



Applying Enerphit to Rejuvenate a Scottish Barn

by

Tom Robinson



Our Work/ Our Practice







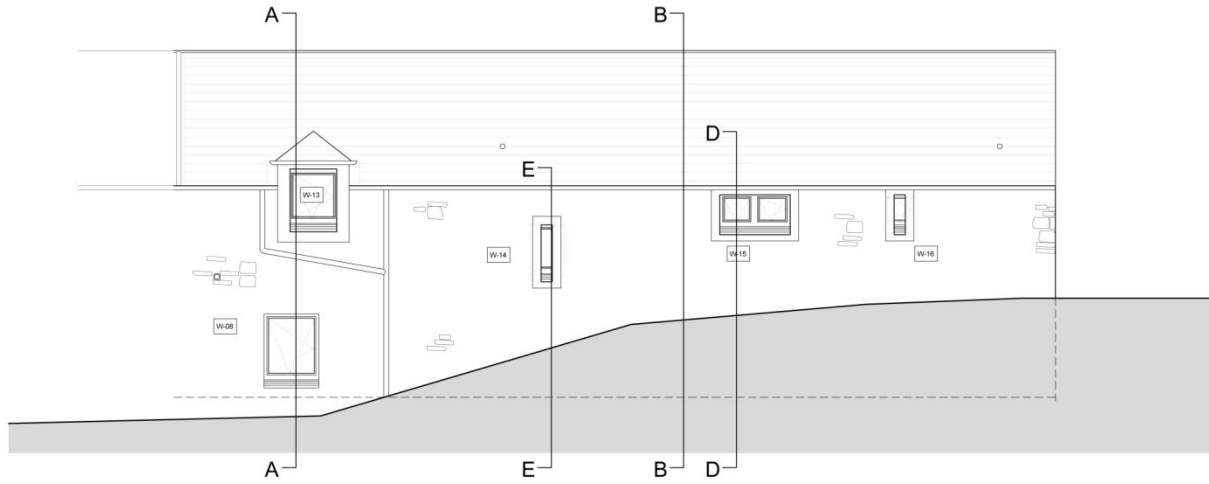
The Brief:

- A comfortable house for a retired couple.
- A low energy house which also makes use of renewable energy sources.
- Must have a view to the hills.

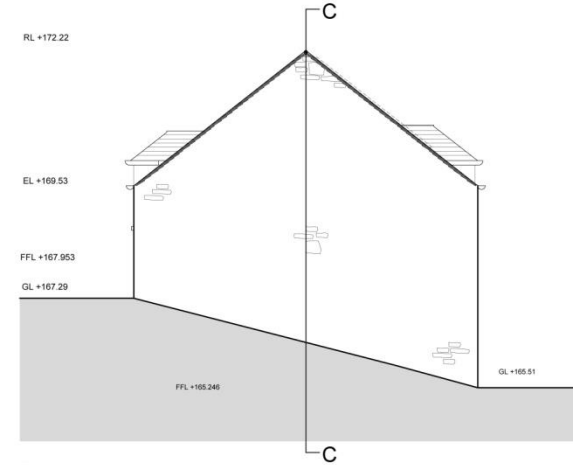


- Preparation for Tanking Works.

