Project Documentation
Gebäude-Dokumentation

Abstract | Zusammenfassung

Merrivale Passive House

Data of building | Gebäudedaten

Year of construction Baujahr	2024	**Space heating** **Heizwärmebedarf**	**12** **kWh/(m²a)**
U-value external wall U-Wert Außenwand	0.273 W/(m²K)		
U-value basement U-Wert Kellerdecke	0.400 W/(m²K)	Primary Energy Renewable (PER) Erneuerbare Primärenergie (PER)	34 kWh/(m²a)
U-value roof U-Wert Dach	0.252 W/(m²K)	Generation of renewable Energy Erzeugung erneuerb. Energie	- kWh/(m²a)
U-value window U-Wert Fenster	1.30 W/(m²K)	Non-renewable Primary Energy (PE) Nicht erneuerbare Primärenergie (PE)	76 kWh/(m²a)
Heat recovery Wärmerückgewinnung	86 %	Pressurization test n_{50} Drucktest n_{50}	n_{50} = 0.37/h
Special features Besonderheiten	The first certified PassivHause in Warrnambool		

Brief Description

Passive House – Merrivale Passive House

This single-family home in Merrivale, Warrnambool was designed to demonstrate that a certified Passivhaus can be achievable, cost effectively. A treated floor area of 179 m², the four-bedroom house focuses on capturing views to the north-east of Warrnambool while maintaining the required performance of a Passive House. Lane Architects led the Passivhaus energy modelling, with James Lane responsible for the PHPP.

Cost effectiveness essentially shaped every design decision. Passivhaus components such as airtight membranes, HRV system, and high-performance glazing are more expensive, so we simplified the building form to reduce thermal-bridges and avoid complex junctions. This allowed the budget to be directed toward the elements that matter most for long-term performance. The garage was completely thermally separated but visually connected through the roofline, preventing any thermal bridge while maintaining a cohesive architectural form.

Airtightness was obviously a key focus. We translated potential thermal-bridge issues into clear, buildable details, ensuring junctions were straightforward to wrap on-site without unnecessary complexity.

Responsible project participants **Verantwortliche Projektbeteiligte**	
Architect Entwurfsverfasser	James Lane - Lane Architects https://www.lanearchitects.com.au/
Implementation planning Ausführungsplanung	James Lane - Lane Architects
Building systems Haustechnik	Fantech Aust Pty Ltd
Structural engineering Baustatik	Oranik Consulting Engineers
Building physics Bauphysik	James Lane - Lane Architects
Passive House project planning Passivhaus-Projektierung	James Lane - Lane Architects
Construction management Bauleitung	Dylan Mahony – Underwood Group
Certifying body **Zertifizierungsstelle**	
Passivhaus Institut Darmstadt www.passiv.de	Hip V Hype
Certification ID **Zertifizierungs ID**	
8006	https://passivehouse-database.org/index.php?lang=en#d_8006

Author of project documentation **Verfasser der Gebäude-Dokumentation**	
Passivhaus Institut Darmstadt www.passiv.de	James Lane – Lane Architects
Date Datum	Signature Unterschrift
27.01.2026	James Lane

