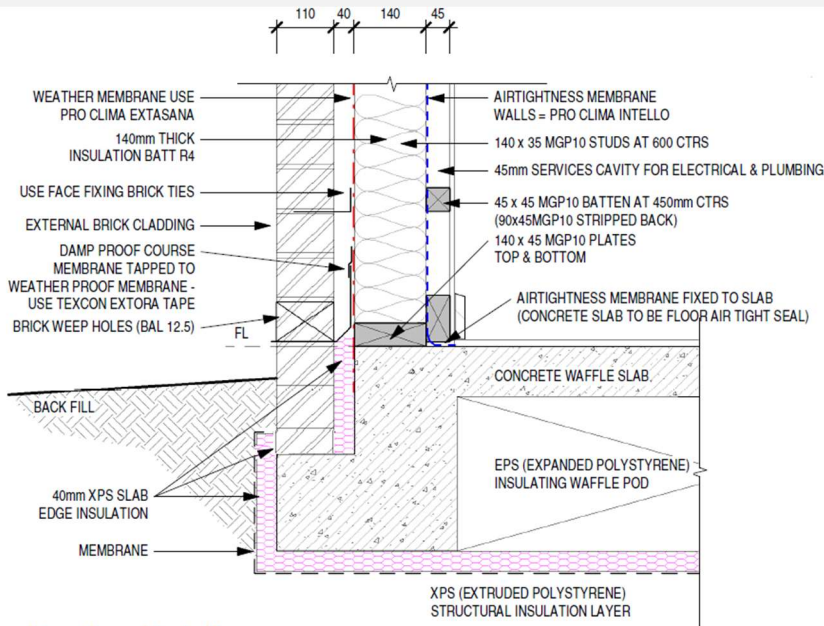
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4. Floor Plans



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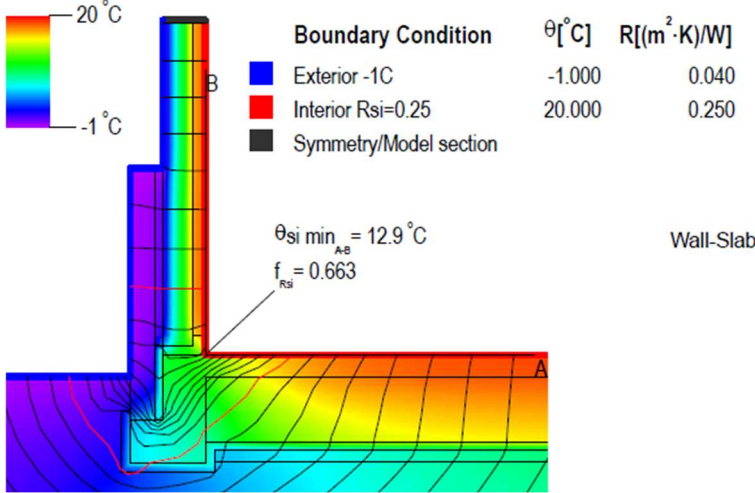
5. Construction of the Floor slab



To minimize the thermal bridge caused during construction due to bricks connected directly to the concrete slab, it was determined that if at least 2 brick courses were in ground (below grade), this would minimize the thermal bridge.

