

2024

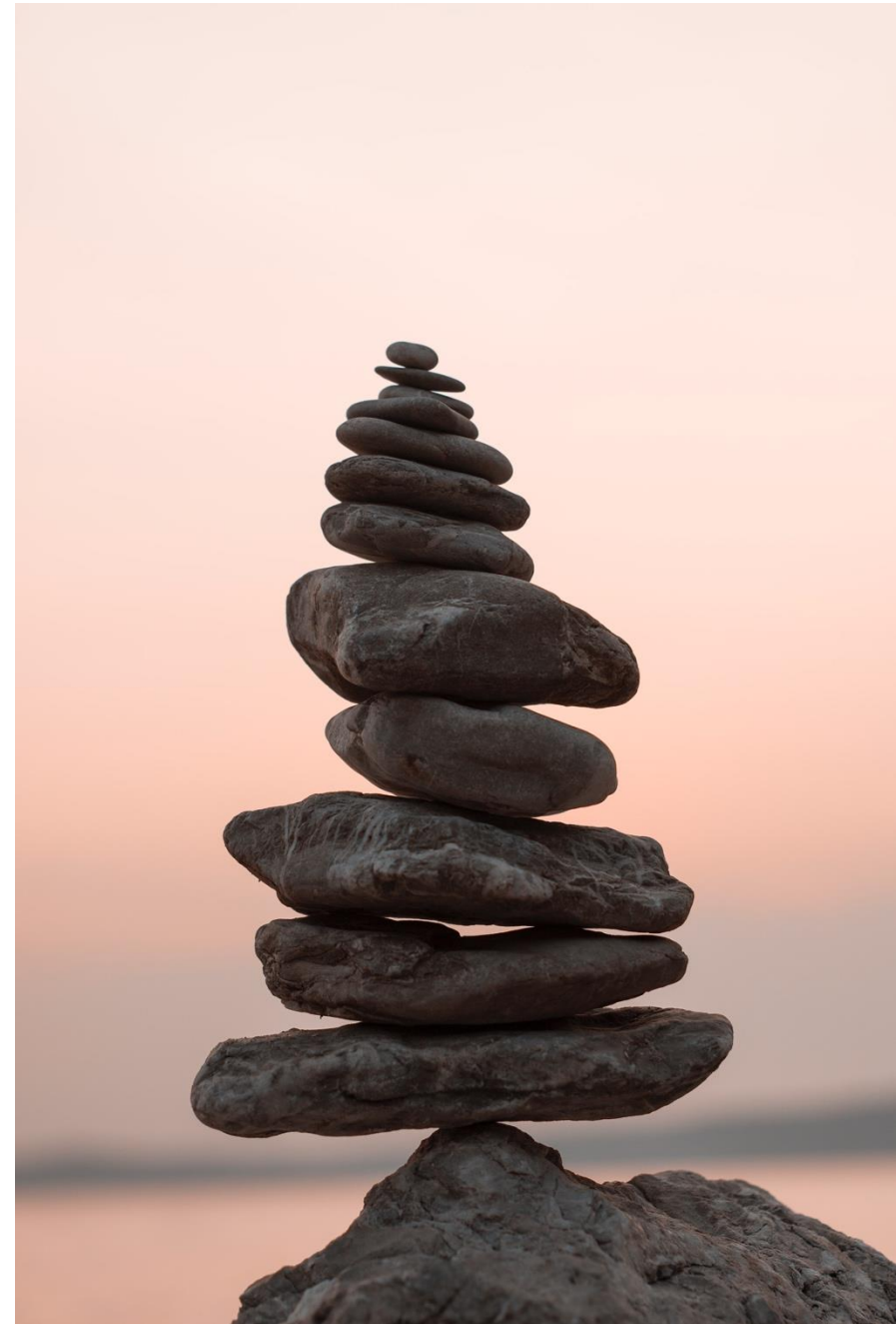
Thanks for joining us
The webinar will begin shortly

Outsulation for High Performance Walls

Code Walls “Sensitive”

Moisture balance

- Ventilation
- Heating
- Insulation (surface temperatures)
- Interior moisture generation



Code Walls

Unintended consequences

- **Ventilation ↓**
- **Heating 20°C**
- **Insulation (surface temperatures) ↓**
- **Interior moisture generation – typ.**

Comments from MBIE on larger buildings have mechanical ventilation which, “moderates the risk of internal moisture and mould”.