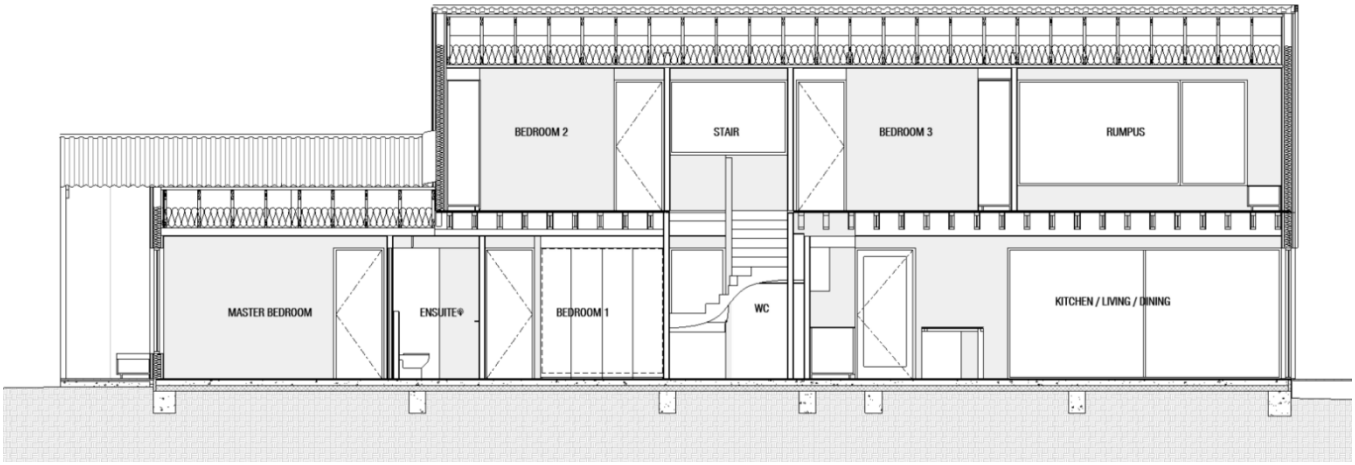
1. Ansichtsfotos – External photos

South West

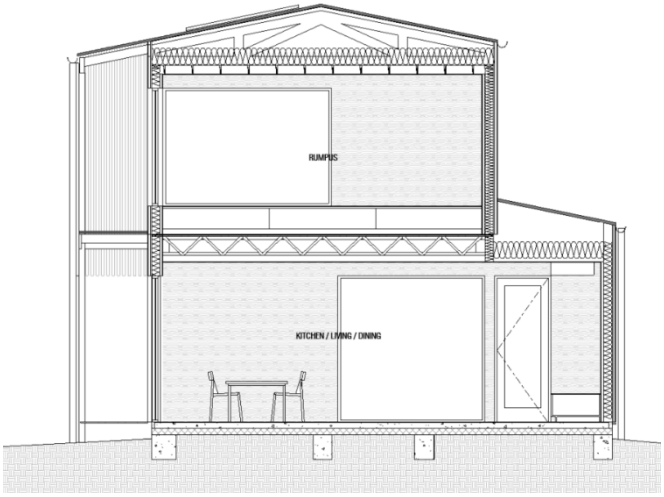
North - East

2. Innenfoto exemplarisch – Internal Photos

3. Sectional drawing of the Passive House



Long section

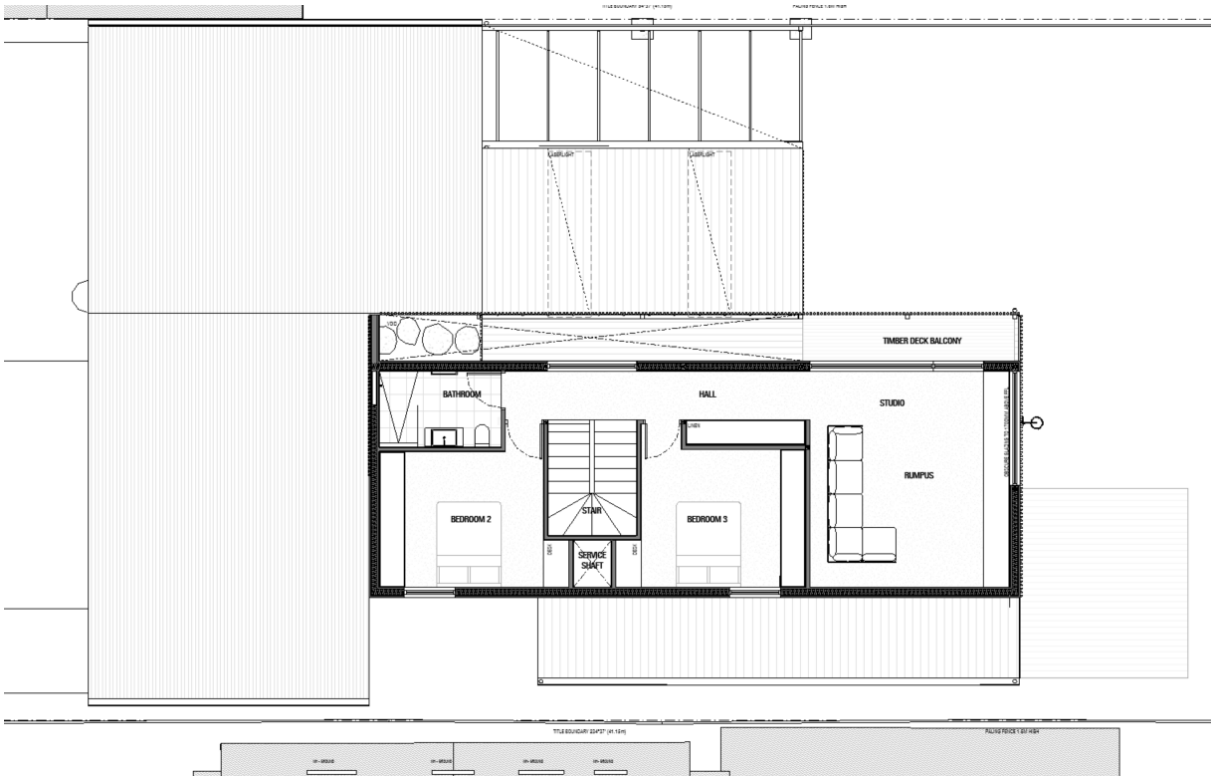


Short Section

The thermal envelope consists of instulated 140mm timber stud walls and roof truss sitting on a (thermally broken) concrete slab.