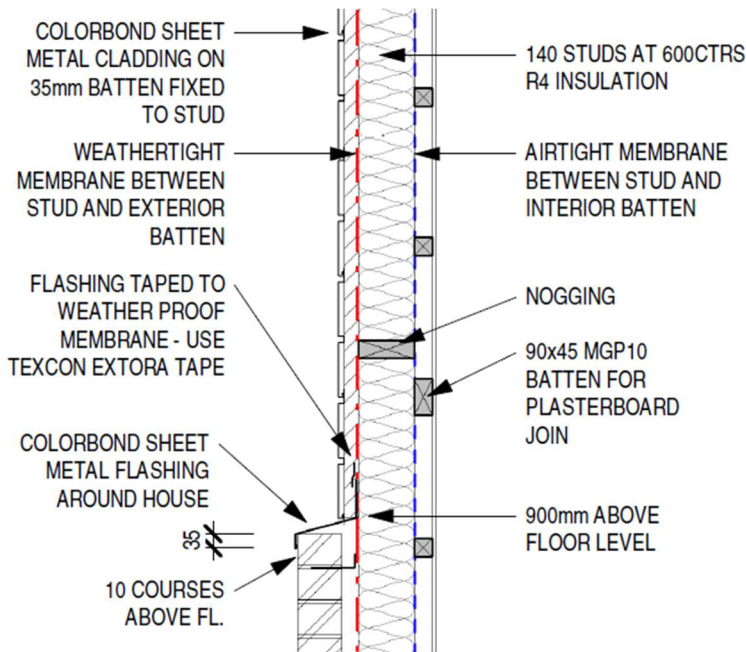


Footing Detail



Assembly no.	03ud Warfe Floor 1			Interior insulation?		
Heat transmission resistance [m ² K/W]						
Orientation of building element	0.17	interior R _{si}	0.17			
Adjacent to	2-Ground	exterior R _{se}	0.00			
Area section 1	$\lambda [W/(mK)]$	Area section 2 (optional)	$\lambda [W/(mK)]$	Area section 3 (optional)	$\lambda [W/(mK)]$	Thickness [mm]
Slab	2.100					100
EPS80% Concrete20%	0.451					50
Air 50% EPS 30%	0.562	Concrete ribs	2.100			250
XPS LOADBEARING	0.028					40
Percentage of sec. 1	80%	Percentage of sec. 2	20.0%	Percentage of sec. 3		Total
						44.0 cm
U-value supplement		U-value:	0.479	W/(m ² K)		

6. Construction of the external walls

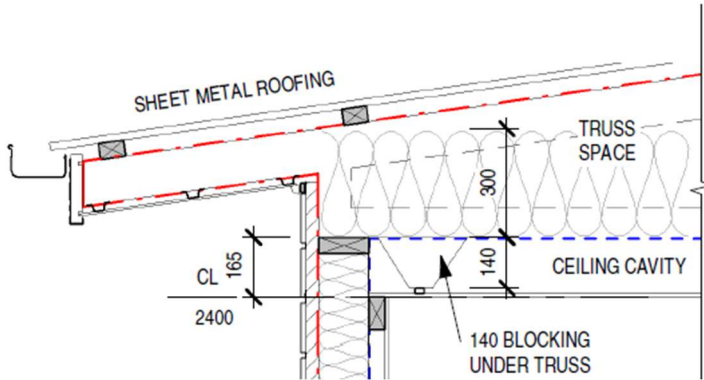


Exterior brick and sheet metal cladding. Sheet metal fixed to batten exterior to weatherproof membrane. 140mm timber stud structural framing with R4 bulk insulation. Airtight membrane fixed to studs, interior services cavity with 45mm timber battens, gypsum plaster interior.



Assembly no.		02ud Warfe Wall 1				Interior insulation?
Orientation of building element		2-Wall				
Adjacent to		1-Outdoor air				
Heat transmission resistance [m ² K/W]						
		interior R _{se}		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]
Sheet metal	50.000					0
Air	0.190	Batten	0.130	Ventilated		0
R4 Batts	0.035	Stud	0.130			140
Air	0.190	Batten	0.130			45
Plasterboard	0.250					10
Percentage of sec. 1		Percentage of sec. 2		Percentage of sec. 3		Total
91%		9.3%				19.5 cm
U-value supplement						U-value: 0.267 W/(m ² K)