Code Walls

Why not ↑ R-value

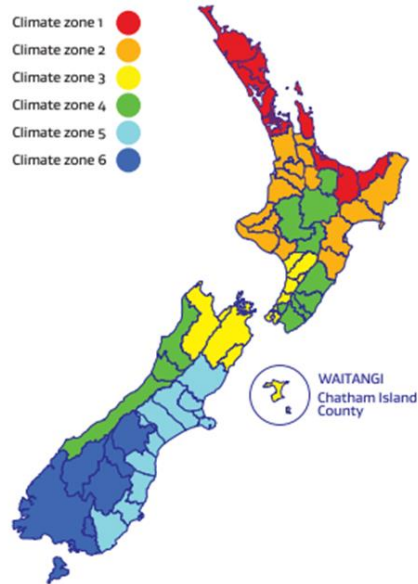


TABLE 1.3: Increase in minimum R-values for residential and small buildings

Building element	Climate zone					
	1	2	3	4	5	6
Roof	R6.6↑					
Windows	R0.37↑		R0.46↑		R0.50↑	
Wall	R2.0↑			R2.0		
Slab-on-ground floors	R1.5↑			R1.5↑	R1.6↑	R1.7↑
Other floors	R2.5↑			R2.8↑	R3.0↑	

This new R-values will result in a reduction of the energy needed for heating residential homes of approximately 40% compared to previous minimum status quo requirements ([Table 1.4](#)).

TABLE 1.4: Increases in energy efficiency for heating and cooling over status quo for different climate zones

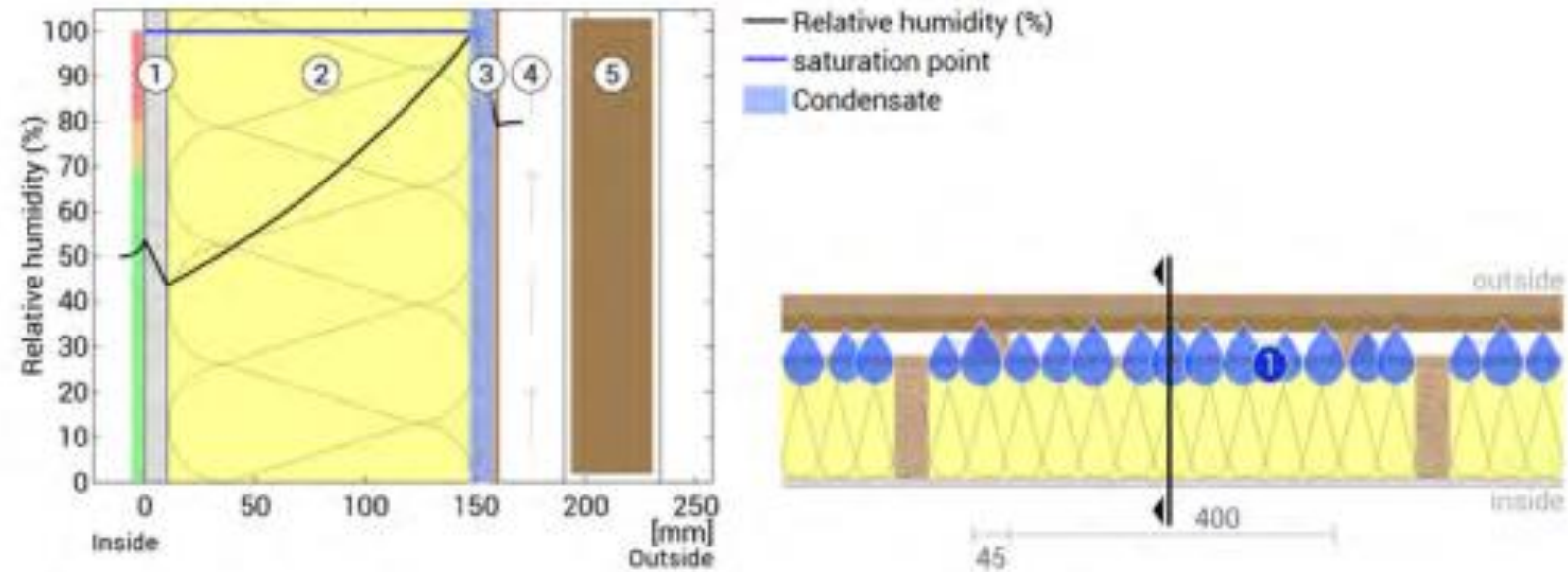
Building type	Climate zone					
	1	2	3	4	5	6
Single storey four bedroom home	39%	38%	42%	40%	42%	41%

BRANZ SR344 [2016] “Vapour control in New Zealand walls” by Greg Overton

Code Walls Risk

Condensation Modelling

Assume: 140mm Batt Insulation with Rigid air barrier = R3.56



- ① Gypsum plaster (10 mm)
- ② High-Performance Glasswool (140mm)
- ③ Rigid Air Barrier (10 mm)
- ④ Rear ventilated level (30 mm)
- ⑤ Clapboard siding (44 mm)

Code Walls Performance

Construction R-value with R2.0 insulation, R1.44
Construction R-value with R2.8 insulation, R1.57
Framing Ratio 43%

Construction R-value with R2.0 insulation, R1.79
Construction R-value with R2.8 insulation, R2.00
Framing ratio 23%

