



PH DESIGNER RENEWAL

The Deerings

Abstract

This document has been written following the Passivhaus Institute guidance to renew the Passivhaus Designer obtained with certifier WARM in July 2015

Ymproving-Passivhaus

Francisco Cerezuela



Aug 2020

Job Name: The Deerings

Passivhaus Database ID: 5282

Revision: -

Written: FC

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1. COVER PAGE



Passivhaus Database ID: 5282



An ultra low energy, contemporary family home, using as many natural materials as possible. Sweet Chestnut cladding, with English Ash interior flooring and panelling.

High ceilings and open plan on the ground floor with a double height space and south facing windows, North facing child bedrooms on the upper floor.

Incorporates automatic solar blinds and skylight ventilation for summer, and oversized solar thermal array with thermal store and water heating airtight log stove for the winter. PV and 3-phase EV charger. Rain water harvesting system for toilets and the garden, and an airtight PH compliant cat flap with RFID.

Roof	0.096 W/(m ² K)
Terrace	0.130 W/(m ² K)
Wall	0.107 W/(m ² K)
Floor	0.092 W/(m ² K)
Garage	0.107 W/(m ² K)
Cat Flap	0.743 W/(m ² K)

MVHR Unit	Paul Novus 450
Heating Demand	12.0 kWh/(m ² a)
Primary Energy (PE)	45.0 kWh/(m ² a)
Airtightness	0.52 ACH

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2. ABSTRACT OF BUILDING PROJECT

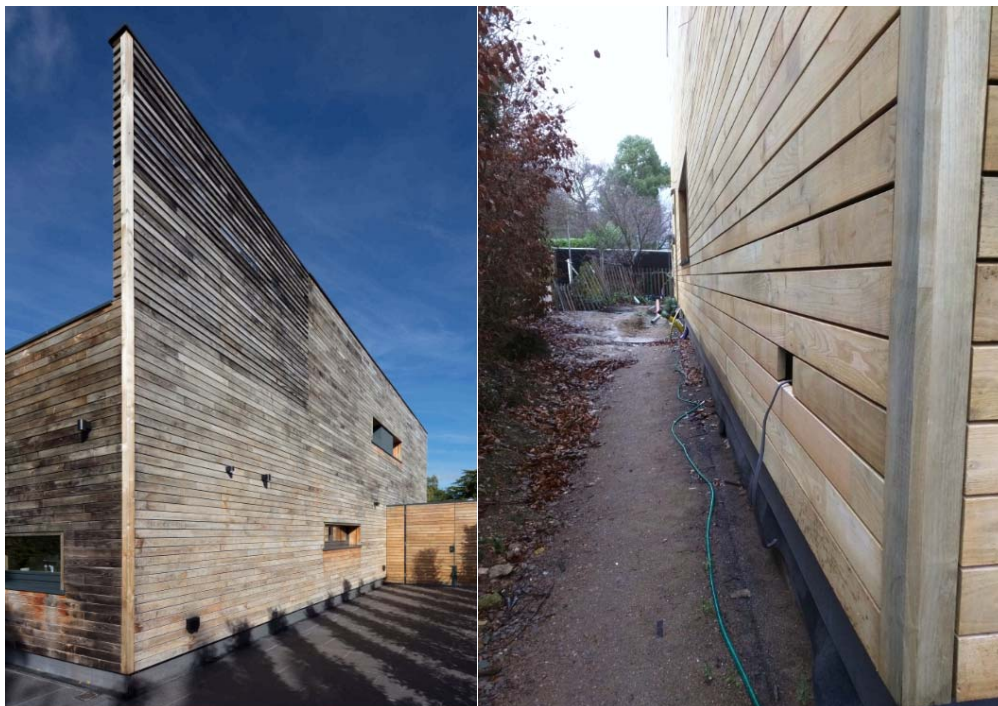
This single detached family unit in the heart of Hertfordshire was designed to home a family of 5 members within two storeys and rear garden.

The client set a 400 m² GIA (342.7 m²) property with the requirements to be as efficient as possible as well as make use of sustainable and local materials where possible.

The result was a timber frame structure with minimised thermal bridging, triple glazed windows and a mechanical ventilation with heat recovery to work in tandem with a gas boiler, a wood burning stove, solar thermal and PV panels.