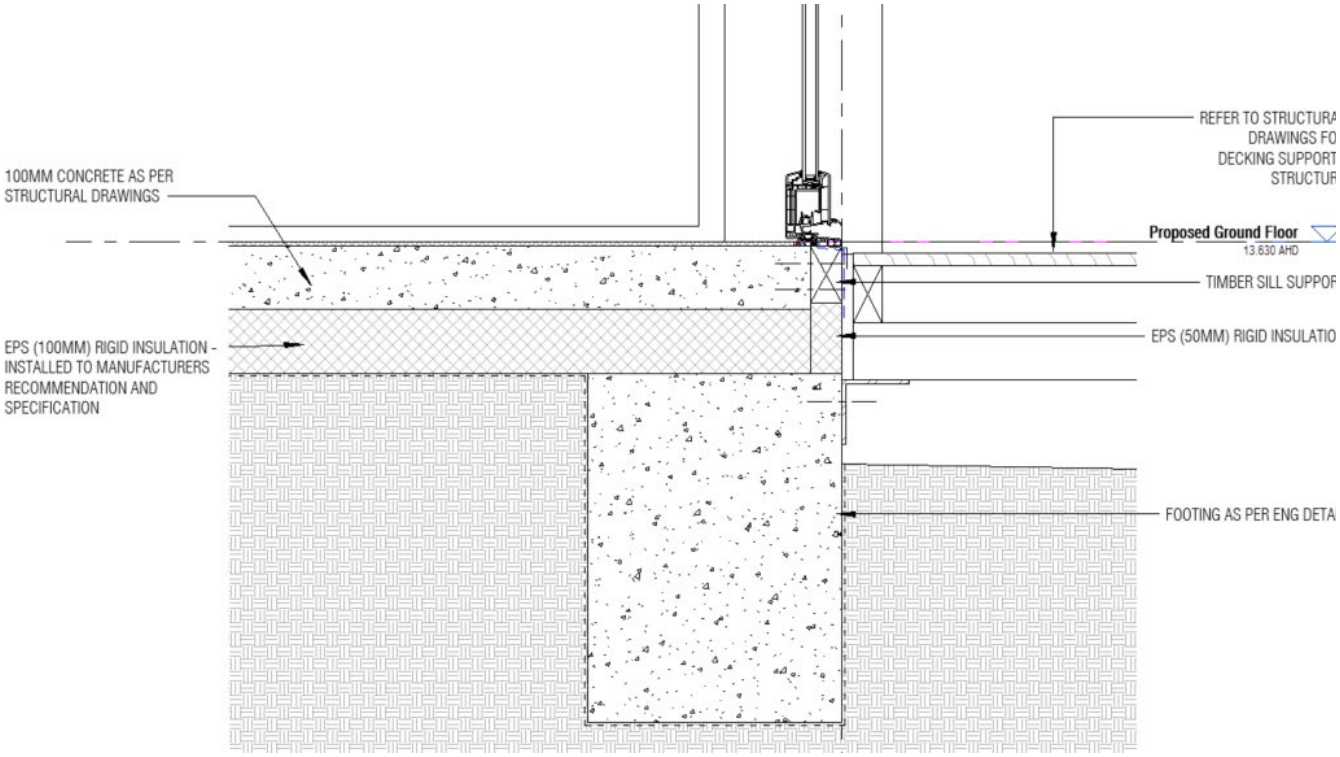
4. Floor Plans

Ground floor



First floor

5. Construction details of the envelope and Passive House technology of the Passive House



SLAB ON GROUND DETAIL

Slab insulation

finished slab

The house is on a 100mm thick concrete slab floor, insulated beneath with 100mm of EPS foam. Walls are erected directly on the slab with a 50mm overhang to allow for a 50mm EPS insulation to the slab edges.

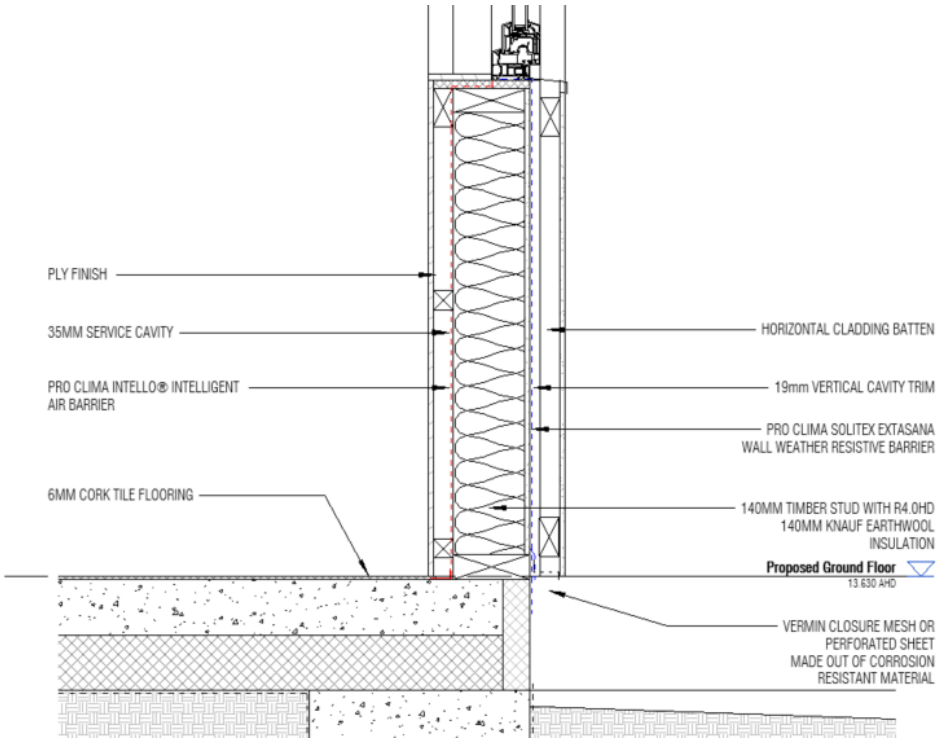
Description of building assembly	Assembly no.
Concrete Slab on ground	01ud