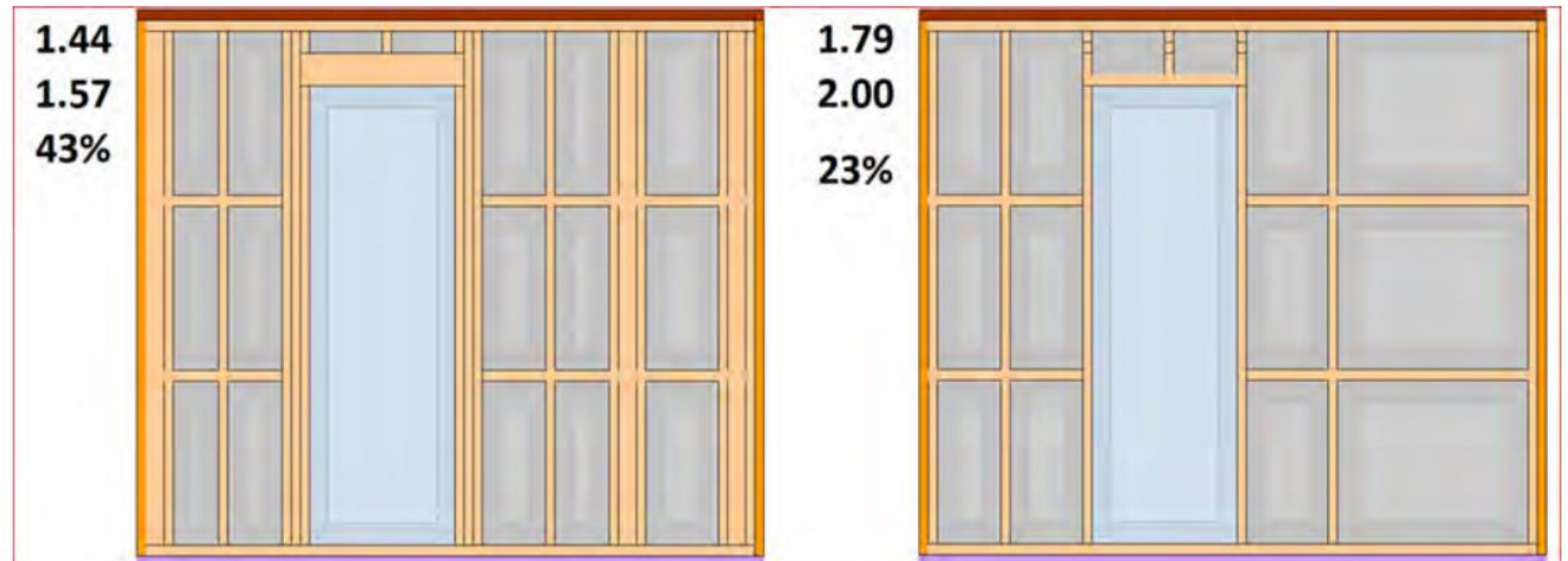


Figure 8: Actual timber framing (left) compared to allowable definitions under NZS 4218 (right)

BRANZ ER53 [2020] “Measuring the Extent of Thermal Bridging in External Timber Framed Walls in New Zealand”,
by Verney Ryan, Guy Penny, Jane Cuming, Ian Mayes, Graeme Baker, Beacon Pathway Inc.