7. Construction of the roof

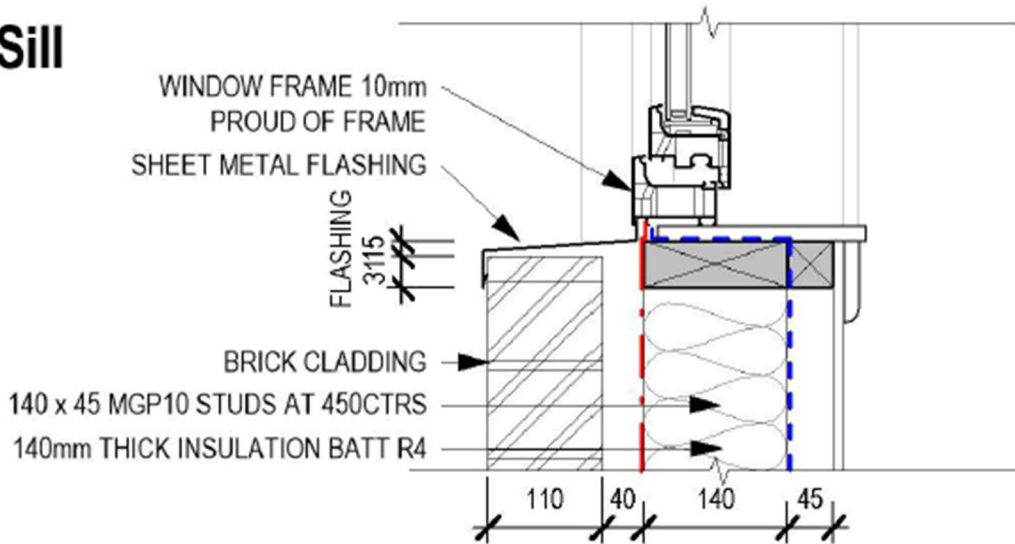


Sheet metal roofing on battens above weatherproof membrane fixed to top of timber truss structure. R7 bulk insulation between roof trusses. Airtight membrane fixed to bottom of roof trusses. Dropped ceiling for ventilation ducts and electrical lighting etc.

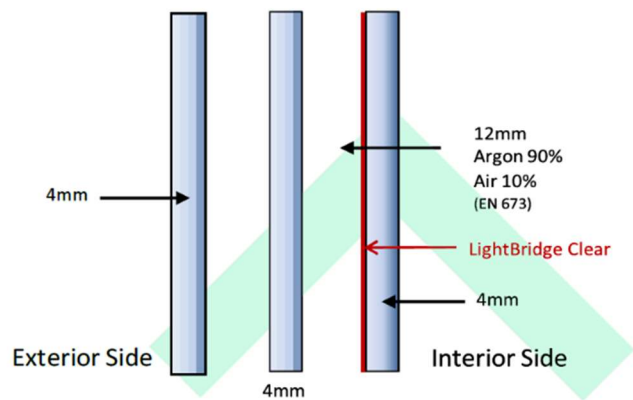
Assembly no.	Building assembly description				Heat transmission resistance [$\text{m}^2\text{K/W}$]		Interior insulation?
01ud	Warfe Roof 1						<input type="checkbox"/>
Orientation of building element	0.1	interior R_{se}		0.10			
Adjacent to	1-Outdoor air	exterior R_{se}		0.04			
Area section 1	λ [W/(mK)]	Area section 2 (optional)	λ [W/(mK)]	Area section 3 (optional)	λ [W/(mK)]	Thickness [mm]	
R7 Batt Hi Performance	0.041	Truss bottomchord	0.130			290	
Service Cavity Air	0.860					140	
Service Cavity Air	0.860			Ceiling Furring Channel	40.000	15	
Plasterboard	0.250					10	
Percentage of sec. 1	91%	Percentage of sec. 2	5.0%	Percentage of sec. 3	4.0%	Total	
						45.5 cm	
U-value supplement	<input type="text"/>	U-value:		0.149	W/(m ² K)		

