Thomas Robinson I **Architects**

Applying Enerphit to Rejuvenate a Scottish Barn

by

Tom Robinson

ukpassivhaus conference 2014

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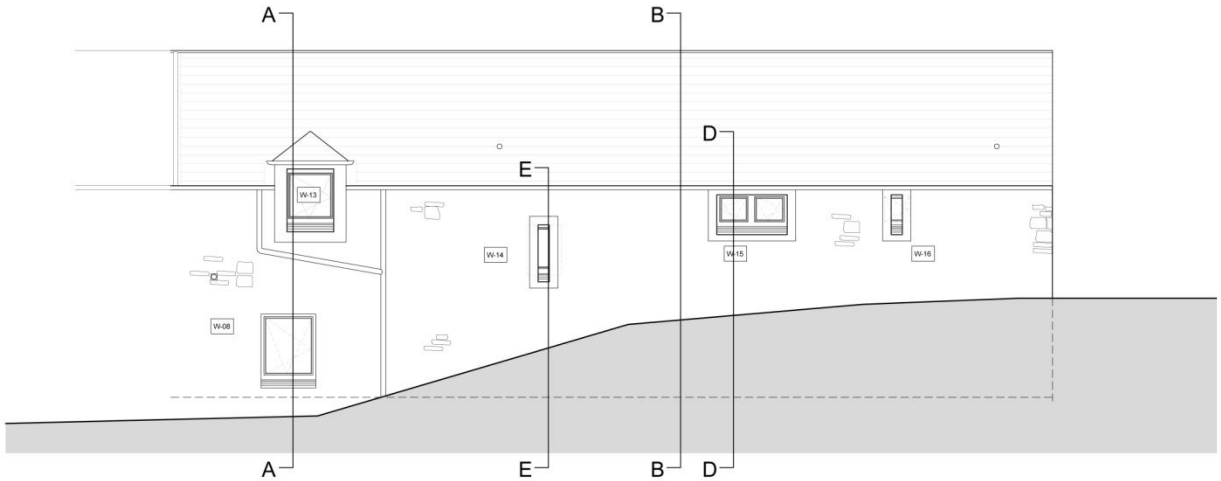
Our Work/ Our Practice

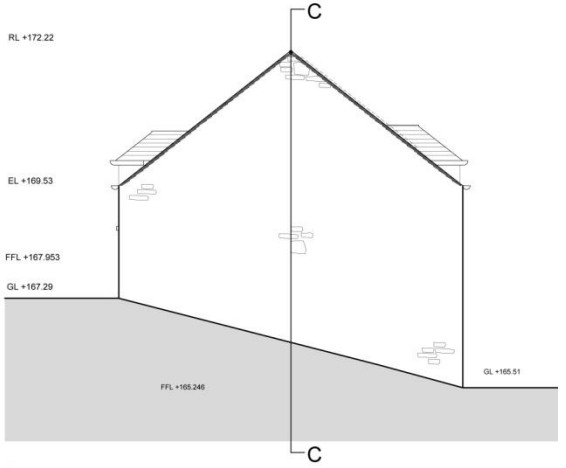
The Brief:

- 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.

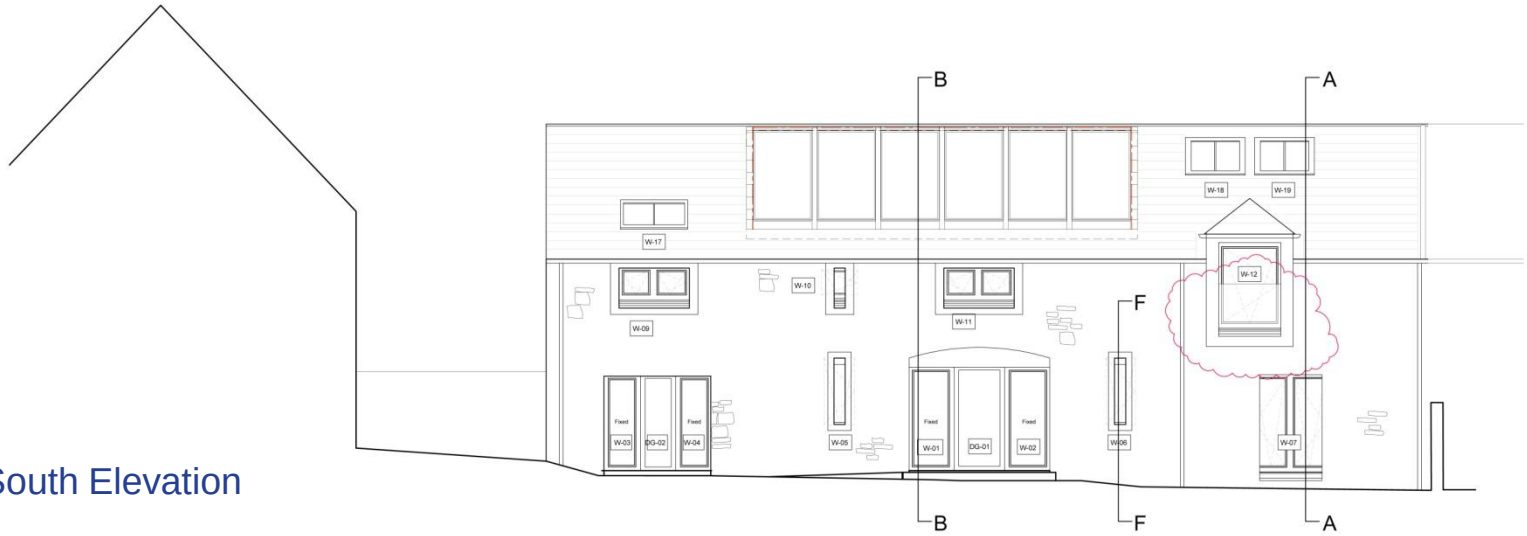
- Preparation for Tanking Works.



North Elevation



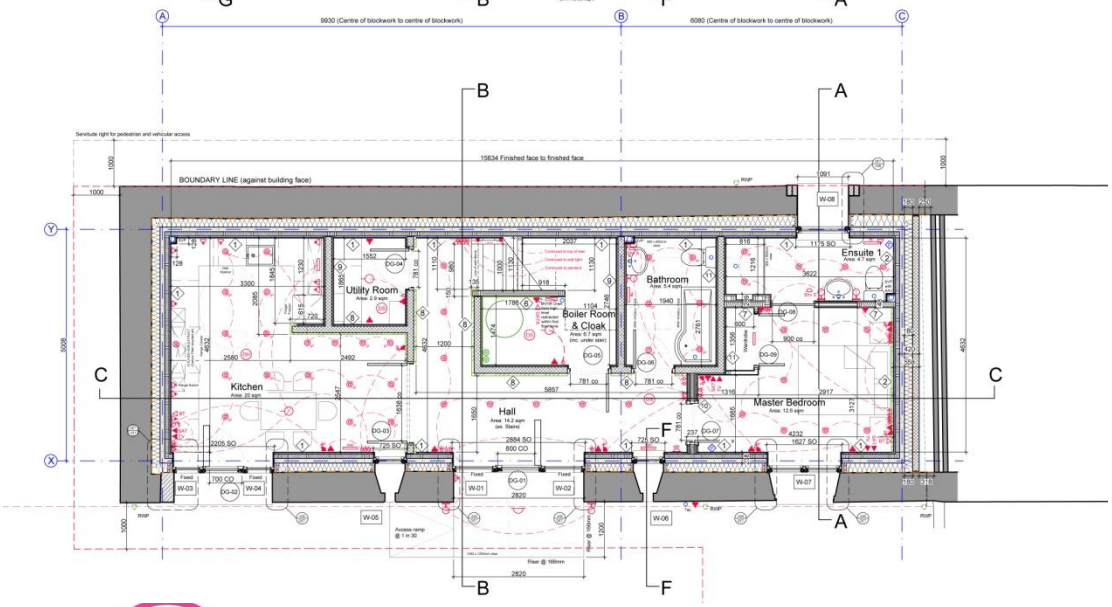
West Elevation



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:

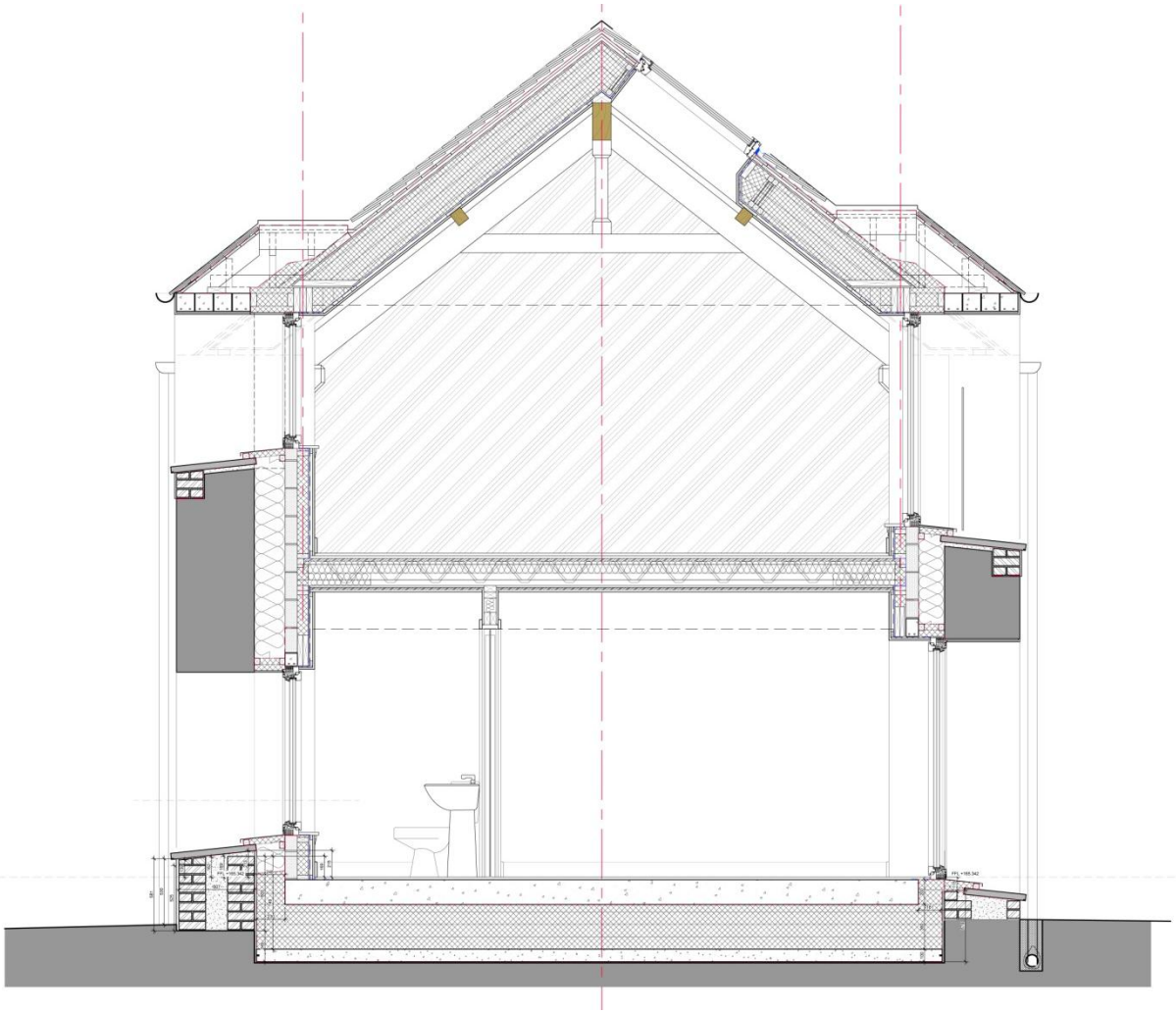
Floor: Excavate and underpin to install 3 layers of Styrodur
U-value 0.1.

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.

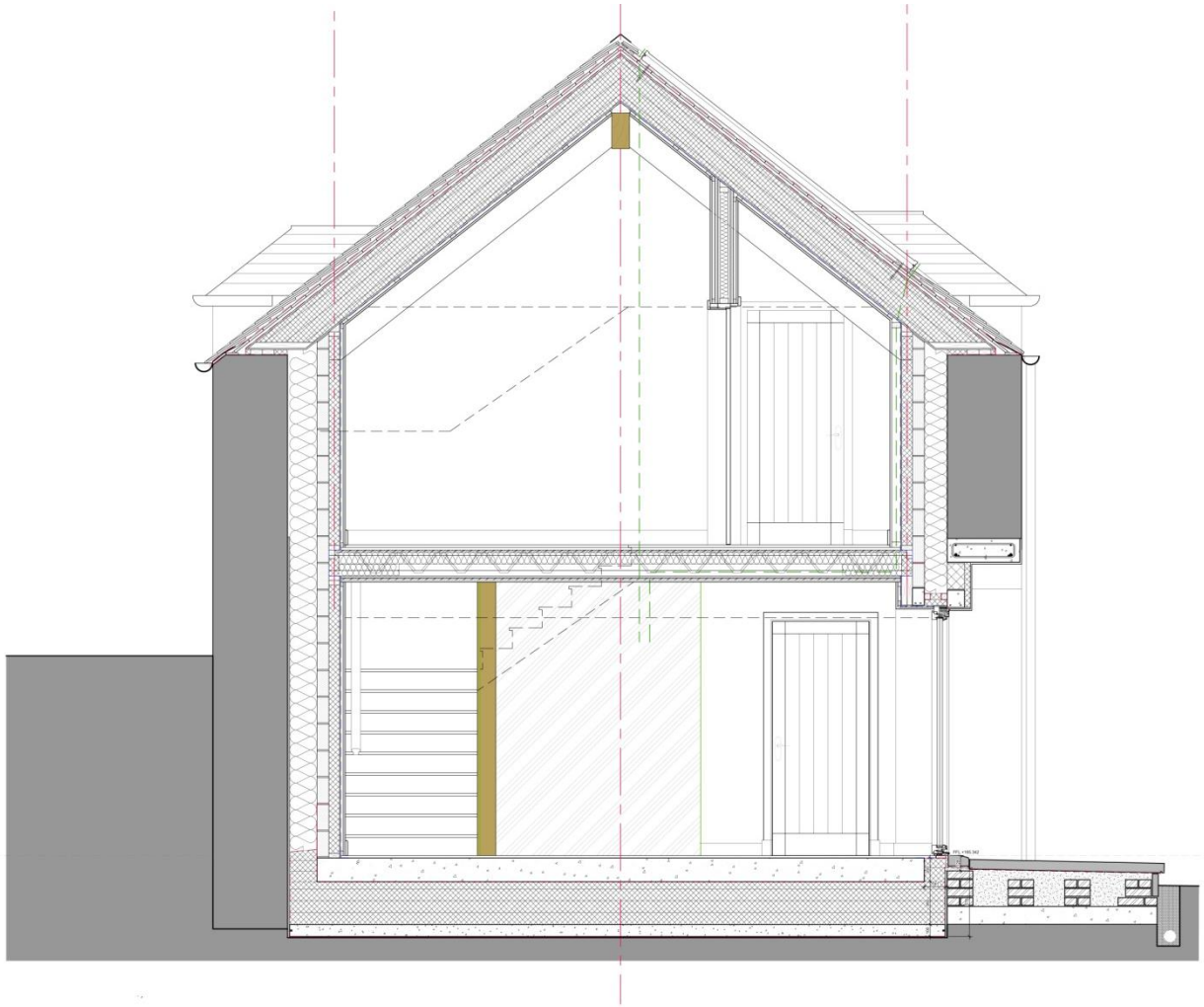
Roof: 350mm Steico Joists with rigid close cell insulation in 3 layers between.
U-value: 0.08.