After the first year of occupancy the client confirmed the total energy bills were zero, as the wood burning stove, the solar thermal and PV panels were enough to meet the demand, not to say the high level of comfort they experienced after being living in an old and leaky home for many years.

3. ELEVATION VIEW OF BUILDING (PHOTO)



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4. EXEMPLARY PHOTO FROM THE INSIDE OF THE BUILDING

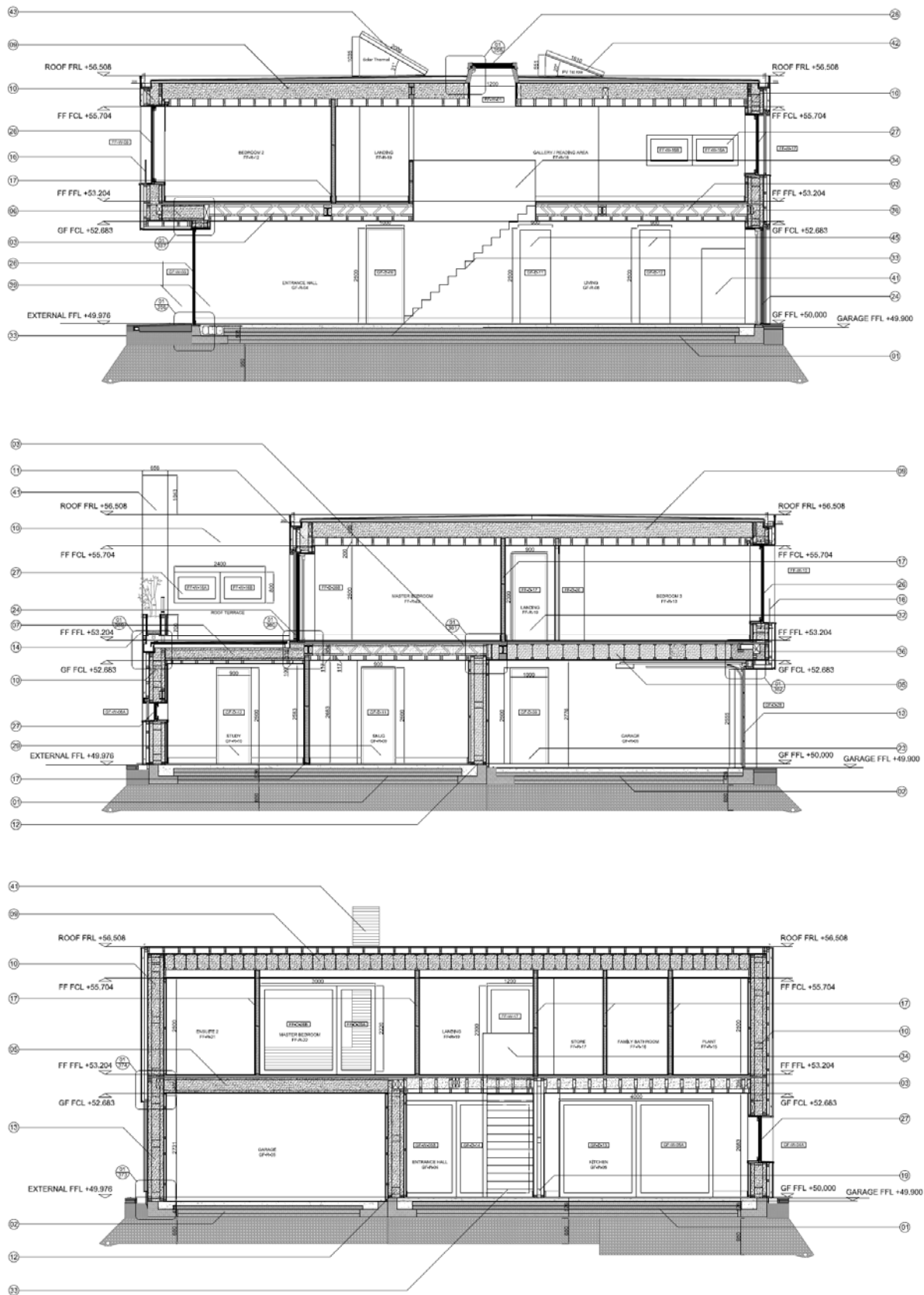


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5. SECTIONAL VIEW OF THE BUILDING