8. Windows and window installation

Sill

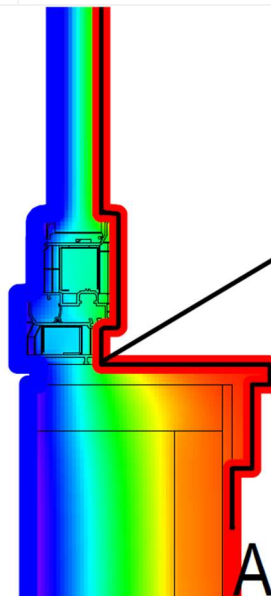


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Description of the window frame, construction, manufacturer	Deceuninck, uPVC
Window make (frame, product name)	Legend
Frame-U-value U_f	1.02 W/(m ² K)
Type of glazing	4 12 4 12 4 – Argon filled with lightbridge film
Glass-U-value U_g	1.02 W/(m ² K)
g-Value of the glass unit	0.57

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$$\theta_{si \min} = 11.6^{\circ} \text{C}$$

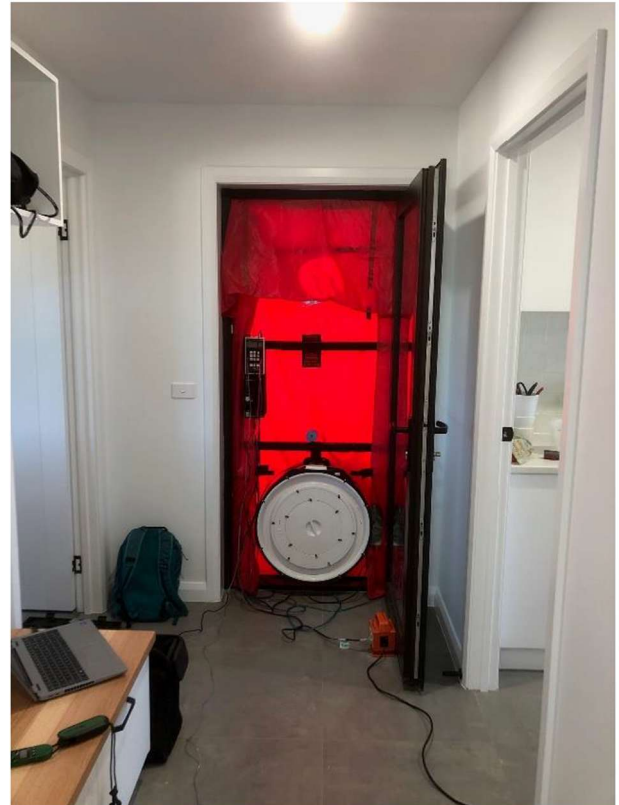
A-B

$$f = 0.600$$

9. Description of the airtightness

Airtightness concept

- Walls: Pro clima Intello airtight membrane fixed between stud and interior batten. Membrane fixed to concrete slab via ORCON joint sealant. Top of membrane to continue over ceiling.
- Floor slab: Concrete
- Window connection: Pro clima Intello membrane taped to PVC window frame with TESCON EXTONSEAL sill tape under timber window reveals.
- Roof: Pro clima Intello airtight membrane fixed between roof truss and dropped ceiling. Membrane to continue from exterior walls across ceiling to opposing exterior wall.



The pressure test was carried out by Detail Green on the 17th of November 2022. There was a temporary seal of the HRV outdoor and exhaust air ducts, the test equipment was setup in the garage doorway.