Openings: Doors: Msora Comfort E112.
Windows: Msora Comfort E112.
Roof lights: Fakro FTT Thermo U8.
Air tightness Methods: Siga Majpel lMembrane and Siga Tapes

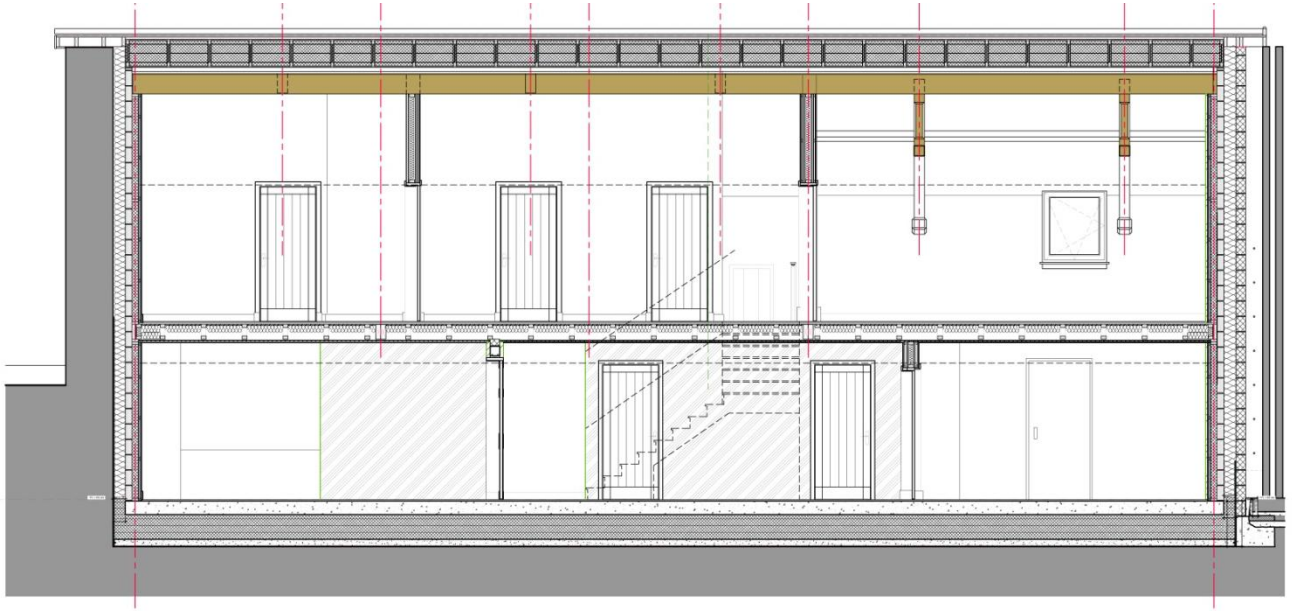
Services: Service runs: In first floor metal Strut Joist system
Paul Novus 300 MVHR
Heating and hot water: Solar PV direct electric water heating and solar thermal water heating. On peak electric radiators and electric underfloor heating.



Section A-A



Section B-B



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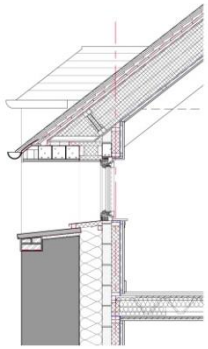

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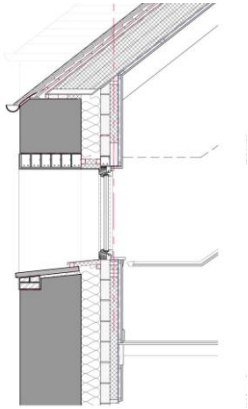

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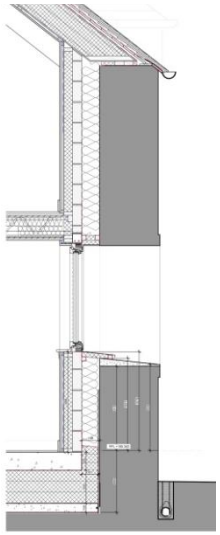
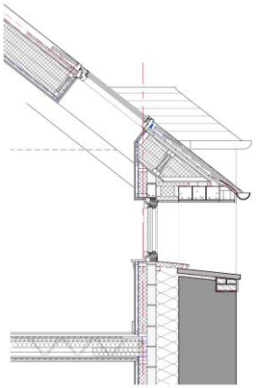
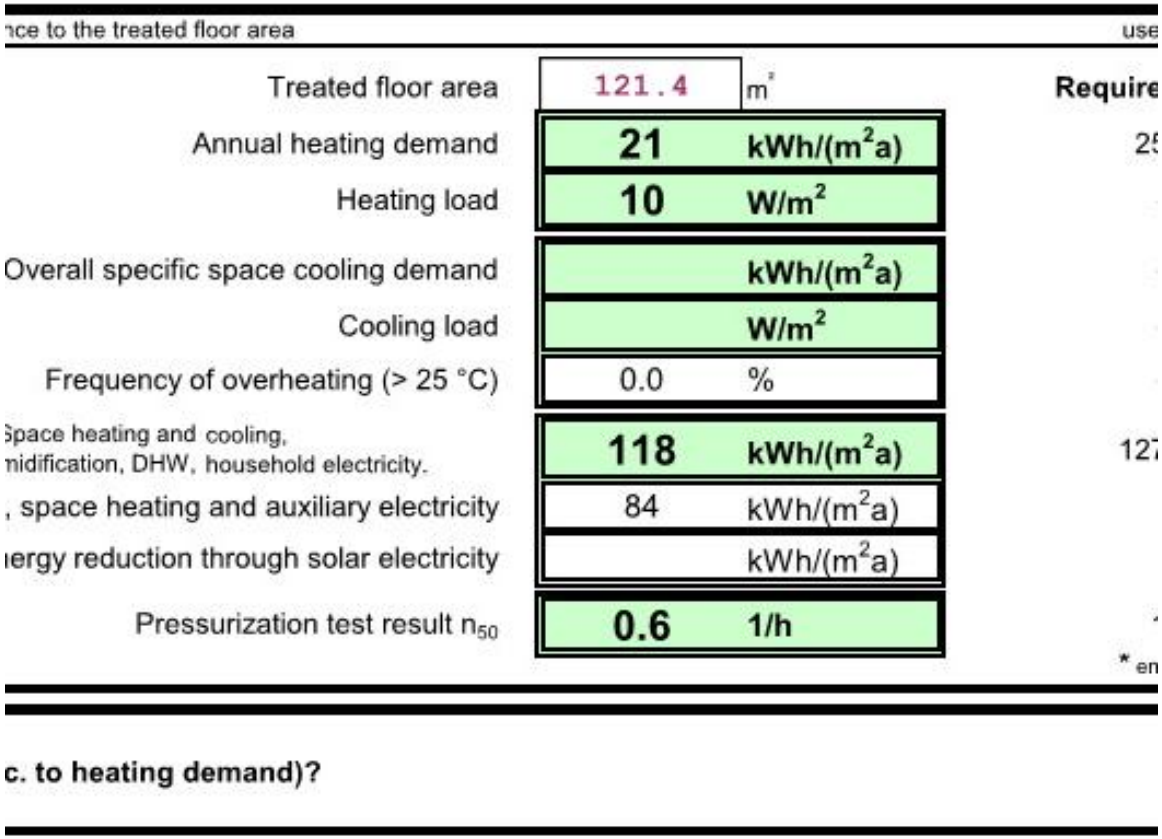