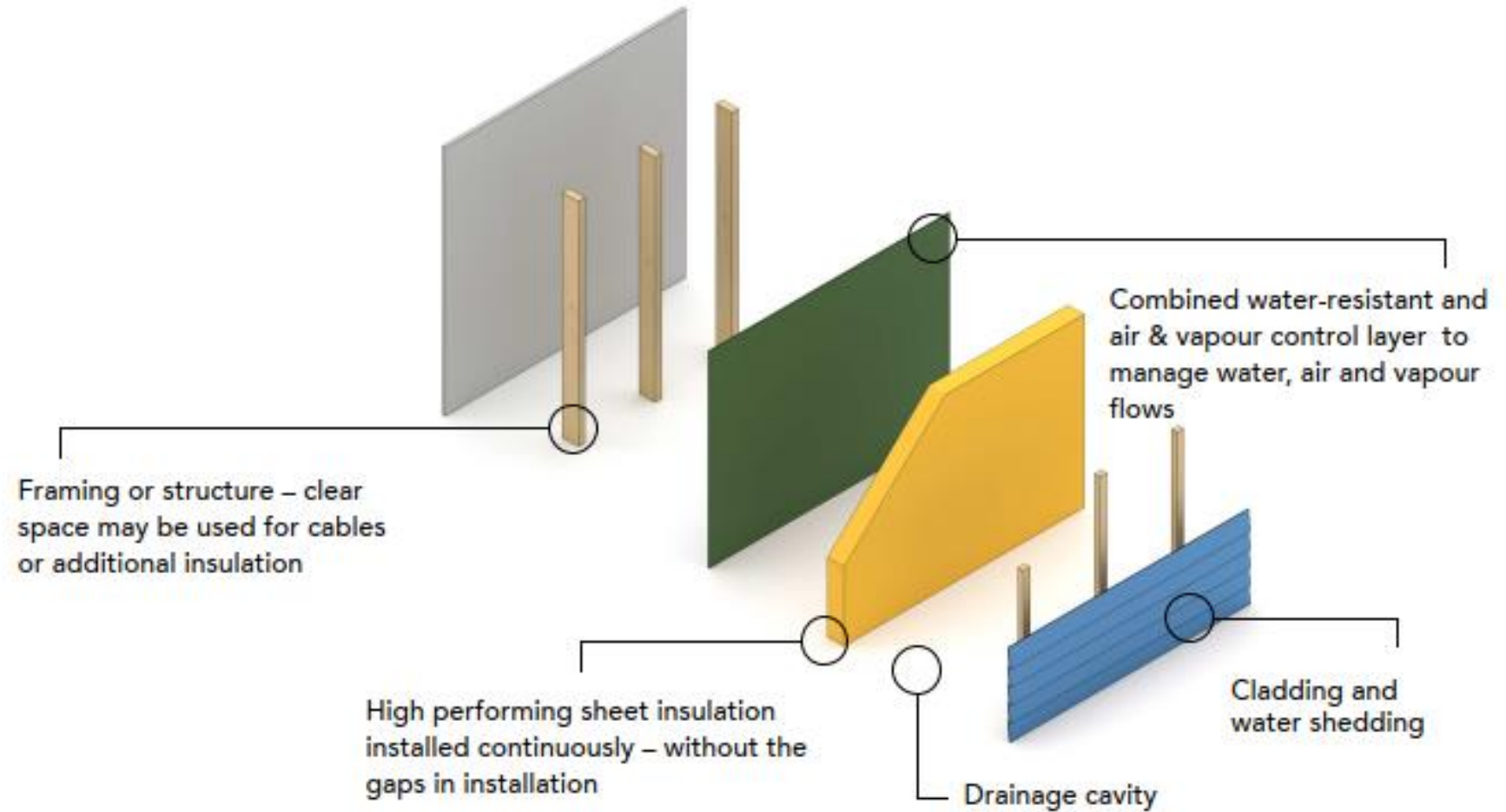
Code Walls Performance

- Performance
- Slab edge overhang
- Internal AVCL
- MVHR ductwork



Outsulation as a solution

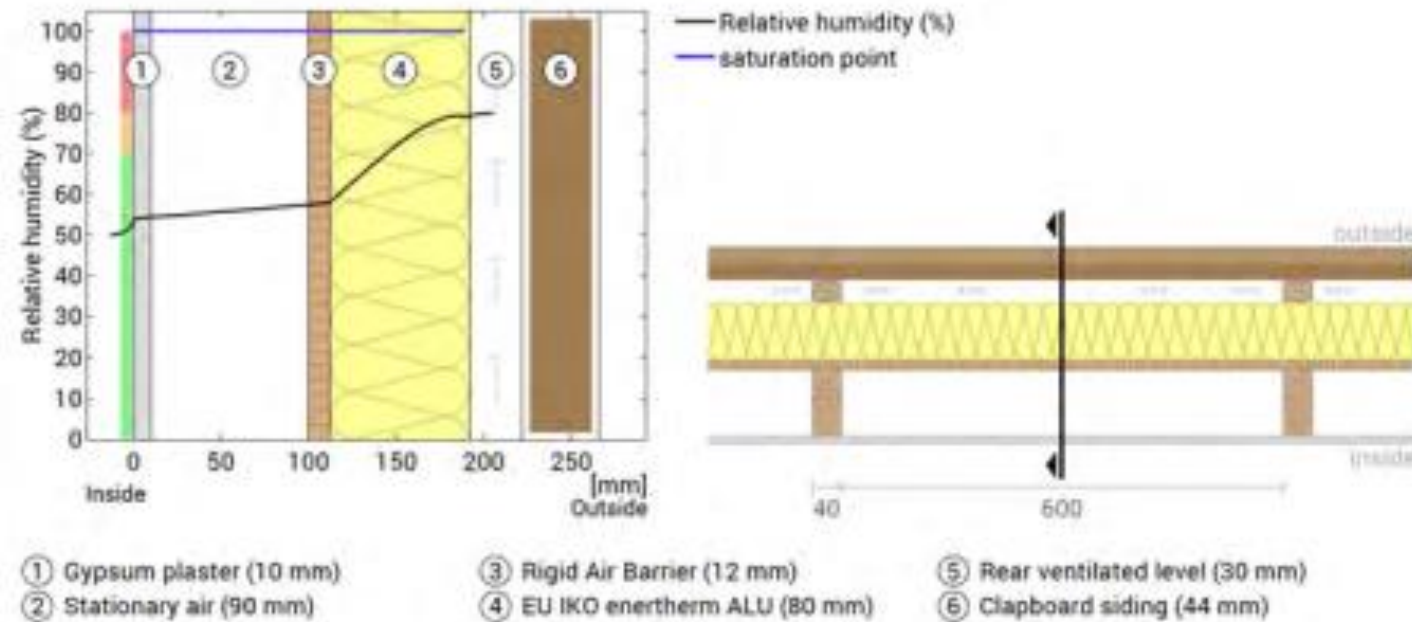
Less “Sensitive”