Table 1 EN 13829 Test results

Type of test	Measurement	Result
	Building Volume (m ³) Calculated to ATTMA TSL-4	586.3 (m ³)
Pressurisation	Air Flow at 50pa, Q ₅₀ (m ³ /hr)	371 (m ³ /hr)
	Ach (n50)	0.63 hr ⁻¹
Depressurisation	Air Flow at 50pa, Q ₅₀ (m ³ /hr)	384 (m ³ /hr)
	Ach (n50)	0.65 hr ⁻¹
Average result	Ach (n50)	0.64 hr⁻¹

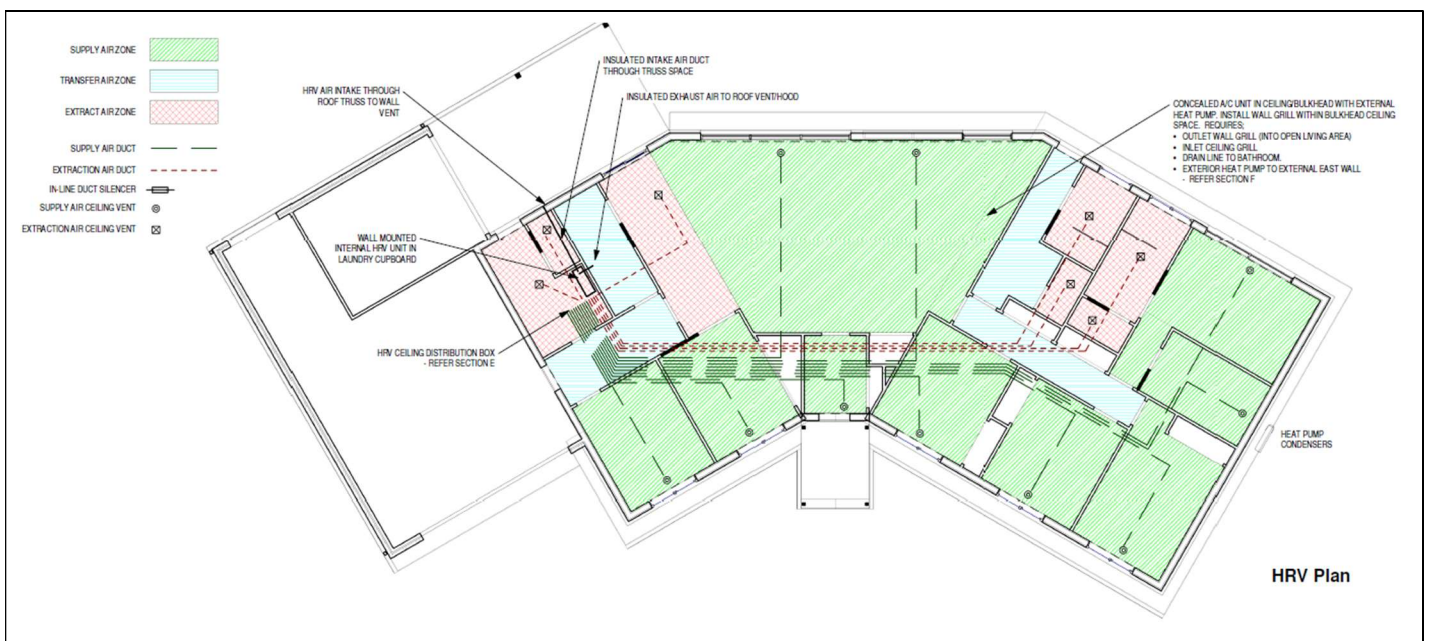
10. Ventilation system

In order to significantly reduce ventilation losses, a balanced supply/exhaust air system with a highly efficient counterflow air-to-air heat exchanger was used. The Stiebel Eltron LWZ 280 heat recovery ventilation unit is a highly efficient appliance, importantly in this climate it has summer bypass function and is passive house certified.



Ventilation system Brand	Stiebel Eltron LWZ 280
Heat recovery efficiency	84 %
Electric efficiency	0.27 Wh/m ³

11. Ventilation planning, duct network



Supply air (green on plan) is delivered to the living spaces and bedrooms, office, rumpus room and entry. It then travels through the **Transfer zones** (light blue on plan) to the **Extract air** ducts in the (red on plan) laundry, kitchen, bathrooms and ensuite.