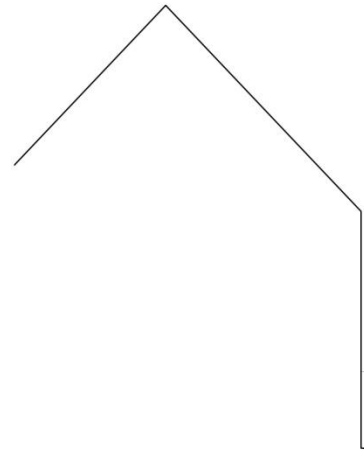
Thomas Robinson | Architects



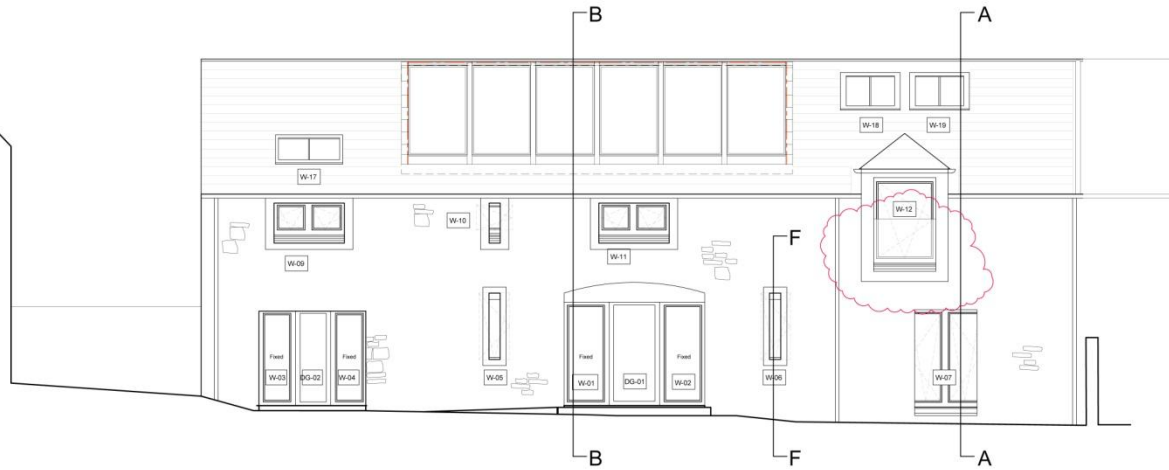
North Elevation

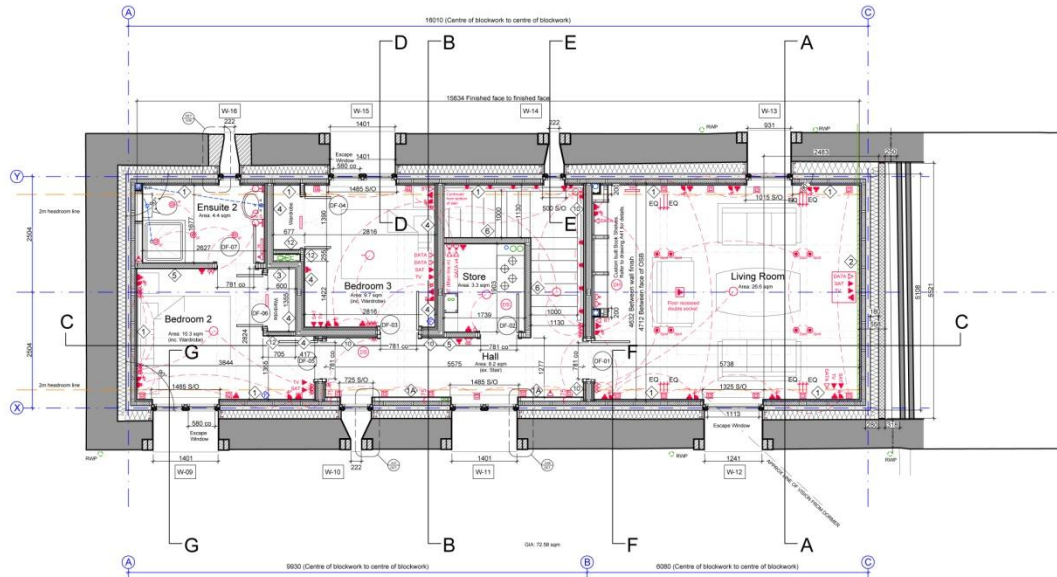


West Elevation

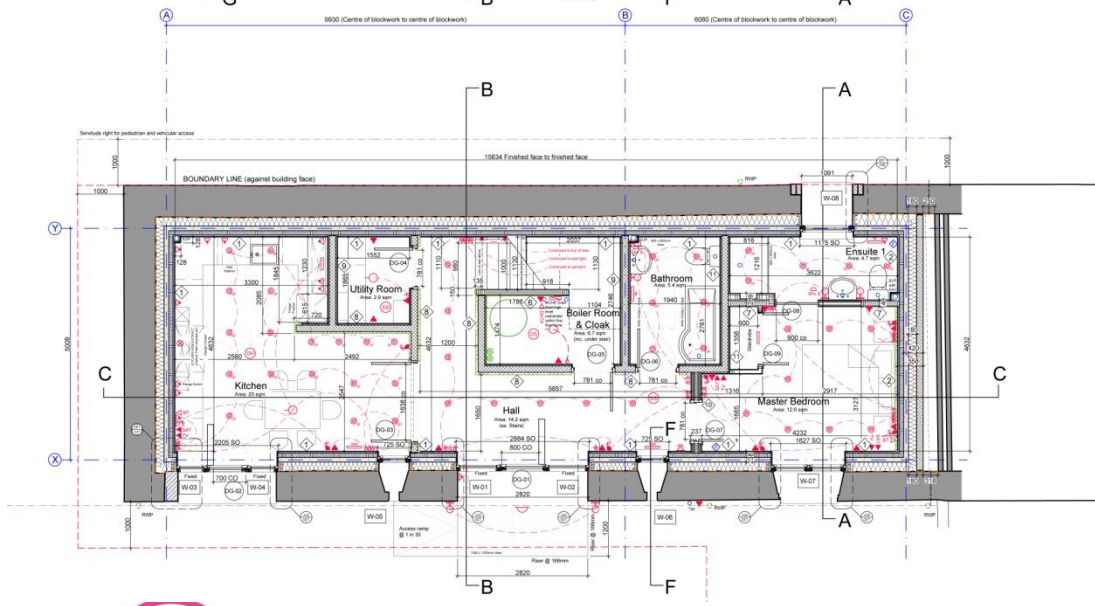


South Elevation





First Floor Plan



Ground Floor Plan

The Challenges:

- No possibility of using external insulation.
- Constrained internal floor area.
- Requirement for a view to the North.
- Shallow foundations which required underpinning.
- Tanking require due to high external ground levels.

Advantages:

- Thick walls facilitated shading.
- Larger openings were on the south side.
- A simple shaped building with a “Form factor “of : 3.6
- A Flexible understanding client.



The Solutions:

Floor: Excavate and underpin to install 3 layers of Styrodur
U-value 0.1.

Walls: Full fill masonry cavity insulation Superglas 032, aerated concrete block,
85mm celotex board, OSB, Majpel 5 VCL, service void and plasterboard.
U-value 0.1.

Roof: 350mm Steico Joists with rigid close cell insulation in 3 layers between.
U-value: 0.08.

Openings: Doors: Msora Comfort E112.

Windows: Msora Comfort E112.

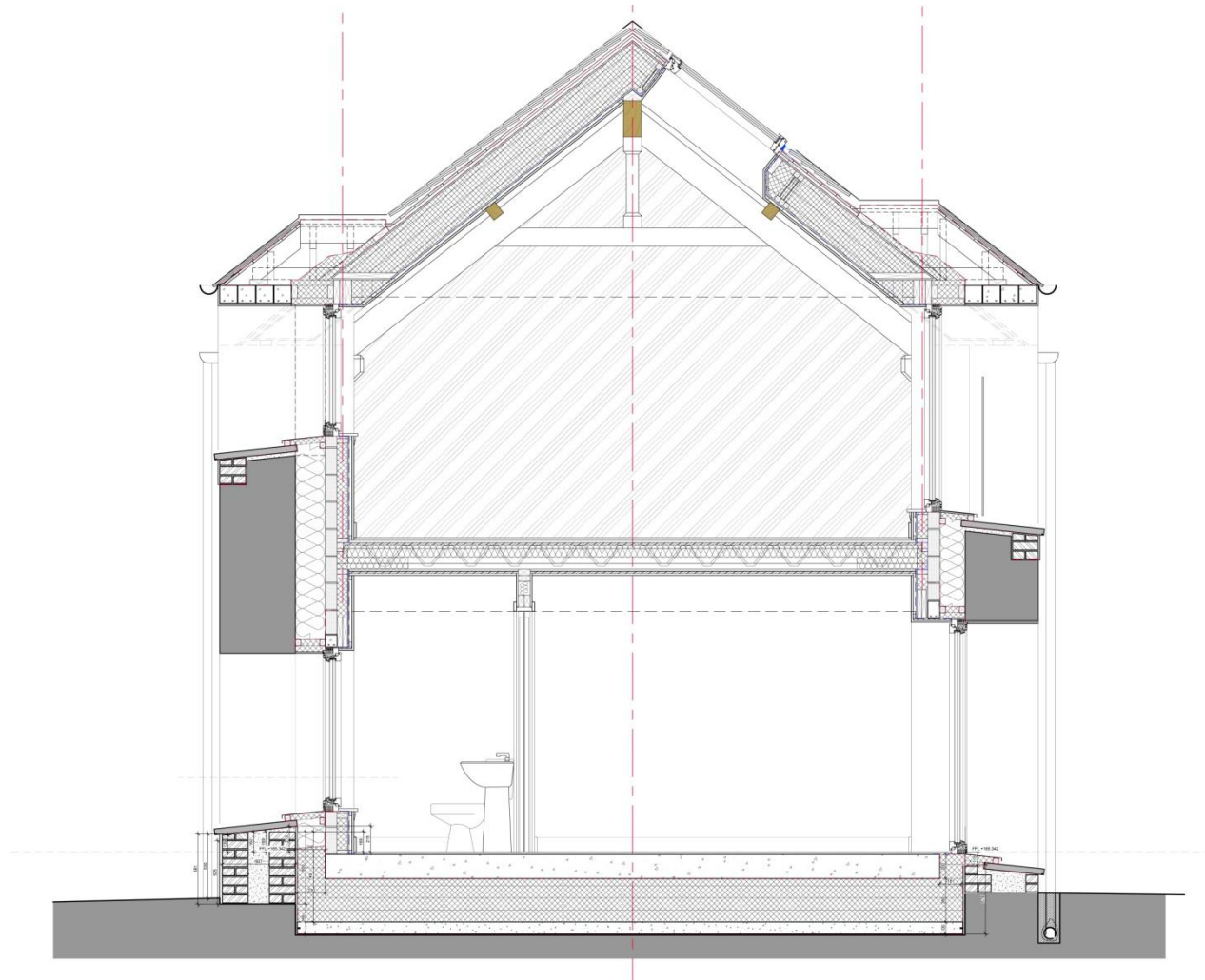
Roof lights: Fakro FTT Thermo U8.