Outsulation as a solution

Condensation Modelling

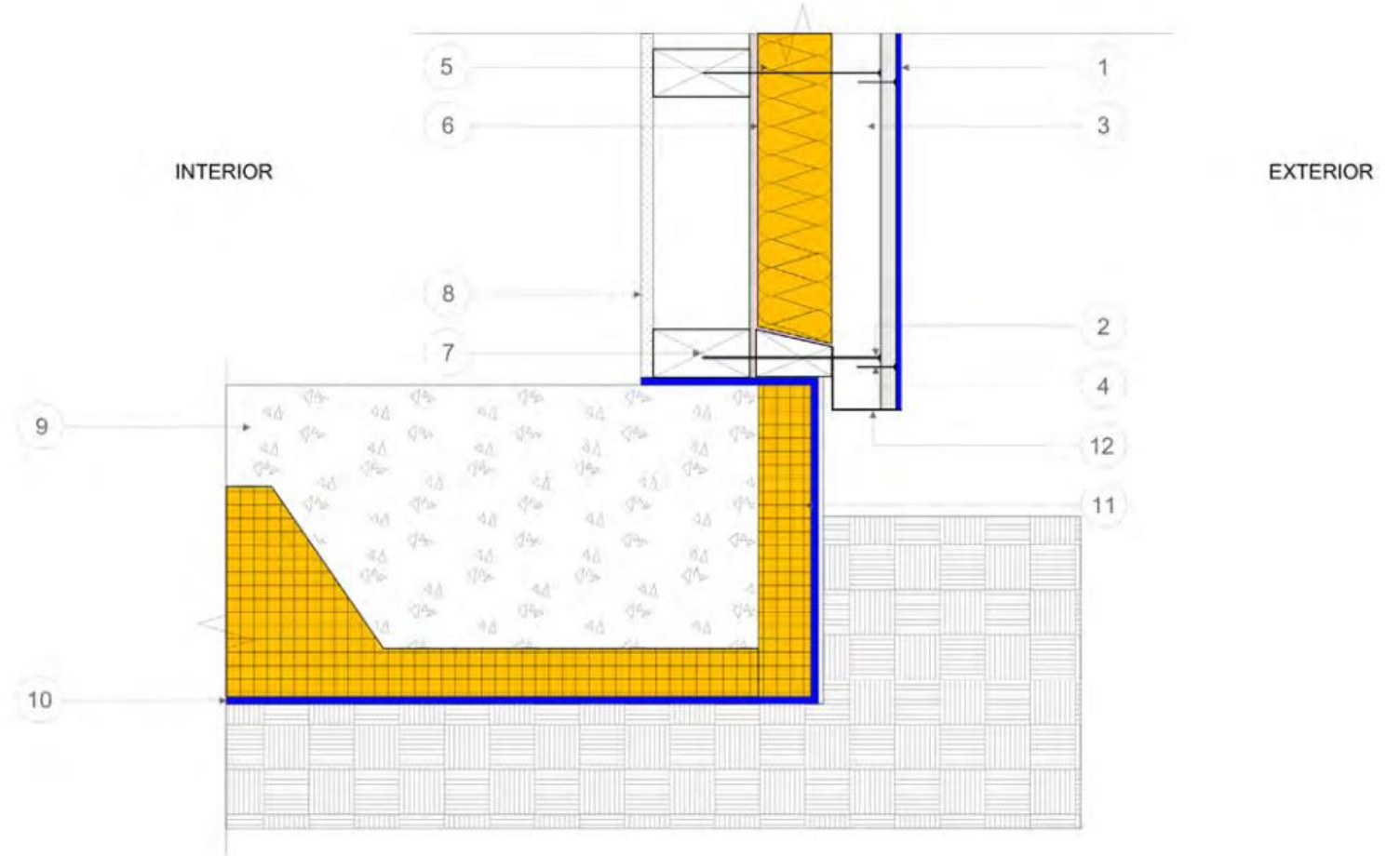
Assume: 80mm Enertherm PIR with Rigid Air Barrier = R3.86



The wall structure illustrated does not cause moisture to form or accumulate.