Outdoor fresh air comes in through a grill at the laundry external wall, it goes through insulated ducts to the HRV unit located in the laundry room. The distribution of ducts is within a dropped ceiling space above the laundry, within the passive house envelope. Ducts are run through the dropped ceiling space throughout the house.

Exhaust air comes out vertically from the HRV unit and goes up through the roof to an exhaust cowl above the roof.

12. Heat supply

The north exterior entertaining room and the covered verandah area have a roof pitched to favour solar panel use. This was included in the design for a future installation. There is no Gas supplied to site.



INTERIOR SPACE HEATING UNIT IN CEILING BULKHEAD



Hot water supply is via a heatpump insulated storage system located in the garage. Space heating and cooling is supplied via a heat pump air to air system. The exterior condenser unit is located outside of the East wall. The interior unit is located within the open living area dropped ceiling with a bulkhead grill, located centrally to help distribution throughout the house.

13. Construction costs

The Waldara passive house was constructed in 2022 after the Covid 19 pandemic. This was a time where construction products were in short supply and therefore construction prices went up. This job was completed at approx \$2500pm² AUD when calculated on the full project including external areas, garage and entertaining areas. Resulting overall cost of \$950,000AUD. This was the first passive house built by this Construction company and I believe it was a reasonable price for the time. Construction prices did go up substantially after the completion of this project. This was due to a construction boom as well as the limited material supply.

14. Literature

- All externally supplied plans, photos and literature in this document can be found on the passive house institute Certification Platform, under Warfe Passive House, or 2020-12_1311_AU_Luc Plowman_Warfe Passive House.

15. PHPP-Results

Passive House Verification



Architecture: 360 Plans
Street: 36 Wareena Street
Postcode/City: 3677 Wangaratta
Province/Country: Victoria AU-Australia
Energy consultancy: 360 Plans
Street: 36 Wareena Street
Postcode/City: 3677 Wangaratta
Province/Country: Victoria AU-Australia
Year of construction: 2022
No. of dwelling units: 1
No. of occupants: 3.1

Building: Warfe House
Street: 23 Wonga Park Drive
Postcode/City: 3678 Waldara
Province/Country: Victoria AU-Australia
Building type: Detached Dwelling
Climate data set: ud--01-AU0015a-Wangaratta
Climate zone: 5: Warm **Altitude of location:** 142 m
Home owner / Client: Sarah & Sean Warfe
Street: 23 Wonga Park Drive
Postcode/City: 3678 Waldara
Province/Country: Victoria AU-Australia
Builder: DKM Builders
Street: PO Box 577
Postcode/City: 3672 Benalla
Province/Country: Victoria AU-Australia
Certification: Detail Green
Street: 18 Fletcher Road
Postcode/City: 3747 Beechworth
Province/Country: Victoria AU-Australia

Interior temperature winter [°C]:	20.0	Interior temp. summer [°C]:	25.0
Internal heat gains (IHG) heating case [W/m²]:	2.3	IHG cooling case [W/m²]:	2.4
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
	Treated floor area m²			Criteria	Alternative criteria	
Space heating	Heating demand kWh/(m²a)	225.0	≤	15	-	yes
	Heating load W/m²	12	≤	-	10	
Space cooling	Cooling & dehum. demand kWh/(m²a)	2	≤	15	15	yes
	Cooling load W/m²	15	≤	-	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	-	yes
Non-renewable Primary Energy (PE)	PE demand kWh/(m²a)	82	≤	-	-	-
Primary Energy Renewable (PER)	PER demand kWh/(m²a)	38	≤	60	60	yes
	Generation of renewable energy (in relation to projected building footprint area) kWh/(m²a)	0	≥	-	-	

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: 2-Certifier **First name:** Luc **Surname:** Plowman **Passive House Classic?:** yes
Certificate ID: 30/03/23 **Issued on:** 30/03/23 **City:** Beechworth **Signature:**