Air tightness Methods: Siga Majpel I Membrane and Siga Tapes

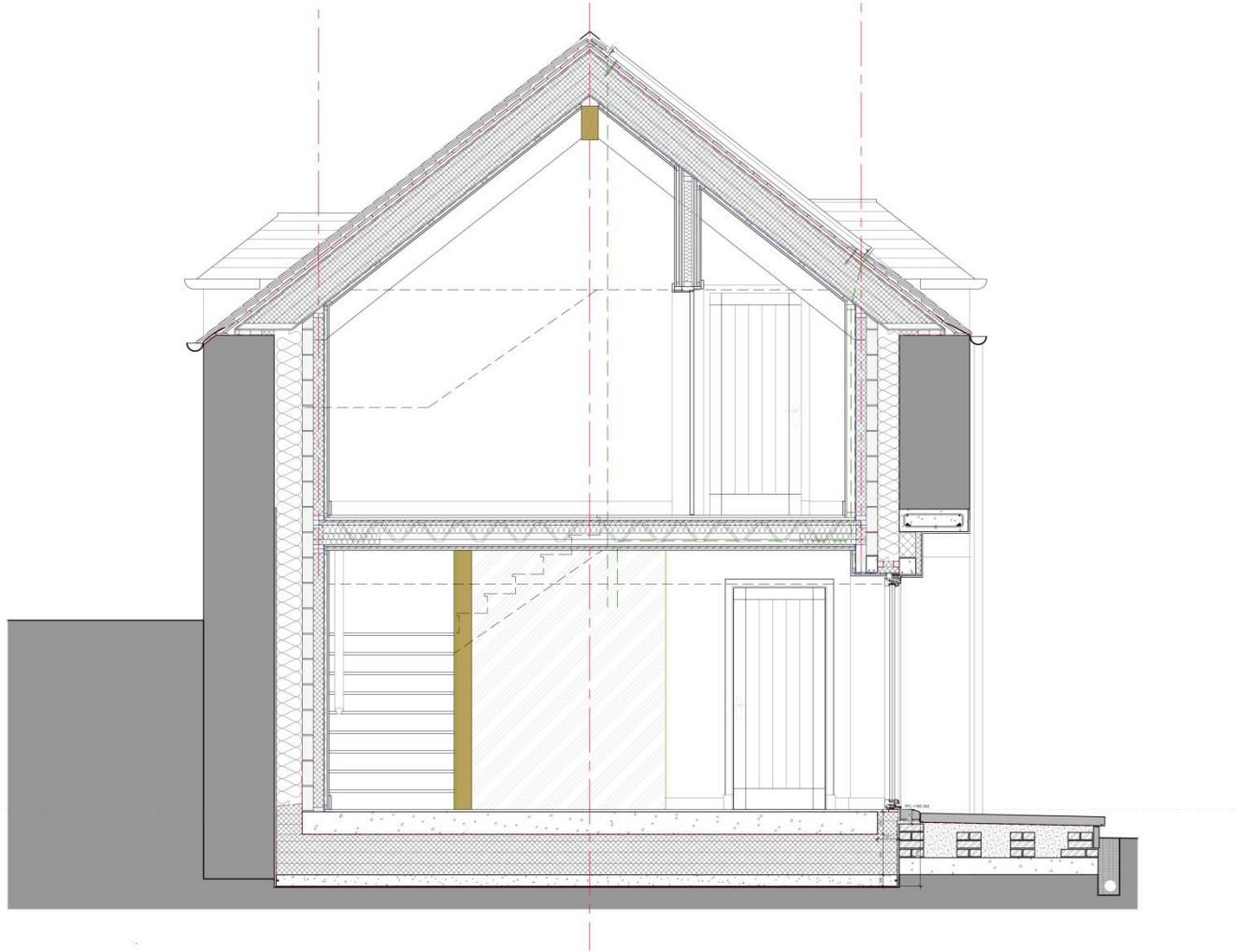
Services: Service runs: In first floor metal Strut Joist system

Paul Novus 300 MVHR

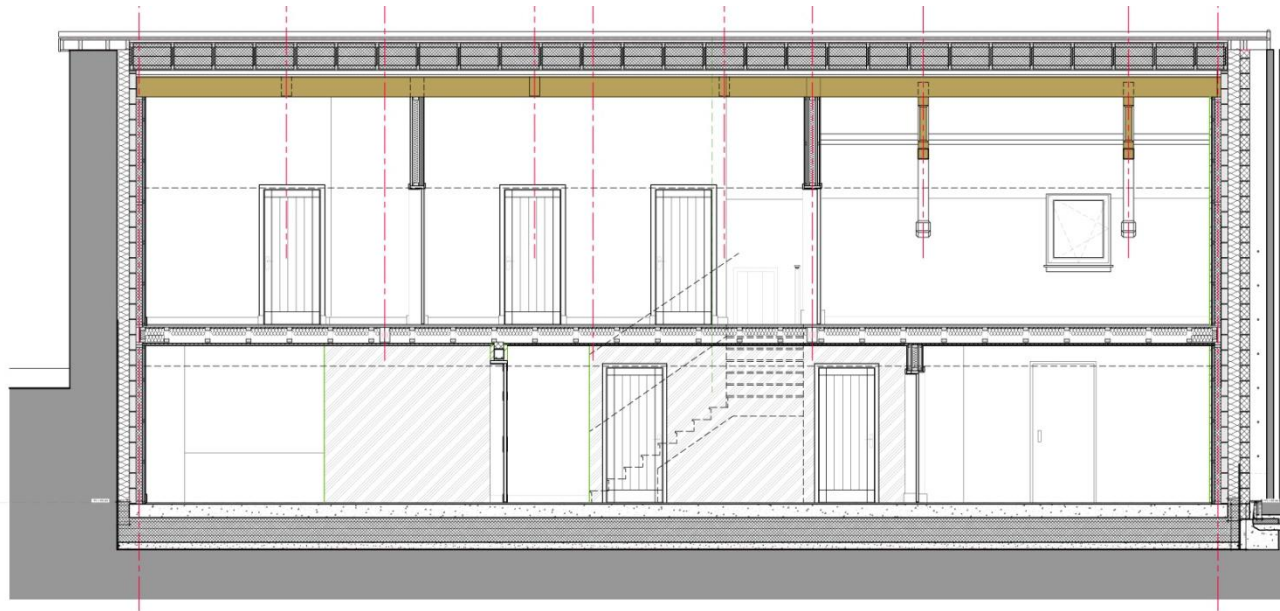
Heating and hot water: Solar PV direct electric water heating and solar
thermal water heating. On peak electric radiators and electric underfloor
heating.