Section F-F



Section G-G



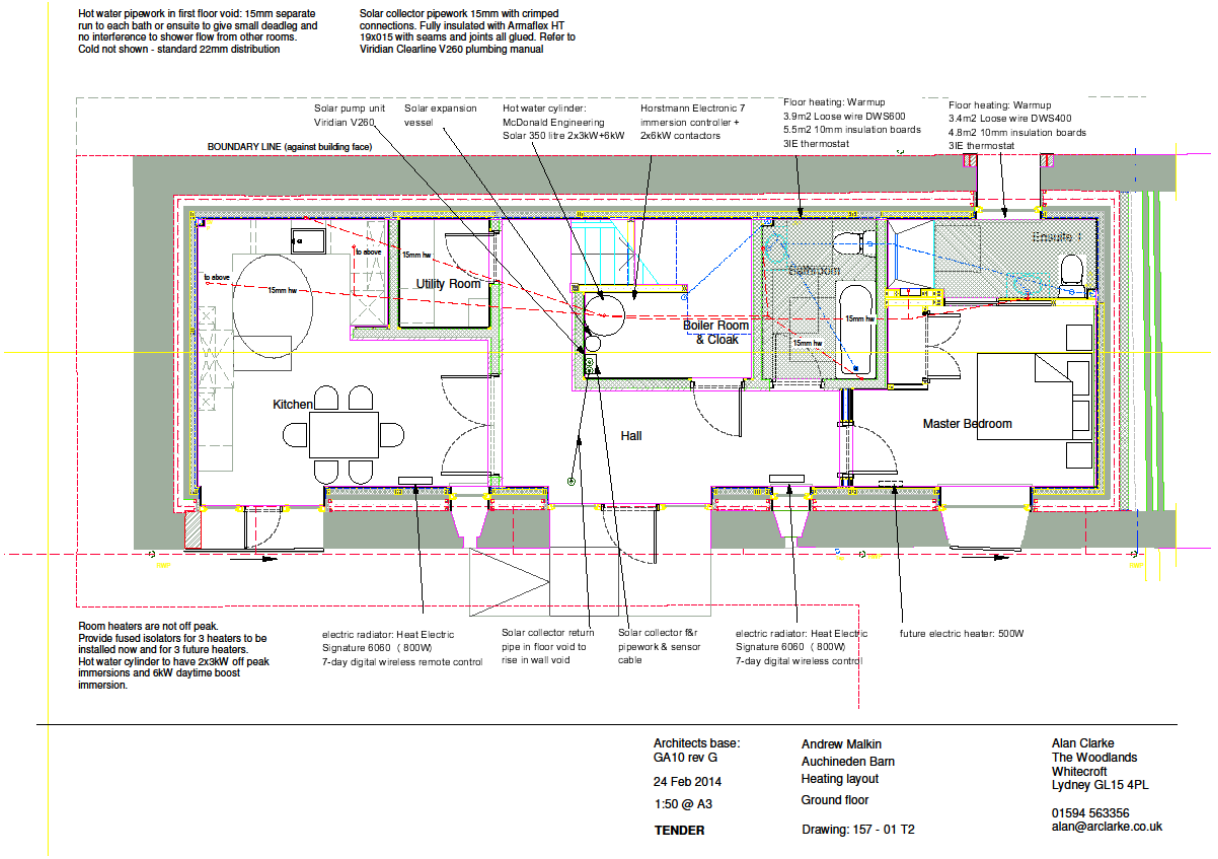
nce to the treated floor area			use
Treated floor area	121.4	m²	Require
Annual heating demand	21	kWh/(m²a)	25
Heating load	10	W/m²	
Overall specific space cooling demand		kWh/(m²a)	
Cooling load		W/m²	
Frequency of overheating (> 25 °C)	0.0	%	
Space heating and cooling, nidification, DHW, household electricity.	118	kWh/(m²a)	127
, space heating and auxiliary electricity	84	kWh/(m²a)	
ıergy reduction through solar electricity		kWh/(m²a)	
Pressurization test result n_{50}	0.6	1/h	