Outsulation as a solution

- Performance
- Slab edge easier
- Internal trades same as BAU
- Suits recessed window installation



St Albans Home

Architect: ADQ Partnership Ltd
Structure: Concrete Block
Insulation: Enertherm PIR 60mm
(walls)



HomeGround Auckland City Mission

Architect: Steven Lawson Architects
Builder: Built Environs
Structure: Cross Laminated Timber
Insulation: ROCKWOOL ThermalRock® S80 (by others)



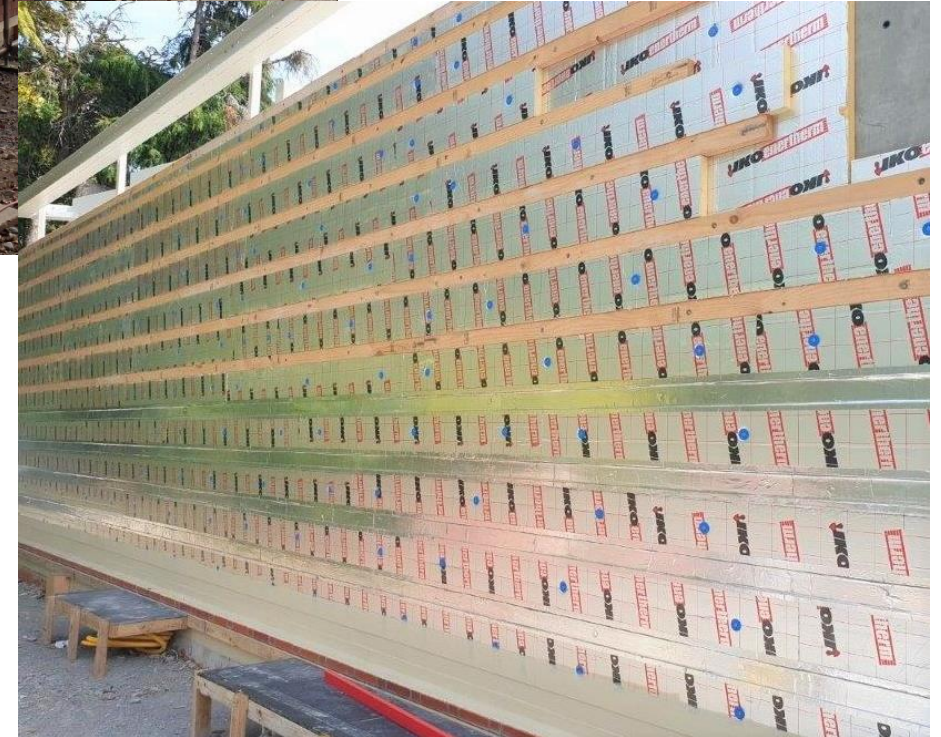
ABODO Cardrona Cabin

Architect: Assembly Architects Ltd
Builder: Dunlop Builders
Structure: ABODO timber framing
Insulation: Enertherm PIR 100mm (walls and roof)