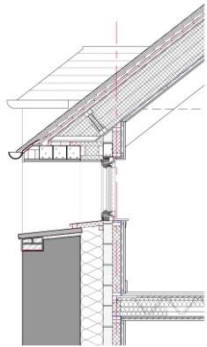
Section A-A



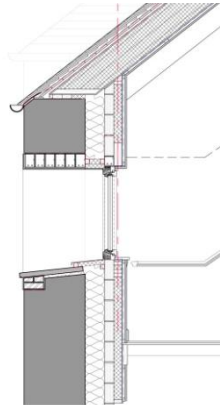
Section B-B



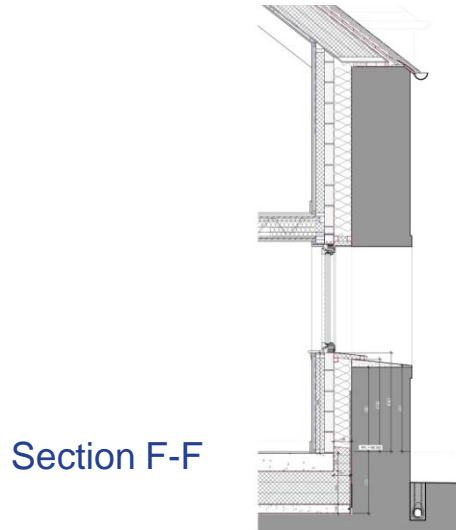
Section C-C



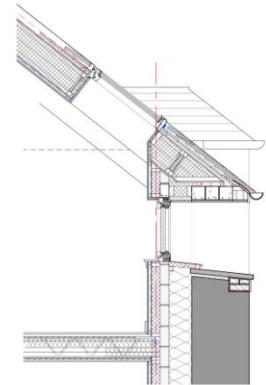
Section D-D



Section E-E



Section F-F



Section G-G

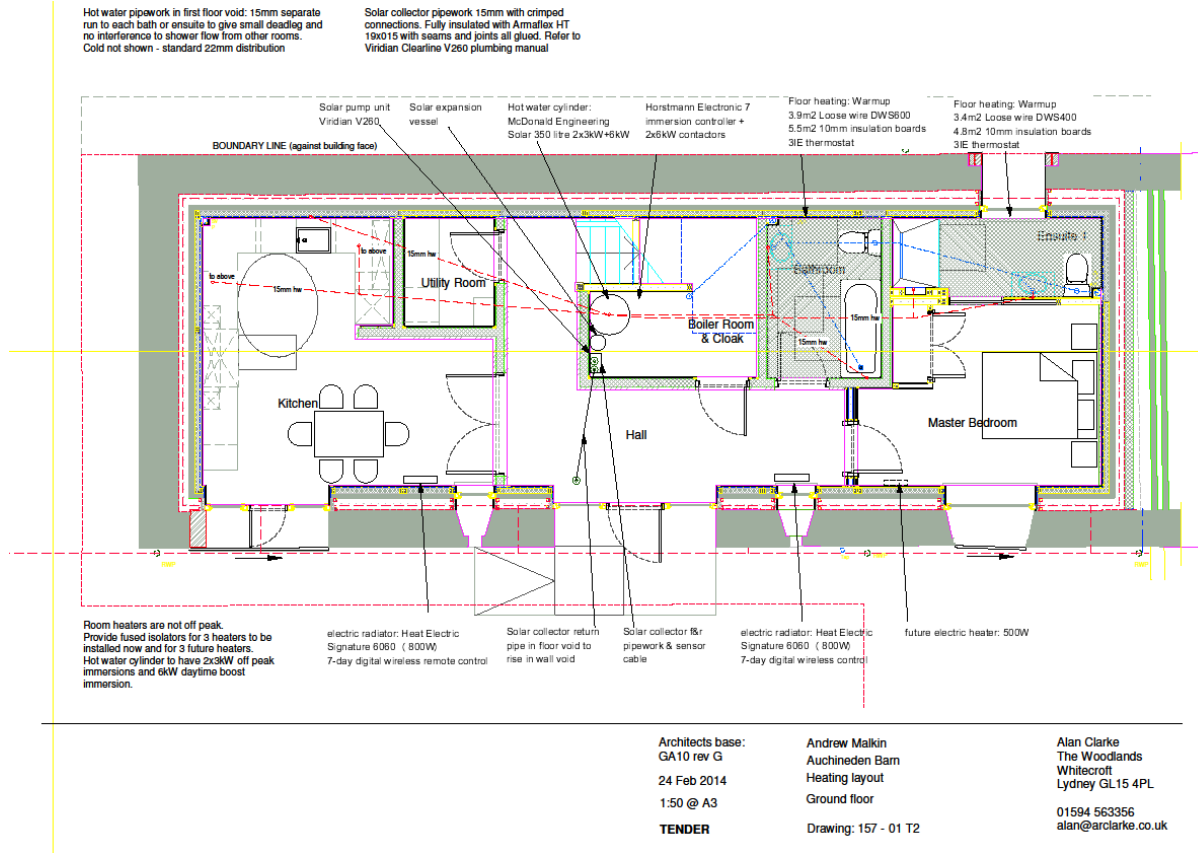
Thomas Robinson | Architects

Ratio to the treated floor area			USE
Treated floor area	121.4	m ²	Require
Annual heating demand	21	kWh/(m ² a)	25
Heating load	10	W/m ²	
Overall specific space cooling demand		kWh/(m ² a)	
Cooling load		W/m ²	
Frequency of overheating (> 25 °C)	0.0	%	
Space heating and cooling, ventilation, DHW, household electricity	118	kWh/(m ² a)	125
Space heating and auxiliary electricity	84	kWh/(m ² a)	
Energy reduction through solar electricity		kWh/(m ² a)	
Pressurization test result n ₅₀	0.6	1/h	

c. to heating demand)?

PHPP Modeling

Graham Drummond of Passivhouse Associates



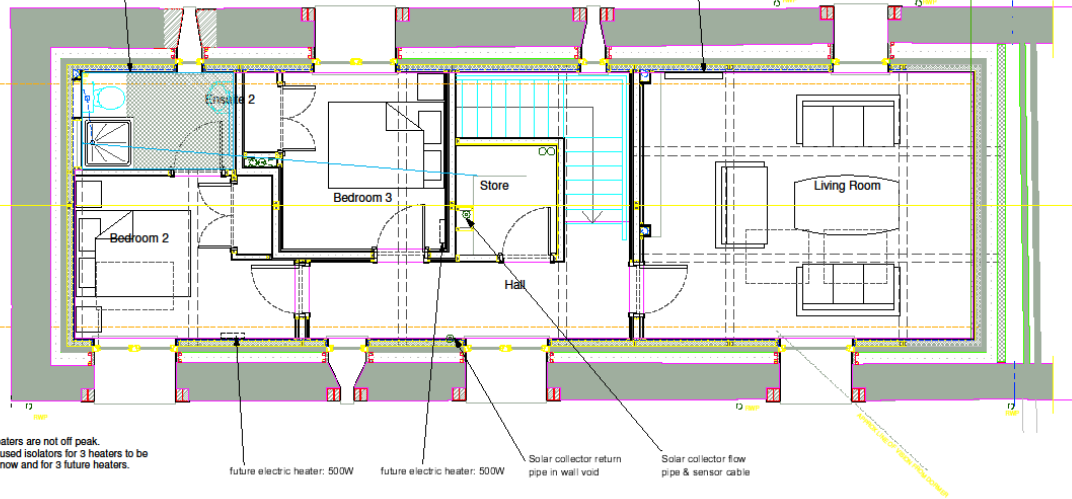
Alan Clark: Ground Floor Plan

Hot water pipework in first floor void: 15mm separate run to each bath or ensuite to give small deadleg and no interference to shower or flow from other rooms.
Cold not shown - standard 22mm distribution