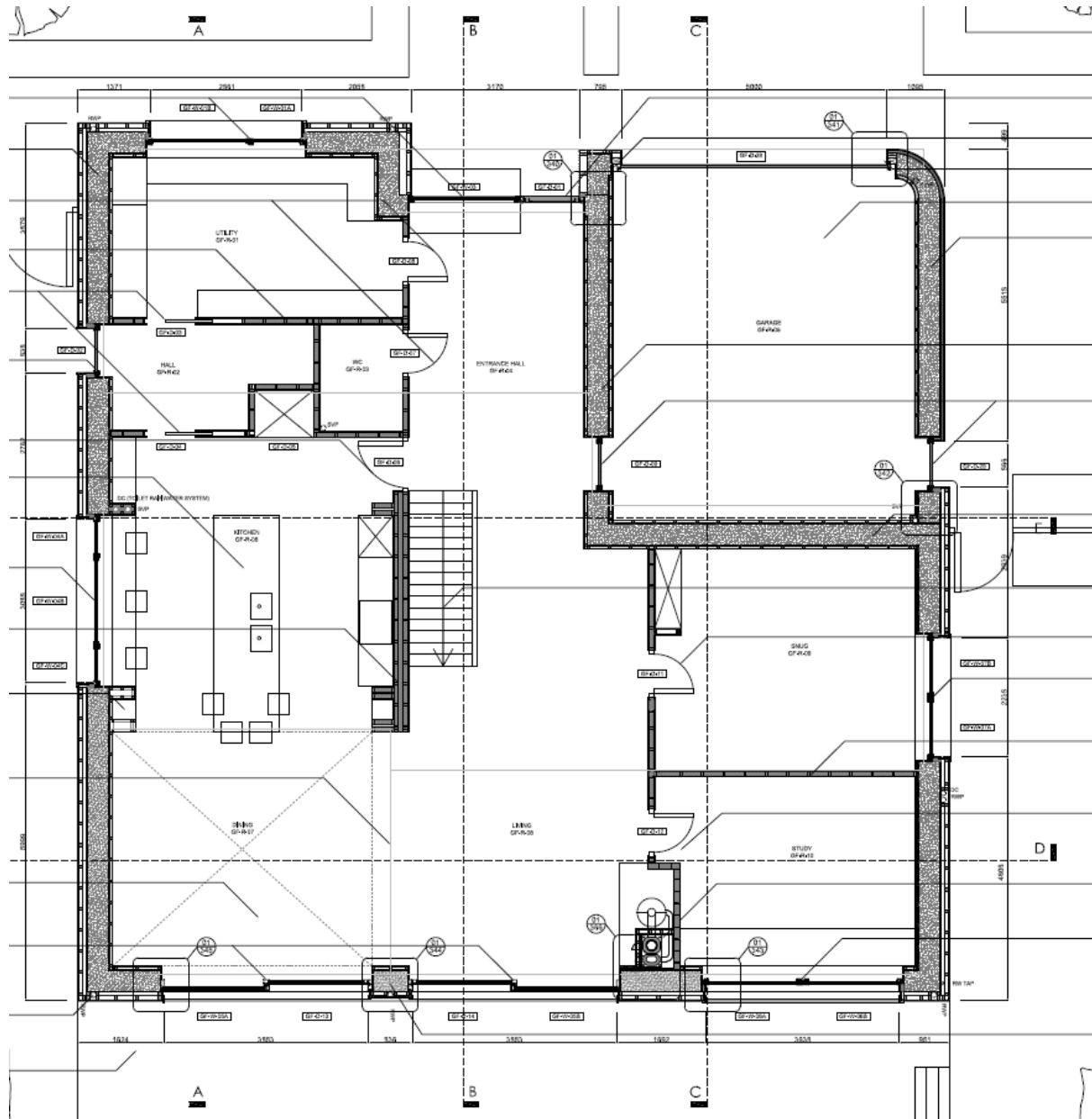
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6. FLOOR PLANS