* en

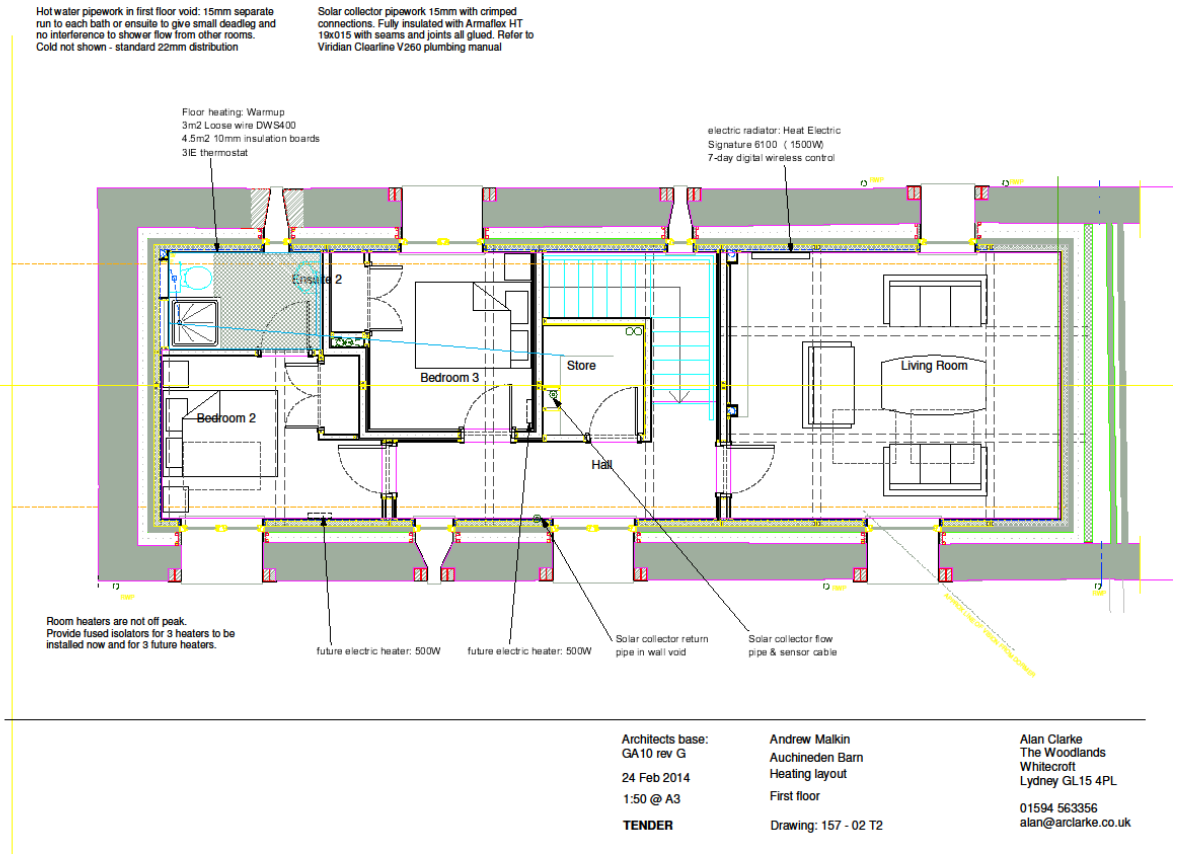
c. to heating demand)?