Orientation of building assembly (or R_{si})	3-Floor			Interior insulation?		
Adjacent to (or R_{se})	2-Ground			U-value supplement [W/(m²K)]		
Area section 1	λ [W/(mK)]	Area section 2 (optional)	λ [W/(mK)]	Area section 3 (optional)	λ [W/(mK)]	Thickness [mm]
Concrete reinforced with 1% steel	2.300					100
FOAMEX 100mm EPS Polystyrene Insulation (CLASS M)	0.043					100
Percentage of sec. 1:	100%	Percentage of sec. 2:		Percentage of sec. 3:		

Heat transmission resistance coefficients		
Interior R_{si}:	0.13	m²K/W
Exterior R_{se}:	0.00	m²K/W

Total thickness [cm]:	**20.0**
U-value [W/(m²K)]:	**0.400**

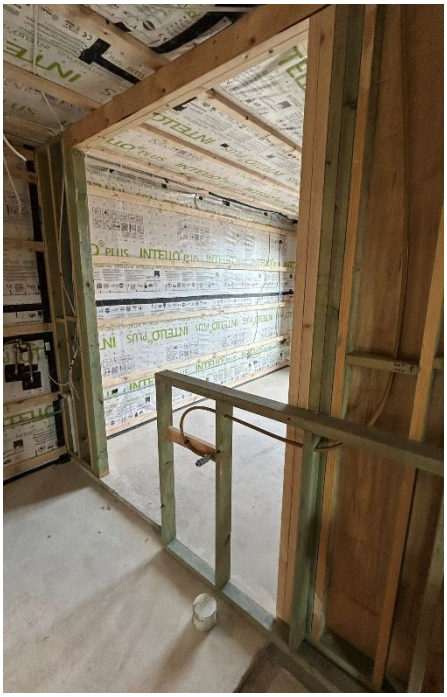
6. External Wall Construction



External wall construction detail

The external walls are constructed from 140 mm timber studs insulated with 140 mm Bradford Gold Hi-Performance batts. On the interior side, the framing is lined with a Pro Clima INTELLO airtight membrane, followed by a 35 mm service cavity and plywood lining.

Externally, the wall is wrapped in a Pro Clima SOLITEX EXTASANA vapour-permeable weather-resistive barrier. Over this, a 20 mm vertical counter-batten and 35 mm horizontal batten system provides the ventilated cavity and support for the corrugated metal cladding.



Construction shot - Internal view

Construction shot - external view

Description of building assembly	Assembly no.
External Wall	02ud

Orientation of building assembly (or R_{si})	2-Wall	Interior insulation?	
Adjacent to (or R_{se})	3-Ventilated	U-value supplement [W/(m²K)]	

Area section 1	λ [W/(mK)]	Area section 2 (optional)	λ [W/(mK)]	Area section 3 (optional)	λ [W/(mK)]	Thickness [mm]
Extasana Membrane						
Bradford Gold Hi-Performance wall insulation (R4.0)	0.035	Timber Stud	0.130			140
Service Cavity	0.214	Timber Batten	0.130			35
Intello airtight Membrane						
Percentage of sec. 1:	90%	Percentage of sec. 2:	10.0%	Percentage of sec. 3:		

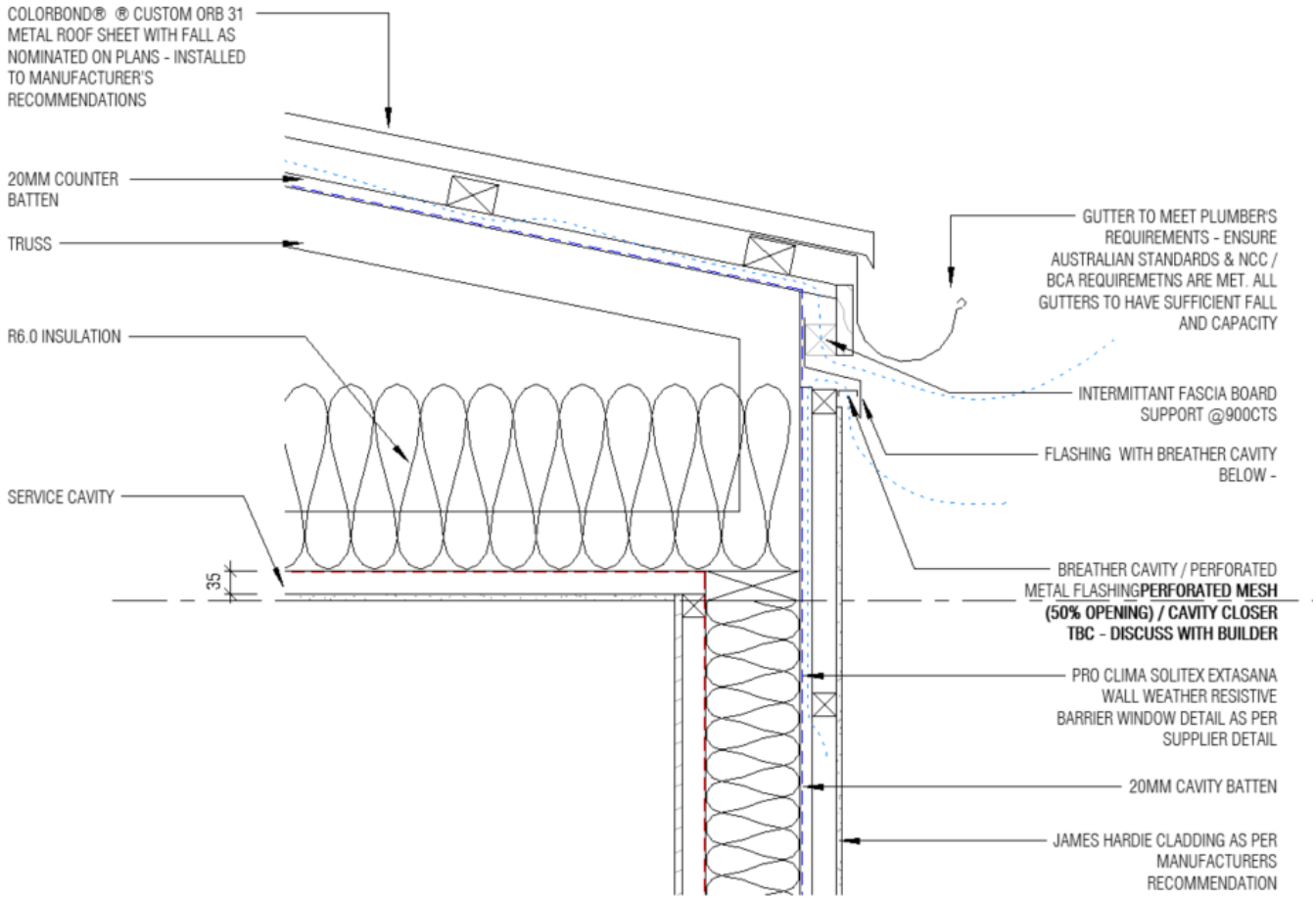
Heat transmission resistance coefficients