Solar collector pipework 15mm with crimped connections. Fully insulated with Armaflex HT 19x015 with seams and joints all glued. Refer to Virdian Clearline V260 plumbing manual

Floor heating: Warmup
3m² Loose wire DWS400
4.5m² 10mm insulation boards
3IE thermostat

electric radiator: Heat Electric
Signature 6100 (1500W)
7-day digital wireless control

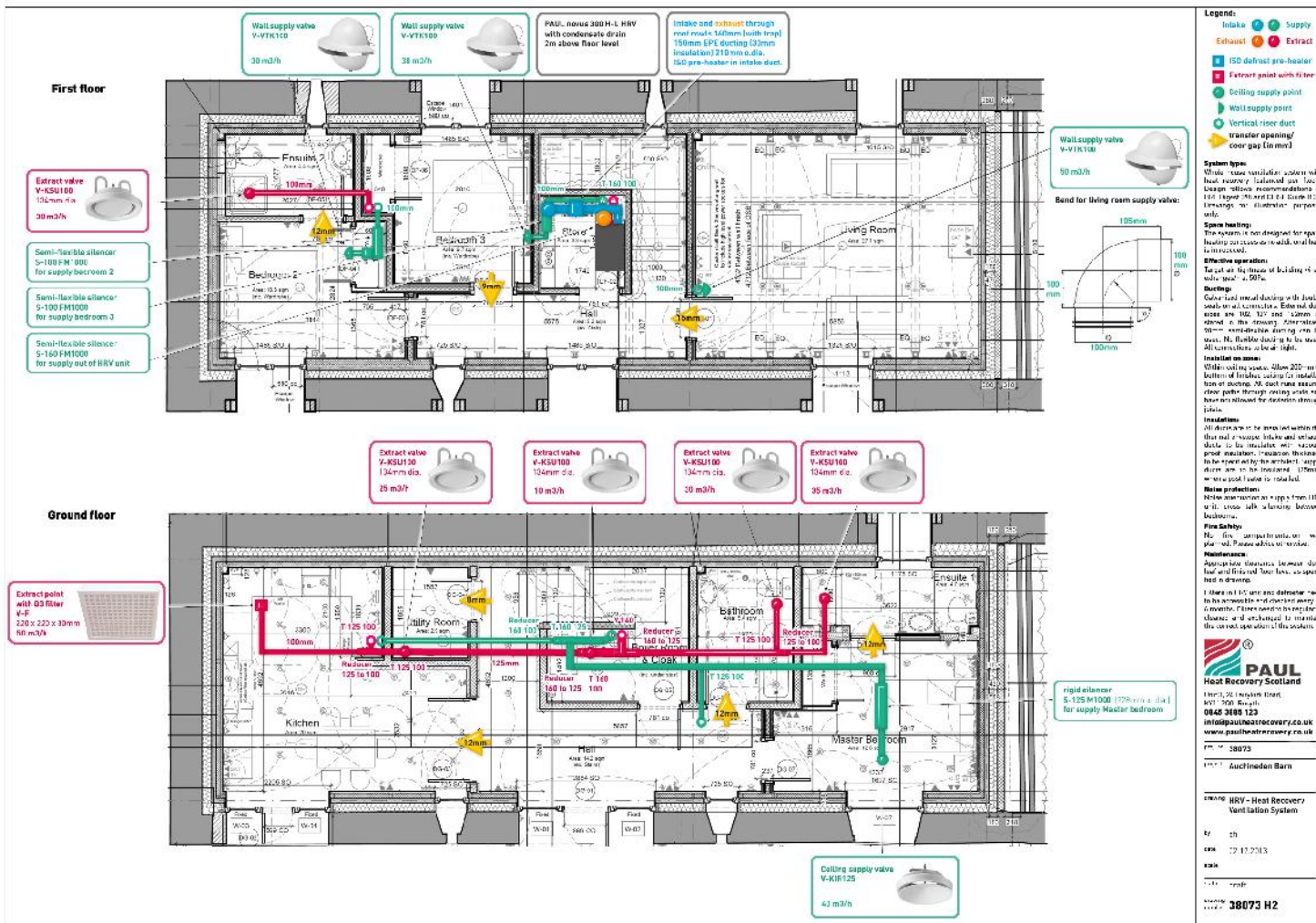


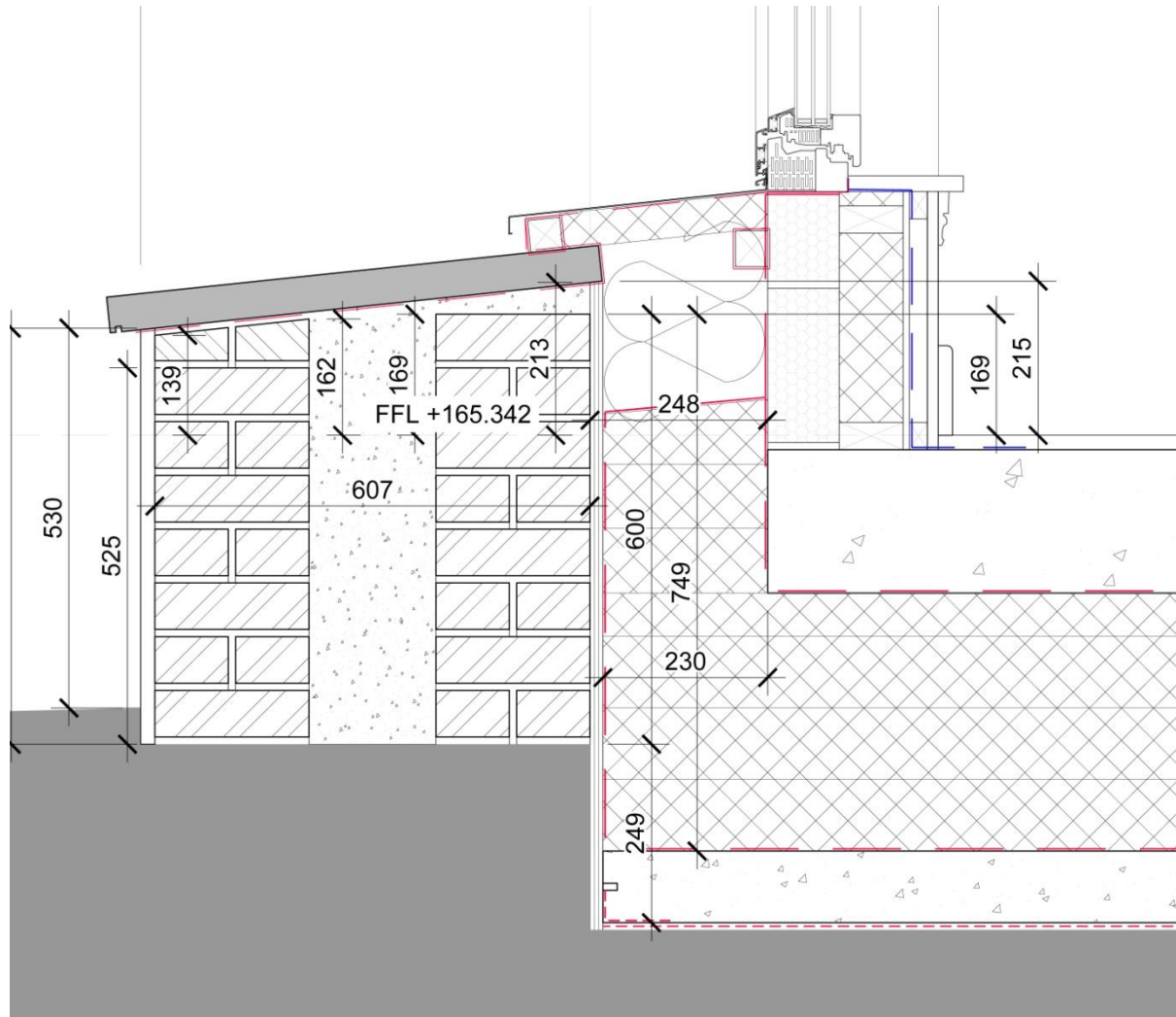
Architects base:
GA10 rev G
24 Feb 2014
1:50 @ A3
TENDER