PHPP Modeling

Graham Drummond of Passivhouse Associates



Alan Clark: Ground Floor Plan



Alan Clark: First Floor Plan

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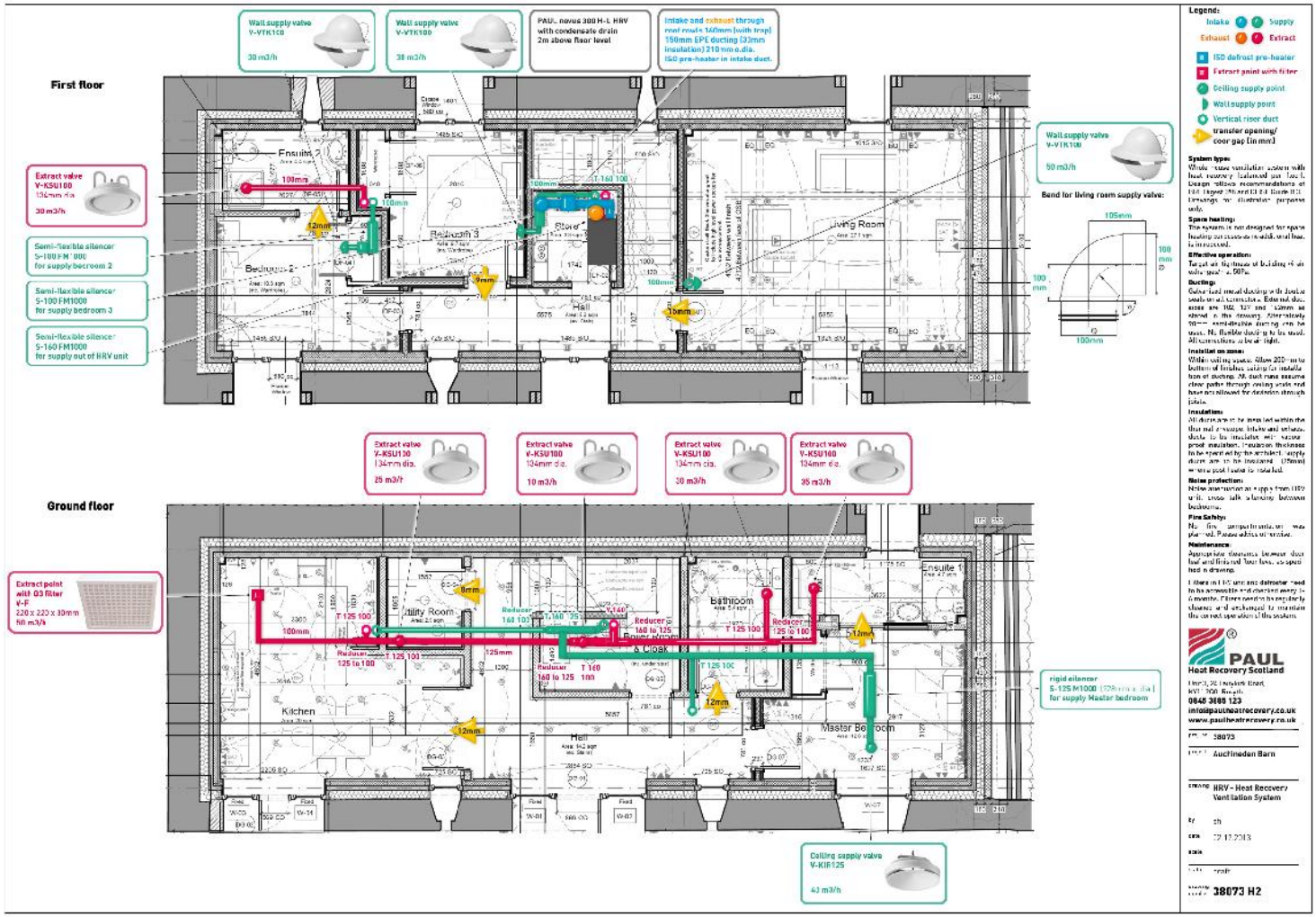
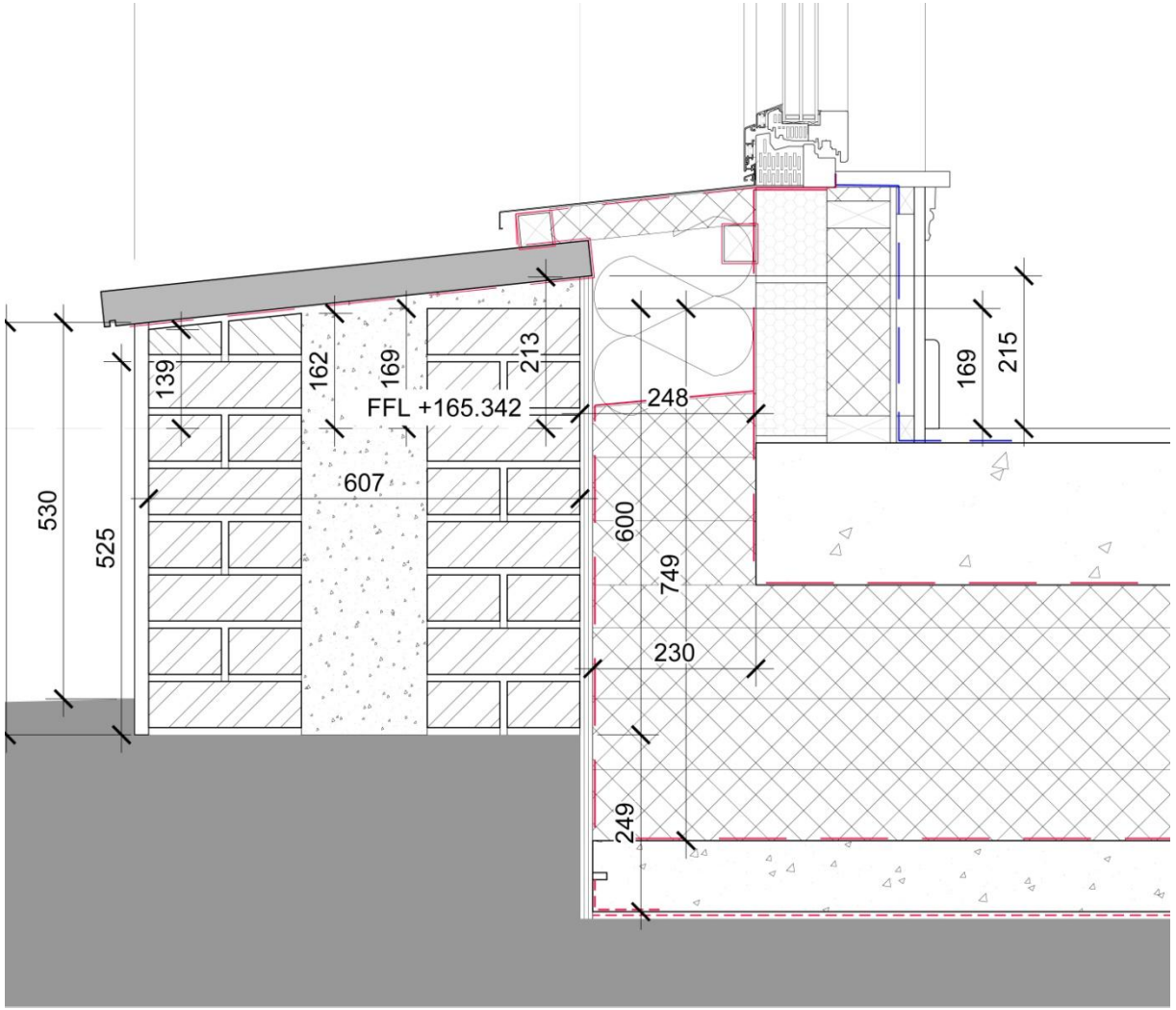
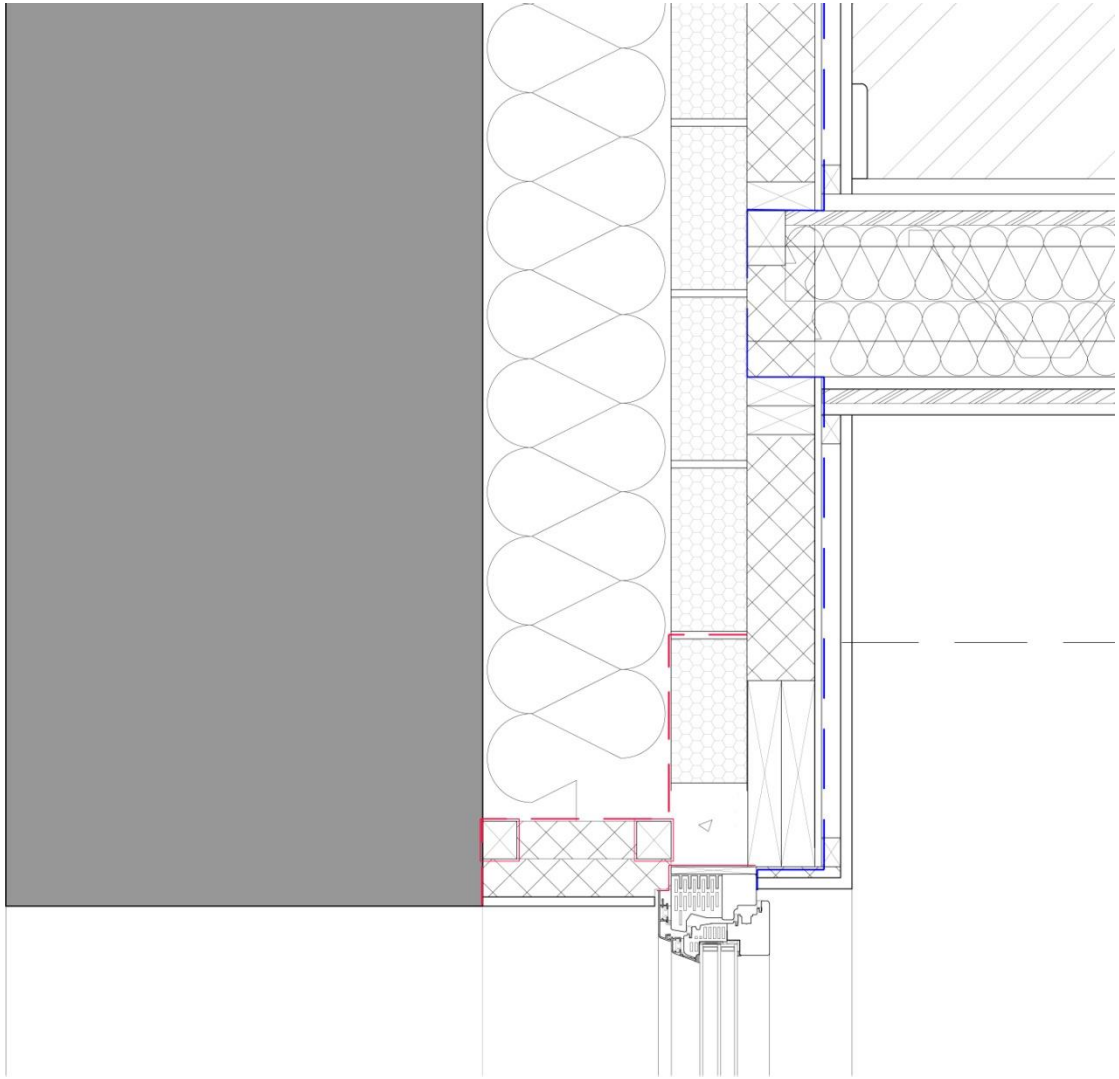