Interior R_{si}:	0.13	m²K/W
Exterior R_{se}:	0.13	m²K/W

Total thickness [cm]: **17.5**

U-value [W/(m²K)]: **0.273**

7. Roof Construction



Roof to wall constrcution detail

The roof construction comprises timber trusses insulated with 260 mm Bradford Gold Hi-Performance ceiling batts. Internally, the ceiling is lined with plywood fixed to a 35 mm service cavity.

Above the trusses, a vapour-permeable waterproof membrane (Pro Clima SOLITEX MENTO) provides the primary weather protection. This is followed by a 20 mm ventilated air cavity and 35 mm roof battens supporting the corrugated metal roofing

Insulation

Celing wrapped with intello membrane and 35mm ceiling cavity

Description of building assembly						Assembly no.
Roof						03ud

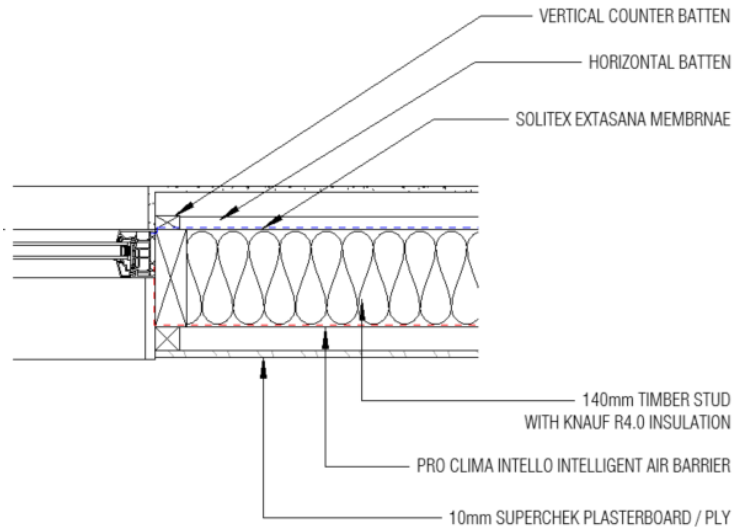
Orientation of building assembly (or R_{si})	1-Roof			Interior insulation?		
Adjacent to (or R_{se})	3-Ventilated			U-value supplement [W/(m²K)]		
Area section 1	λ [W/(mK)]	Area section 2 (optional)	λ [W/(mK)]	Area section 3 (optional)	λ [W/(mK)]	Thickness [mm]
Weatherproof layer						
Bradford Gold Hi-Performance Ceiling insulation (R6.0)	0.043	AIR	1.130			170
Bradford Gold Hi-Performance Ceiling insulation (R6.0)	0.043	Timber Joist	0.130			90
Service Cavity	0.210	Timber Batten	0.130			35
Intello airtight Membrane						
Percentage of sec. 1:	93%	Percentage of sec. 2:	7.5%	Percentage of sec. 3:		

Heat transmission resistance coefficients		
Interior R_{si}:	0.13	m²K/W
Exterior R_{se}:	0.13	m²K/W