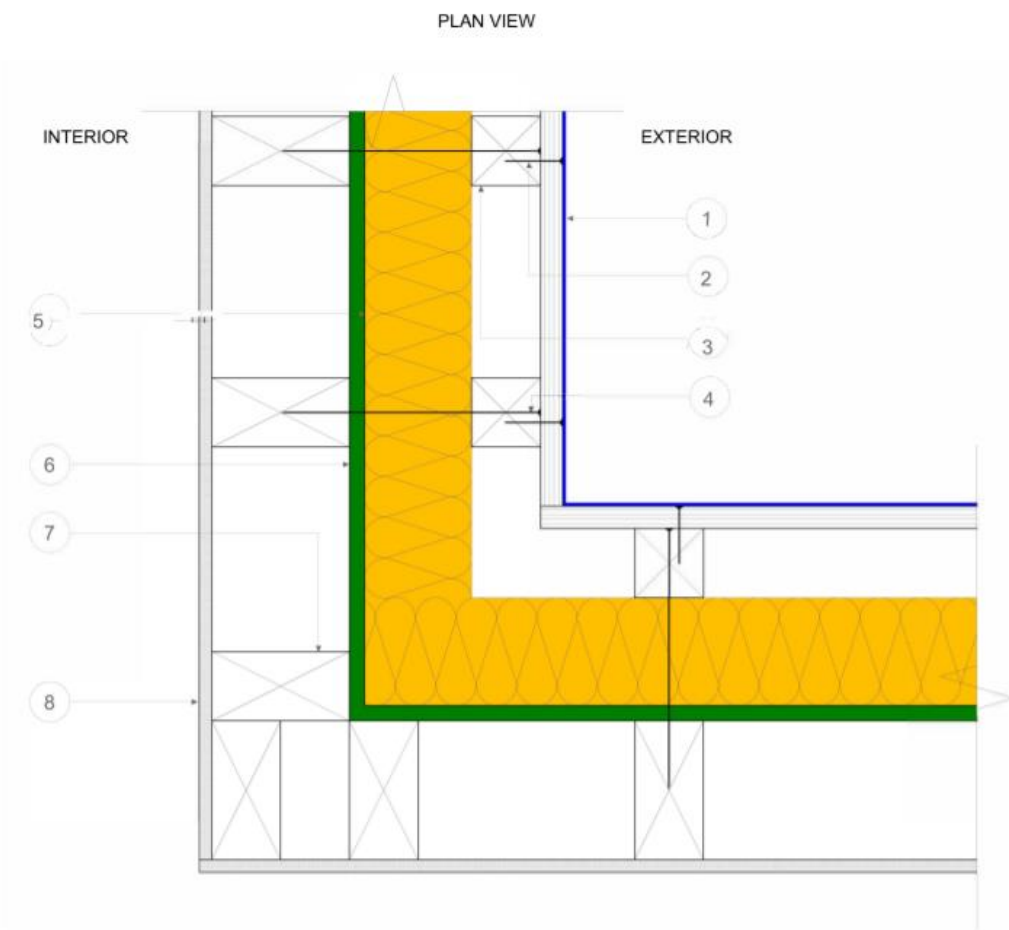
Family Home

Architect: RTA Studios
Structure: Concrete
Insulation: Enertherm PIR 100mm (walls)



Internal Corner

- Key
- 1. Cladding
 - 2. Cladding Fixing
 - 3. Cavity Batten
 - 4. Cavity Batten Fixing
 - 5. Insulation
(Enertherm PIR or ROCKWOOL)
 - 6. WRAP
(High-performance Underlay and/or Rigid Air Barrier)
 - 7. Timber Framing
 - 8. Internal Lining
- Layers
- Water Shedding
 - Water, Air & Vapour Control
 - Thermal



Wall to Pitch Roof (Eave)

Key

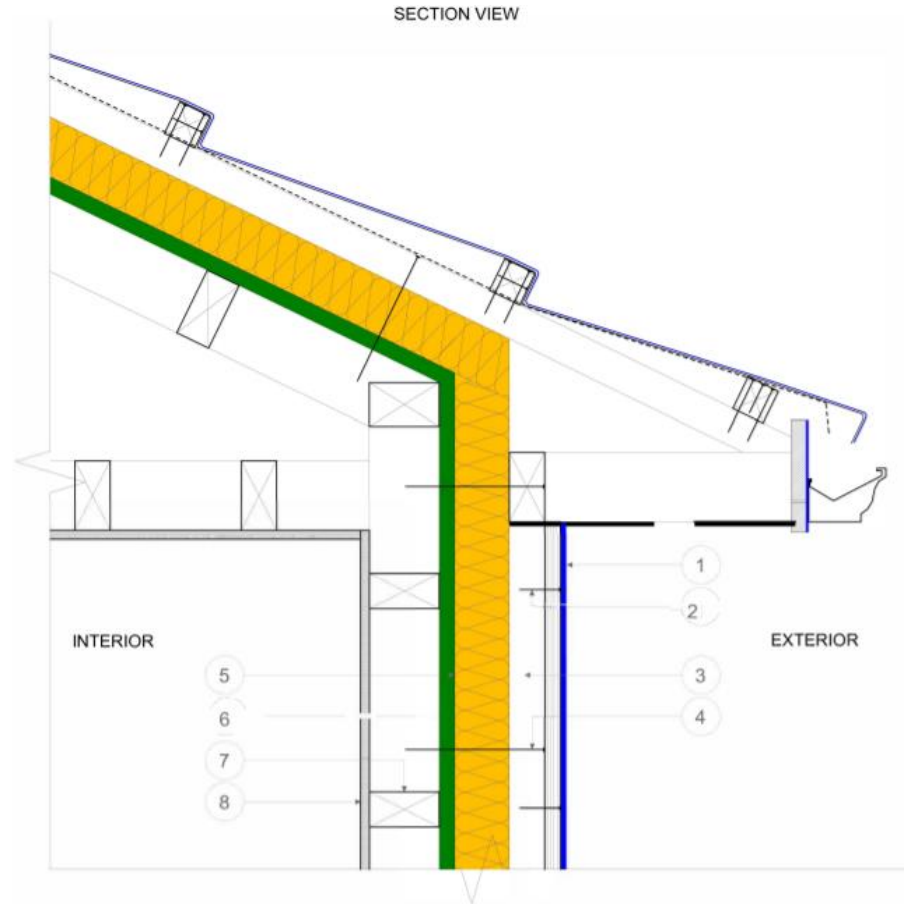
1. Cladding
2. Cladding Fixing
3. Cavity Batten
4. Cavity Batten Fixing
5. Insulation
(Enertherm PIR or ROCKWOOL)
6. WRAP
(High-performance Underlay and/or Rigid Air Barrier)
7. Timber Framing
8. Internal Lining

Notes

- Roof system shown is Gerard ThermoCore.
- Other options like Dimond TriCore may equally be accommodated.
- Soffit vent assists with air flow between roofing and insulation.
- Internal ceiling can be eliminated to create a cathedral ceiling.