Andrew Malkin
Auchineden Barn
Heating layout
First floor
Drawing: 157 - 02 T2

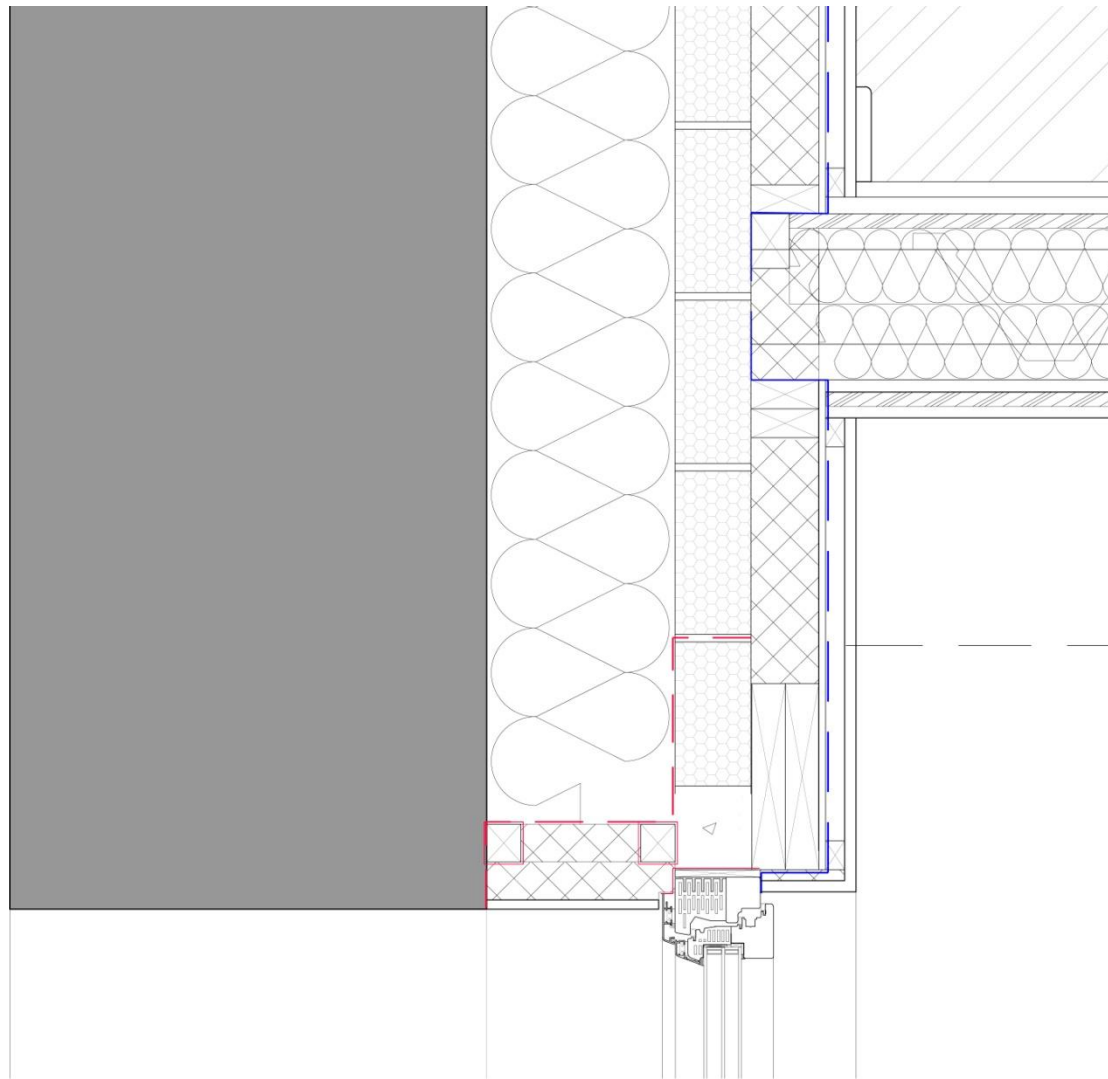
Alan Clarke
The Woodlands
Whitecroft
Lydney GL15 4PL
01594 563356
alan@arclarke.co.uk