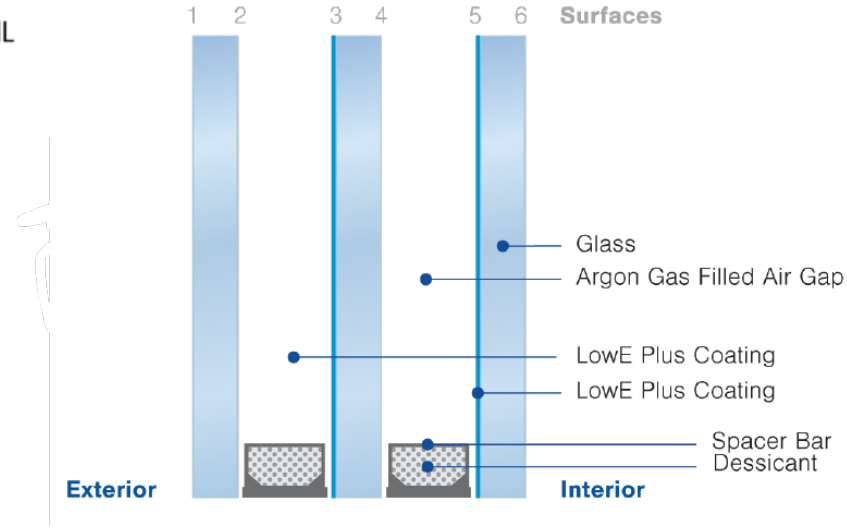
Total thickness [cm]: **29.5**

U-value [W/(m²K)]: **0.252**

8. Windows and window installation



3 TYPICAL WINDOW JAMB SINGLE STUD DETAIL
1 : 10



Description of window (frame) construction, manufacturer	**Aluplast**
Window frame model (product name)	IDEAL 4000
Frame U-value Uf	1.3 W/(m²K)
Type of glazing	40mm AGG Insulglass LowE Plus (ARGON GAS); 4 | 14 | 4 | 14 | 4
Glass U-value Ug	0.638 W/(m²K)
Solar heat-gain coefficient (g-value)	0.50

9. Description of the airtight envelope.

The airtight envelope is formed using Pro Clima INTELLO on all internal walls and ceilings. All membrane joints are sealed with the appropriate Pro Clima airtight tapes, and the membrane is bonded to the concrete slab using compatible tape and adhesive. All service penetrations are sealed with grommets and airtight tape as required.

A blower-door test, carried out by Greg O'Beirne, achieved an airtightness result of n_{50} = 0.37 air changes per hour.

Summary

retrotec **FanTestic**	version: **5.16.88**	licensed to: **O Beirne Design**
Test date: **12/02/25**	By: **Greg O'Beirne** Signature:	
Customer:	**Underwood Group**	
Building Lot Number:		
Building address:	**68 Merrivale Drive** **Warrnambool** **VIC** **Australia** **3280**	

Building and Test Information	
Test file name:	**25044 Underwood Group 1 ATTMA 2025-02-12 192251**
Building volume [m³]:	**478.7**
Envelope Area [m²]:	**511.1**
Floor Area [m²]:	**121.89**
Building Height (from ground to top) [m]:	**6.8**

Results	
Air flow at 50 Pa, Q_{50} [m³/h]	**176.40**
Air changes, n_{50}	**0.37**
Equivalent leakage area at 50 Pa [cm²]	**28.61**
Permeability at 50 Pa [m³/h/m²]	**0.3452**

Building Information

Building Measurements

Building Volume [m³]: 478.7

Envelope Area (A_T) [m²]: 511.1

Building Height (from ground to top) [m]: 6.8

Heating/Ventilation System

HVAC Systems Present:

Ductless heat pump reverse cycle split system

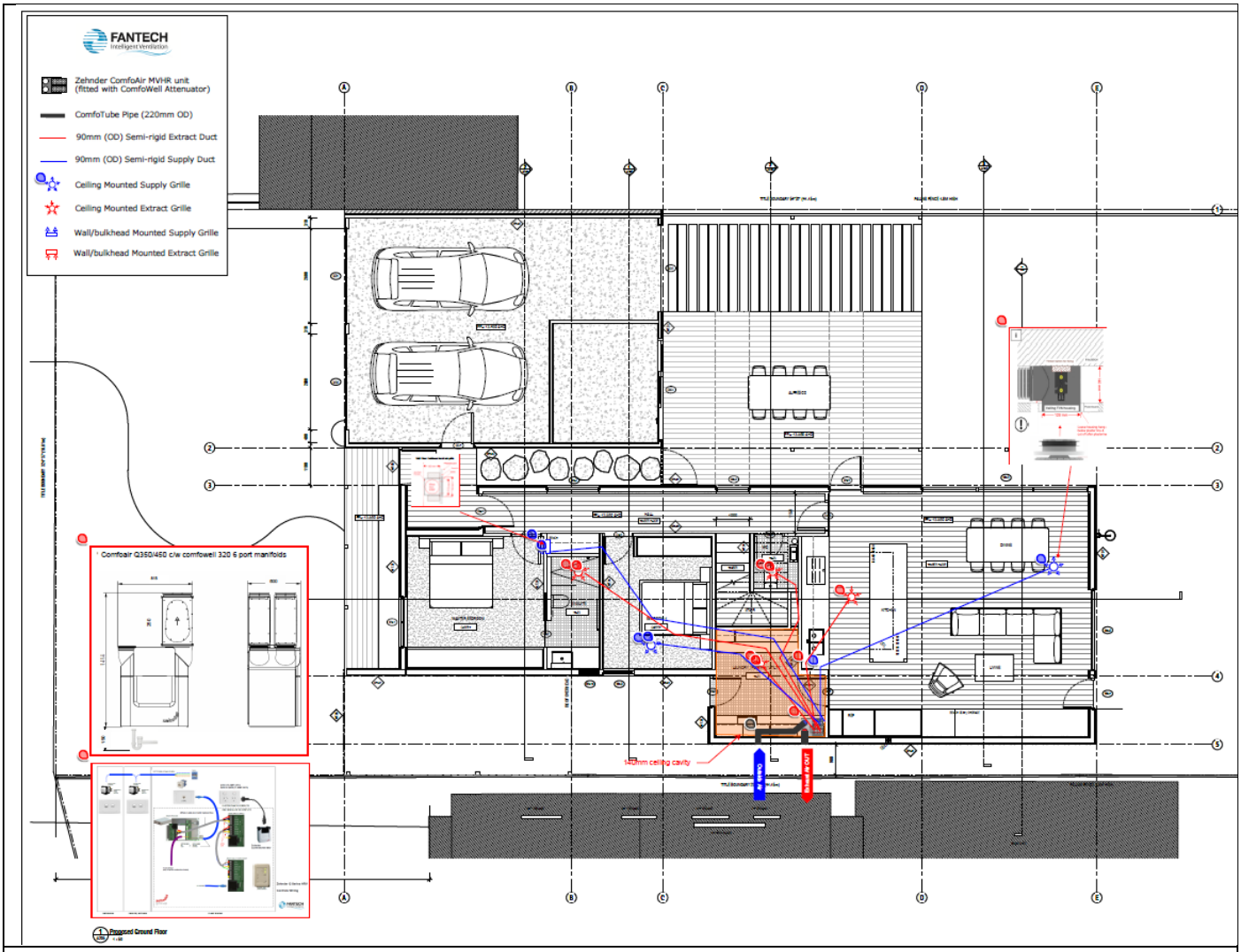
10. Ventilation unit

The home is ventilated by a Zehnder ComfoAir Q350 heat-recovery ventilation unit, which provides a continuous supply of filtered fresh air while extracting stale indoor air. The unit is discreetly housed within the laundry/pantry cupboard, keeping it accessible yet unobtrusive.

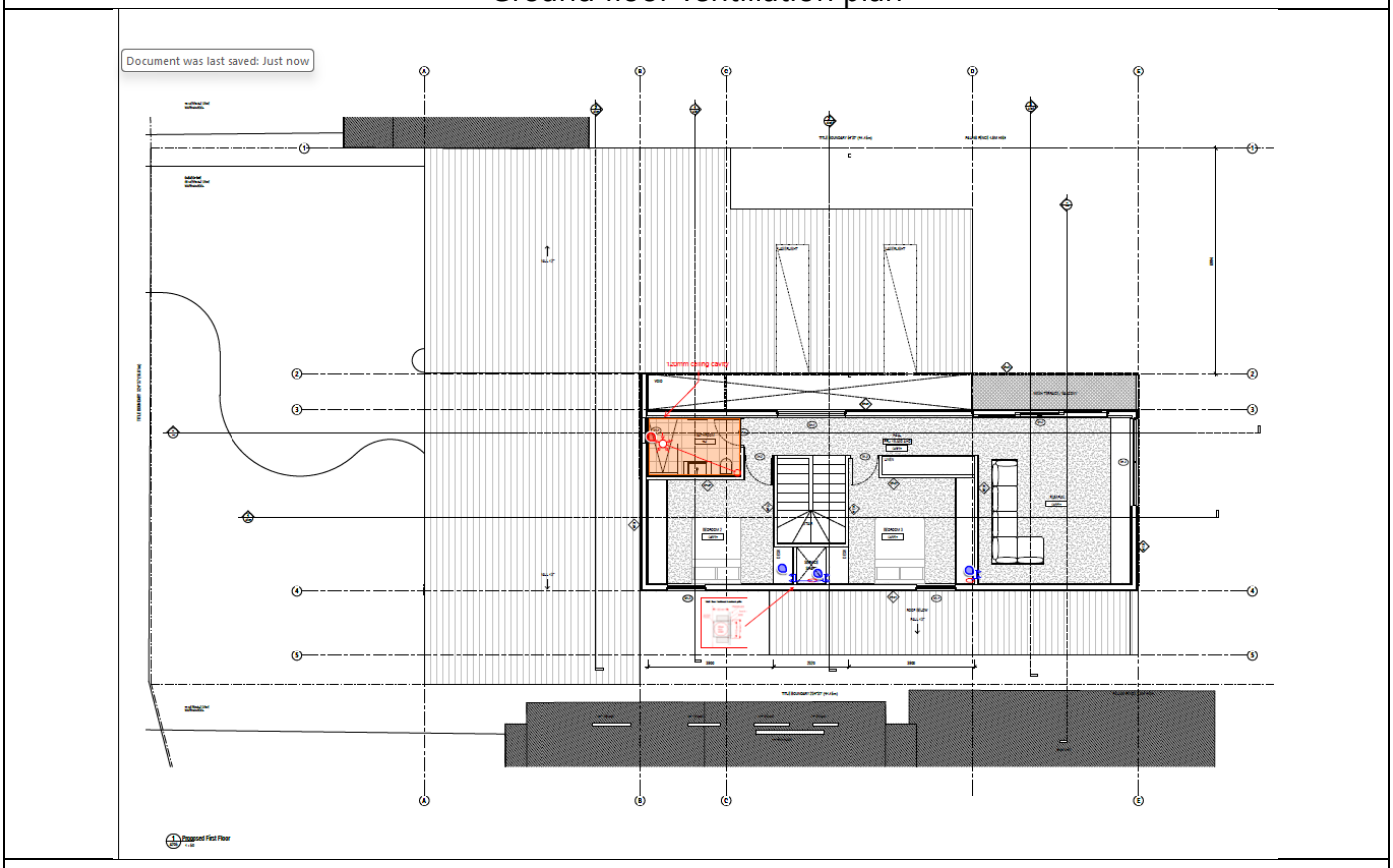
Ventilation unit manufacturer:	Zehnder
Effective heat recovery efficiency:	86 %
Electrical efficiency:	0,25 Wh/m³