Layers

-  Water Shedding
-  Water, Air & Vapour Control
-  Thermal



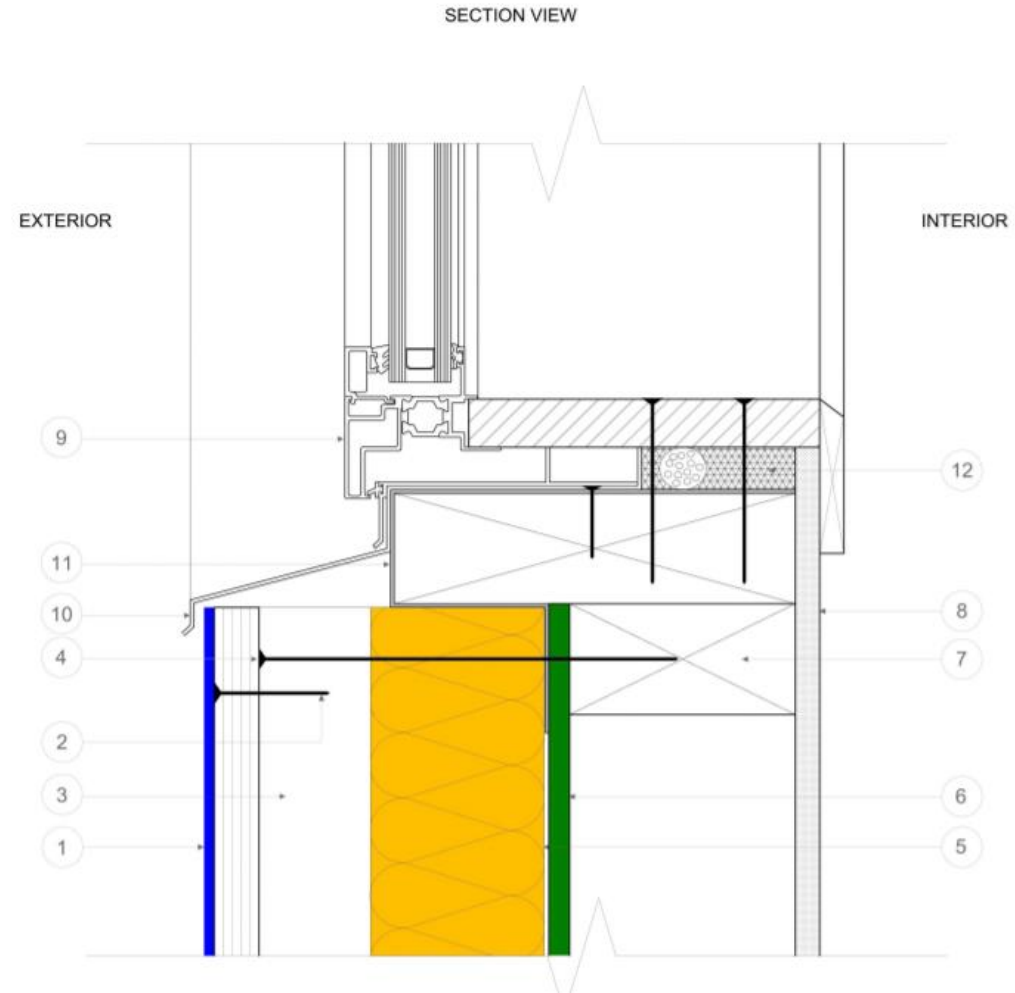
Window Sill

Key

1. Cladding
2. Cladding Fixing
3. Cavity Batten
4. Cavity Batten Fixing
5. Insulation
(Enertherm PIR or ROCKWOOL)
6. WRAP
(High-performance Underlay and/or Rigid Air Barrier)
7. Timber Framing
8. Internal Lining
9. Thermally Broken Window Frame
10. Sill Flashing
11. Butyl Flashing Tape (or Equivalent)
12. Air Sealant Full Depth

Layers

- Water Shedding
- Water, Air & Vapour Control
- Thermal

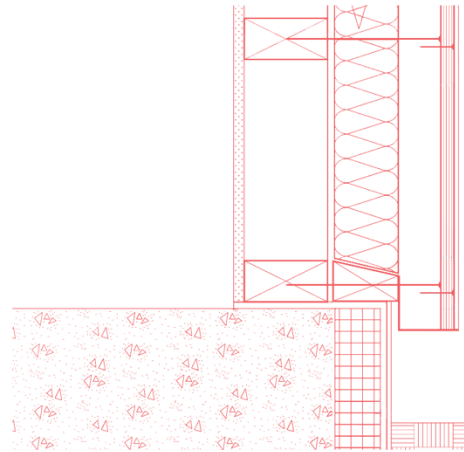


Outsulation Design Guide



A Designer's Guide:

Outsulation for High-Performance Walls



VERSION 1: DECEMBER 2021