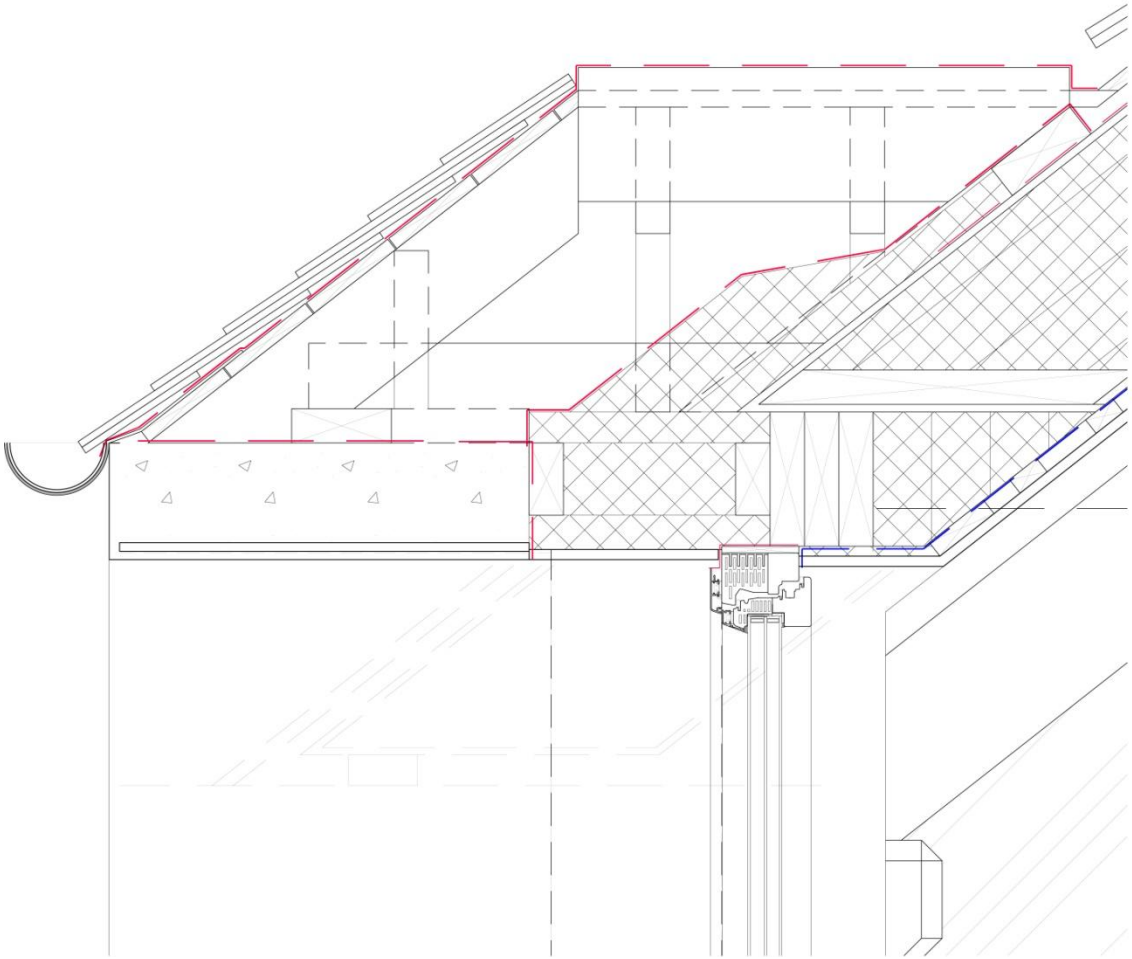


Detail:

Detail under W08 as proposed

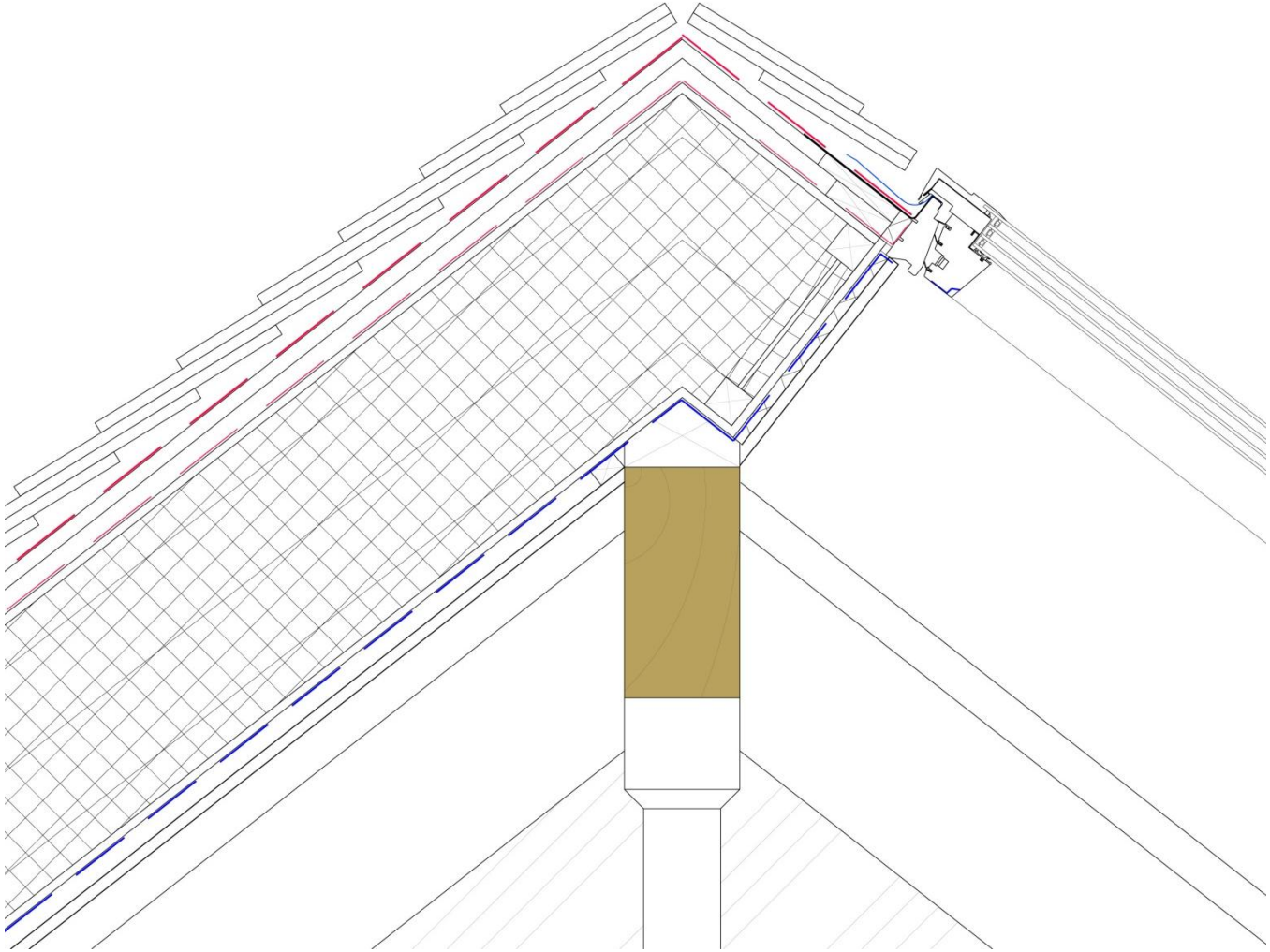


Detail:
W08 head detail as proposed



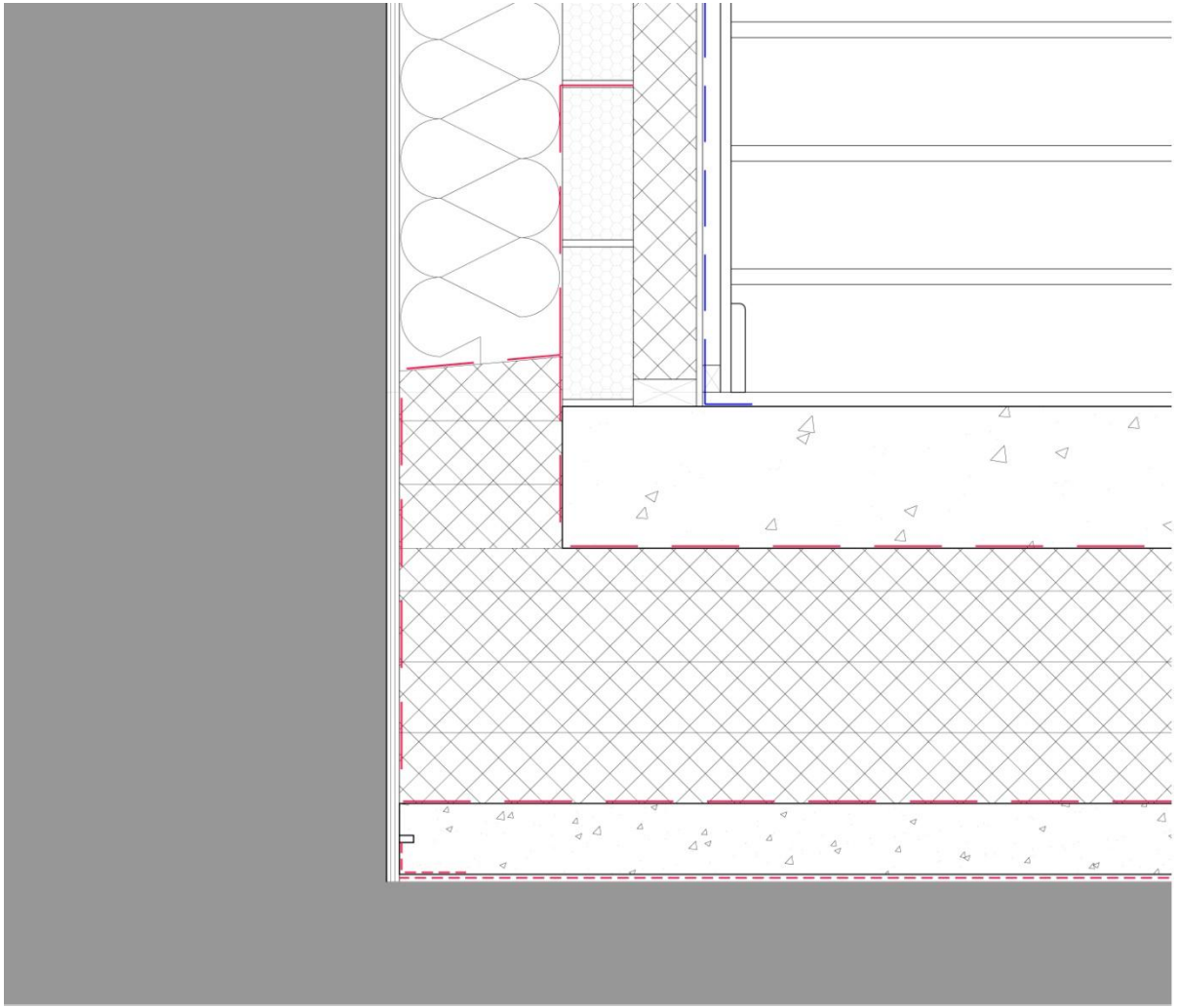
Detail:

W13 head + soffit dormer detail as proposed



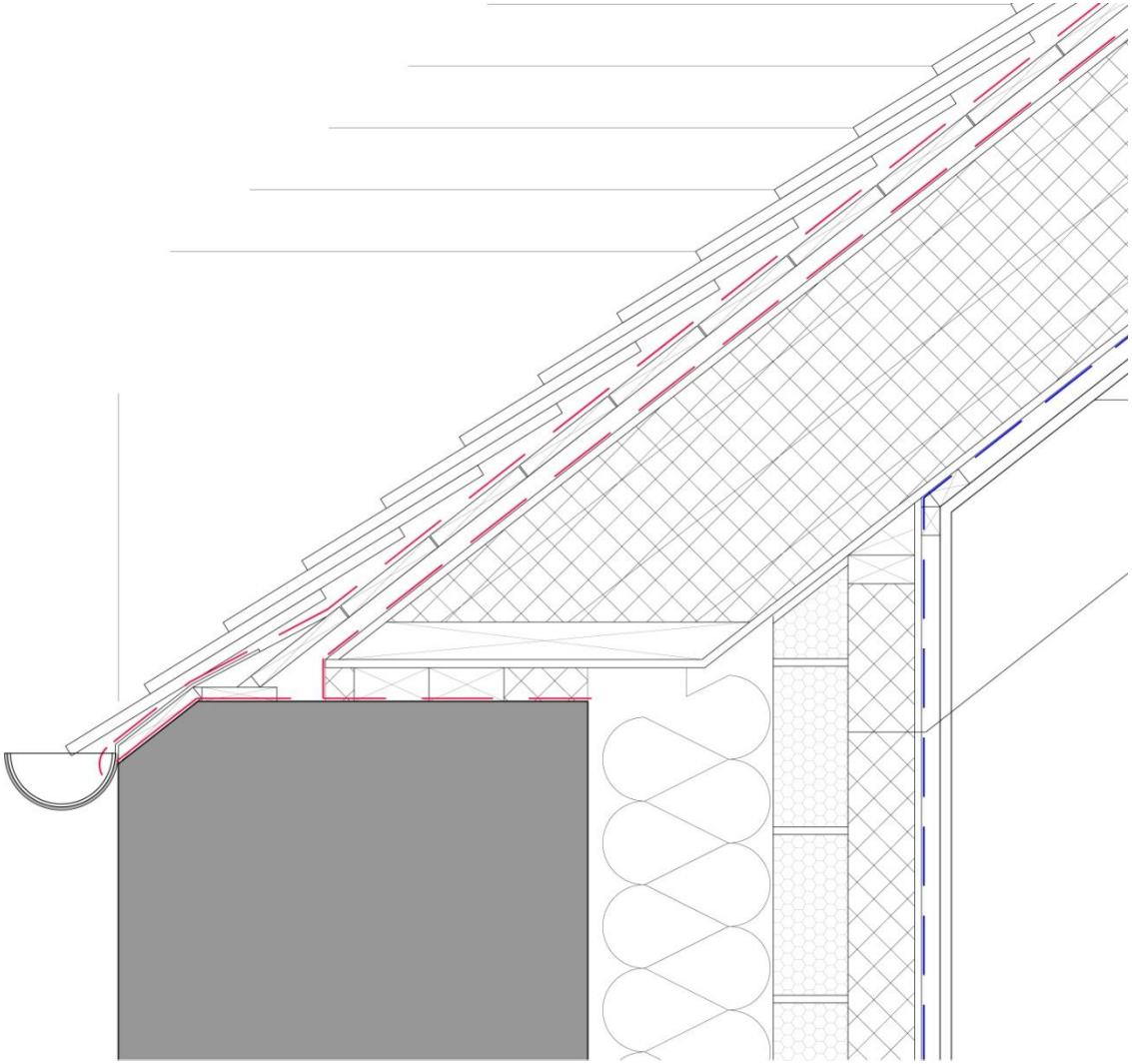
Detail:

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

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.