Alan Clark: First Floor Plan

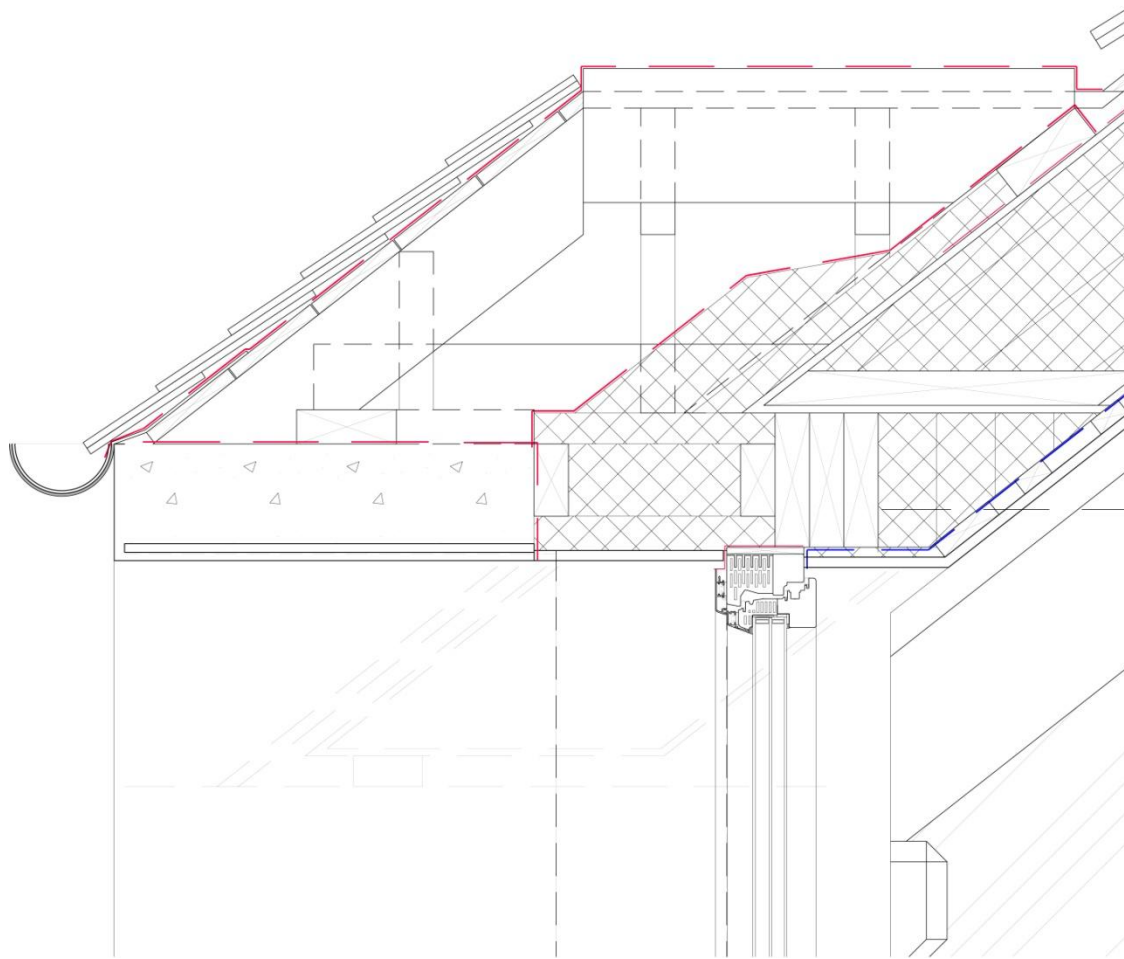




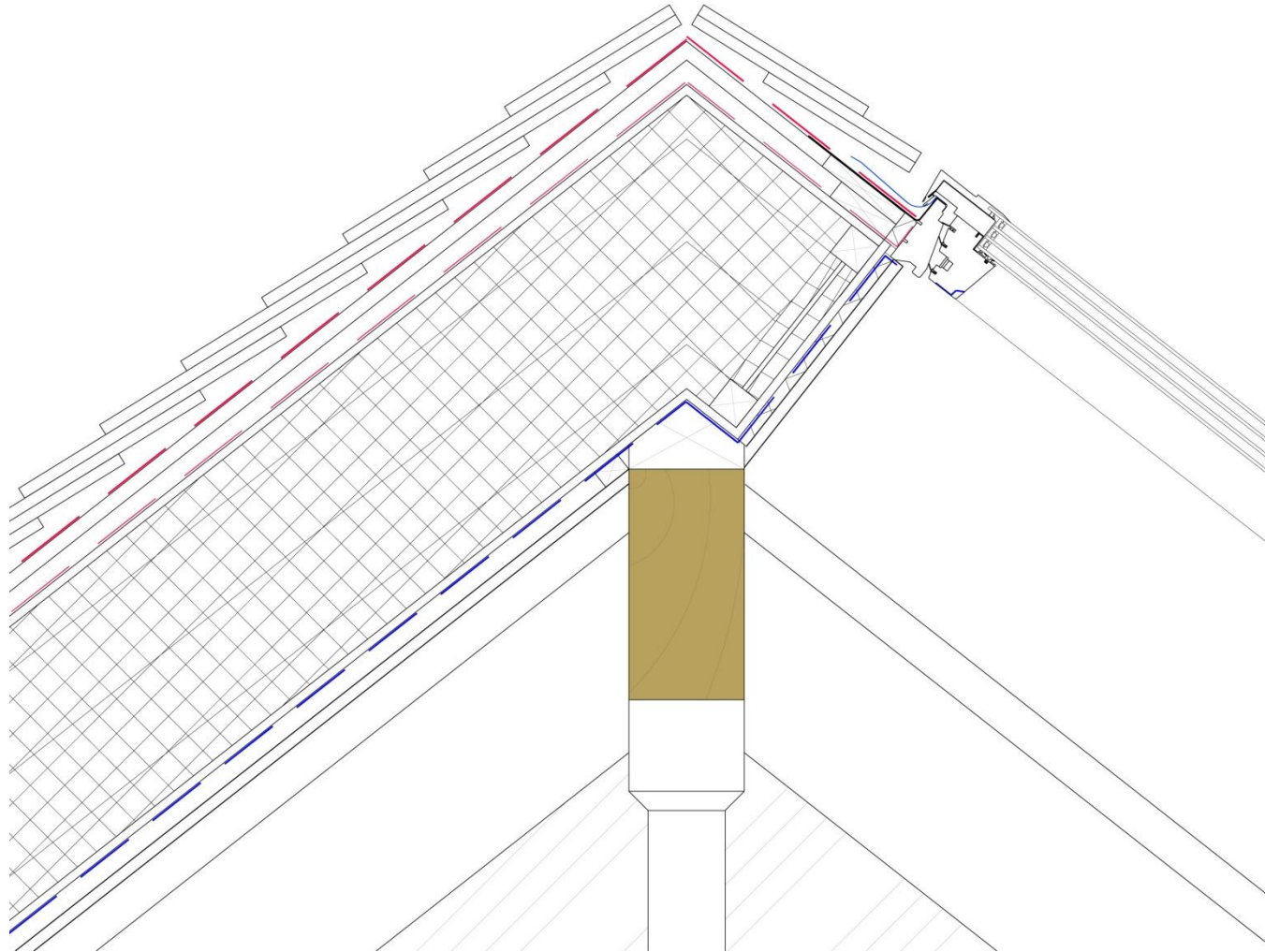
Detail:
Detail under W08 as proposed



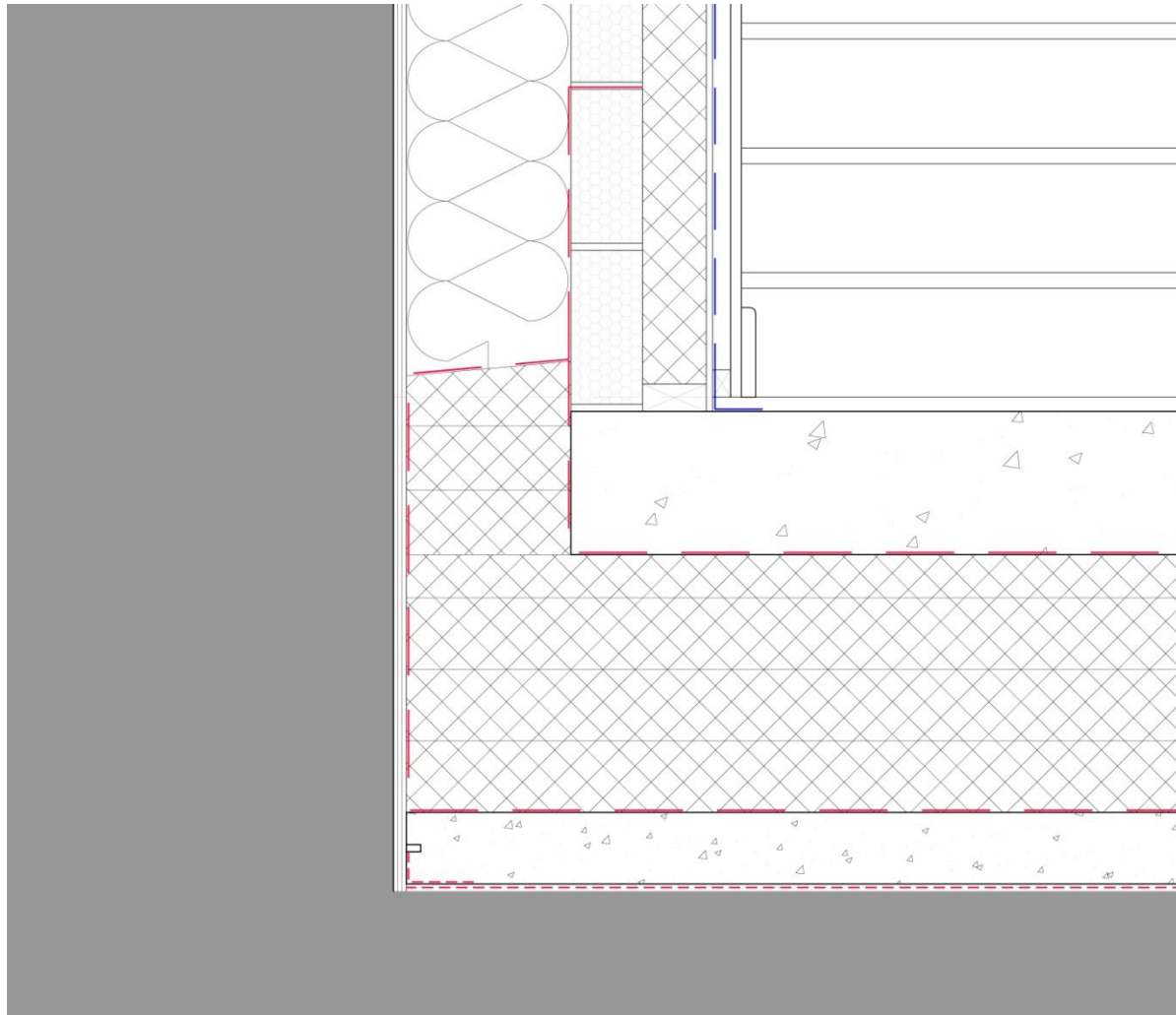
Detail:
W08 head detail as proposed



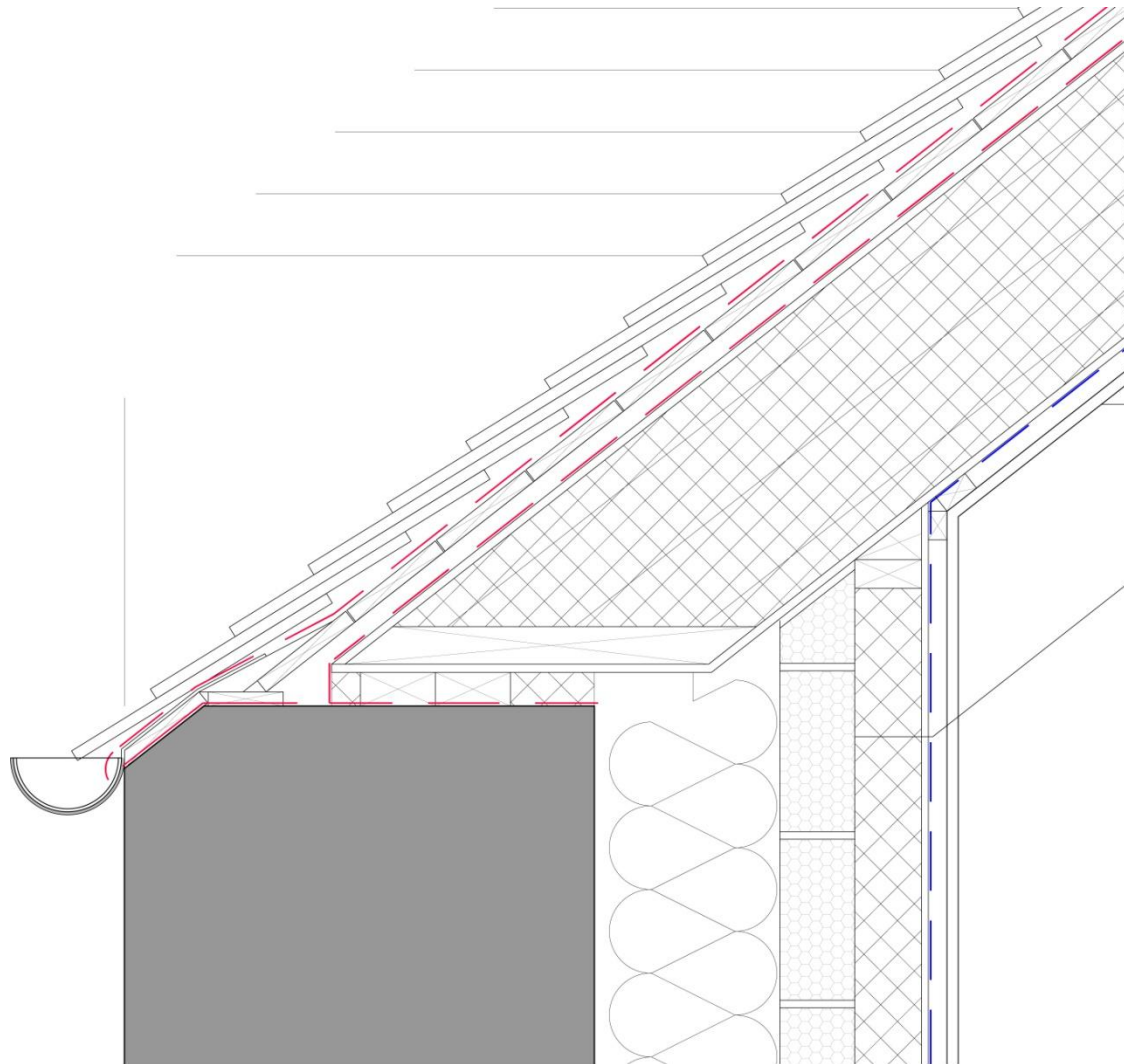
Detail:
W13 head + soffit dormer detail as proposed



Detail:
Roof at ridge light with oak ridge beam detail as proposed



Detail:
Ground floor slab and slab perimeter detail as proposed



Detail:
Wall head detail as proposed

Thomas Robinson | Architects

Project Team:

Architect:

Thomas Robinson Architects.

Tom Robinson. Certified Passive House Designer.

Project Architect :Kevin Stewart.

Structural Engineer: Peter Brett Associates.

Services Engineer: Alan Clark.

Quantity Surveyor: McDougall Surveyors.

PHPP Modelling: Graham Drummond Passivhouse Associates.

Certifier: Warm Low Energy Building Practice.

Contractor: W& A Scott.

Conclusion and Learning Points- So Far

1. An exceptional client required.
2. Approx Cost £3000/m²
3. Services designer must be a specialist.