11. Ventilation planning – duct network

Air is distributed through ComfoTube DN90 (90 mm) semi-rigid ductwork, installed within the thermal envelope. The ducting sits below the roof insulation and INTELLO membrane, running along a dedicated service cavity created by the suspended plywood ceiling. There is a service shaft behind the stair so ducts can run from ground (unit location) to first floor.



Ground floor ventillation plan



First floor ventillation plan

12. Heating and cooling supply

All heating and cooling comes from the Reverse Cycle, wall mounted 3.5KW split system (Fujitsu ASTG12KMTC). The cooling device is installed but does not meet the project's full cooling demand.

Compliance with the frequency of overheating during the summer season depends on the operation of the blinds and opening of operable windows when outdoor conditions are favourable which the client is aware of.

13. Construction Costs

Total $1,050,000 AUD

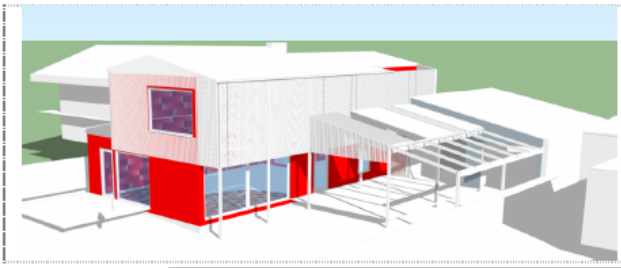
This Passive House was completed post-pandemic, following the initial price surges but before costs fully normalized. At a total construction cost of $1,050,000 AUD including garage and studio (non passive) and landscaping the build average sits at $3,700/m²

14. Literatur

15. PHPP-Ergebnisse

Passive House-Verification

10.4a EN



Building:	68 Merrivale Drive		
Street:	Merrivale Drive		
Postcode/City:	3280	Warrnambool	
Province/Country:	VIC	AU-Australia	
Building type:	1-Freestanding single family house		
Climate data set:	AU1065a-Portland, Altitude corrected		
Climate zone:	5: Warm	Altitude of location:	13.5 m
Home owner / Client:	Dylan Mahony and Emma Ponting		
Street:	68 Merrivale Drive		
Postcode/City:	3280	Warrnambool	
Province/Country:	VIC	AU-Australia	

Architecture:	Lane Architects		
Street:	56 Harris Street		
Postcode/City:	3280	Warrnambool	
Province/Country:	Victoria	AU-Australia	
Energy consultancy:	Lane Architects		
Street:	56 Harris Street		
Postcode/City:	3280	Warrnambool	
Province/Country:	Victoria	AU-Australia	

Builder:	Underwood Group		
Street:			
Postcode/City:		Warrnambool	
Province/Country:	Victoria	AU-Australia	
Certification:	HIP V. HYPE		
Street:	293 Barkly Street		
Postcode/City:	3056	Brunswick	
Province/Country:	Victoria	AU-Australia	

Year of construction:	2025	Interior temperature winter [°C]:	20.0
No. of dwelling units:	1	Internal heat gains (IHG) winter [W/m²]:	2.4
No. of occupants:	3.0	Specific heat capacity [Wh/K per m² TFA]:	84
		Interior temp. summer [°C]:	25.0
		IHG summer [W/m²]:	2.4
		Mechanical cooling:	

Specific building characteristics with reference to the treated floor area

				Criteria	Alternative criteria	Fullfilled?[2]
	Treated floor area m²	179.7				
Space heating	Heating demand kWh/(m²a)	12	≤	15	-	Yes
	Heating load W/m²	11	≤	-	10	
Space cooling	Cooling & dehum. demand kWh/(m²a)	-	≤	-		-
	Frequency of overheating (> 25 °C) %	3	≤	10		Yes
	Frequency of excessively high humidity (> 12 g/kg) %	0	≤	20		Yes
Airtightness	Pressurisation test result n_{50} 1/h	0.4	≤	0.6		Yes
Non-renewable Primary Energy (PE)	PE demand kWh/(m²a)	76	≤	-		-
Primary Energy Renewable (PER)	PER demand kWh/(m²a)	34	≤	60	60	Yes
	Renew. energy generation (in rel. to projected building footprint area) kWh/(m²a)	0	≥	-	-	

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

Passive House Classic? Yes

Task:	First name:	Surname:	Signature:
2-Certification	Marcus	Strang	

Certificate-ID	Issued on:	City:
49734_HVH_PH_20250911_MAS	11/09/25	Melbourne