GROUND FLOOR

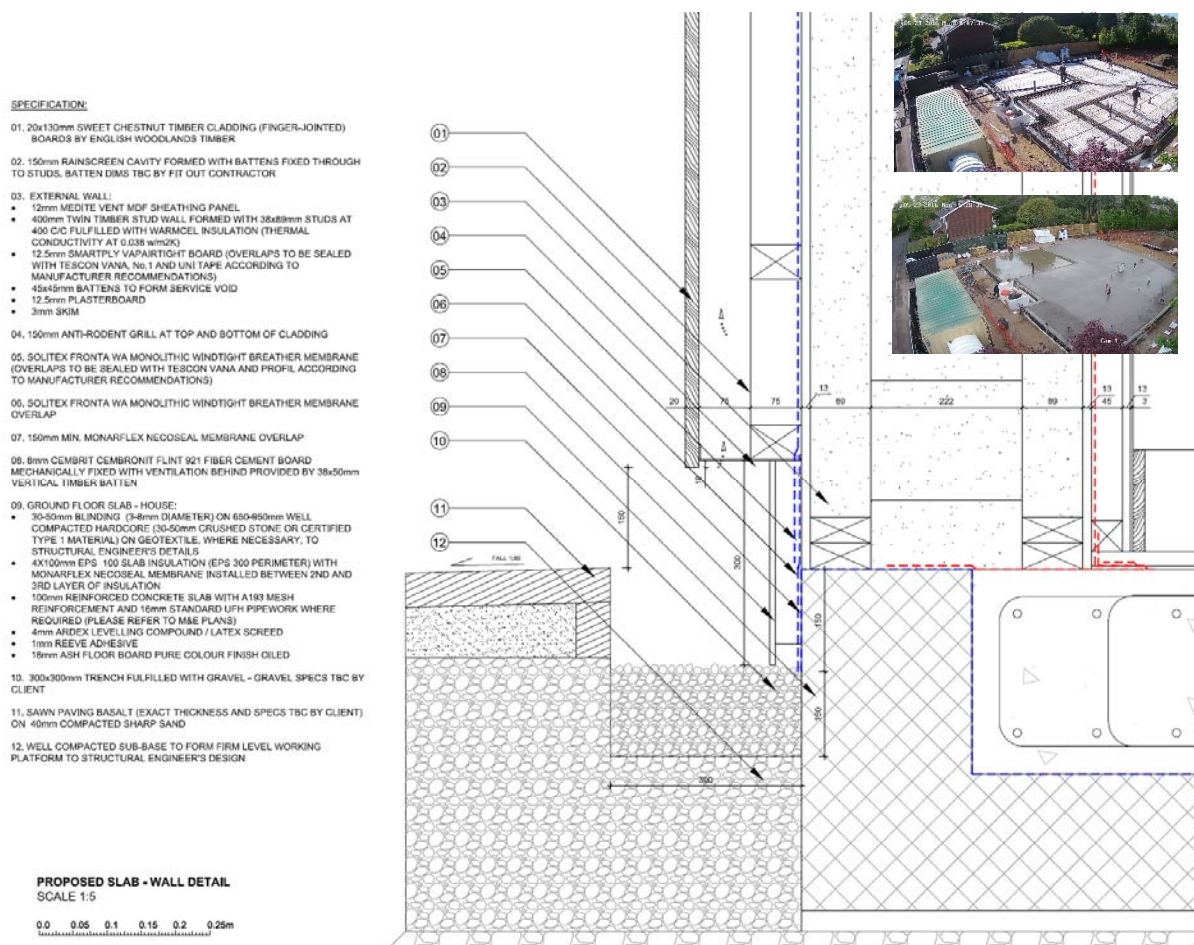


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7. CONSTRUCTION OF FLOOR SLAB



Assembly no. 04ud		Floor				Interior insulation?	
Orientation of building element: 3-Floor		Heat transmission resistance [m ² K/W]		interior R _{si} 0.17			
Adjacent to: 2-Ground				exterior R _{se} 0.00			
Area section 1	λ [W/(mK)]	Area section 2 (optional)	λ [W/(mK)]	Area section 3 (optional)	λ [W/(mK)]	Thickness [mm]	
Timber Floor	0.130					18	
Concrete screed	1.150					4	
RC Concrete	2.100					100	
KORE Floor EPS100 white	0.038					100	
KORE Floor EPS100 white	0.038					100	
KORE Floor EPS100 white	0.038					100	
KORE Floor EPS100 white	0.038					100	
Percentage of sec. 1 100%		Percentage of sec. 2		Percentage of sec. 3		Total 52.2 cm	
U-value supplement W/(m ² K)				U-value: 0.092 W/(m ² K)			

DESCRIPTION

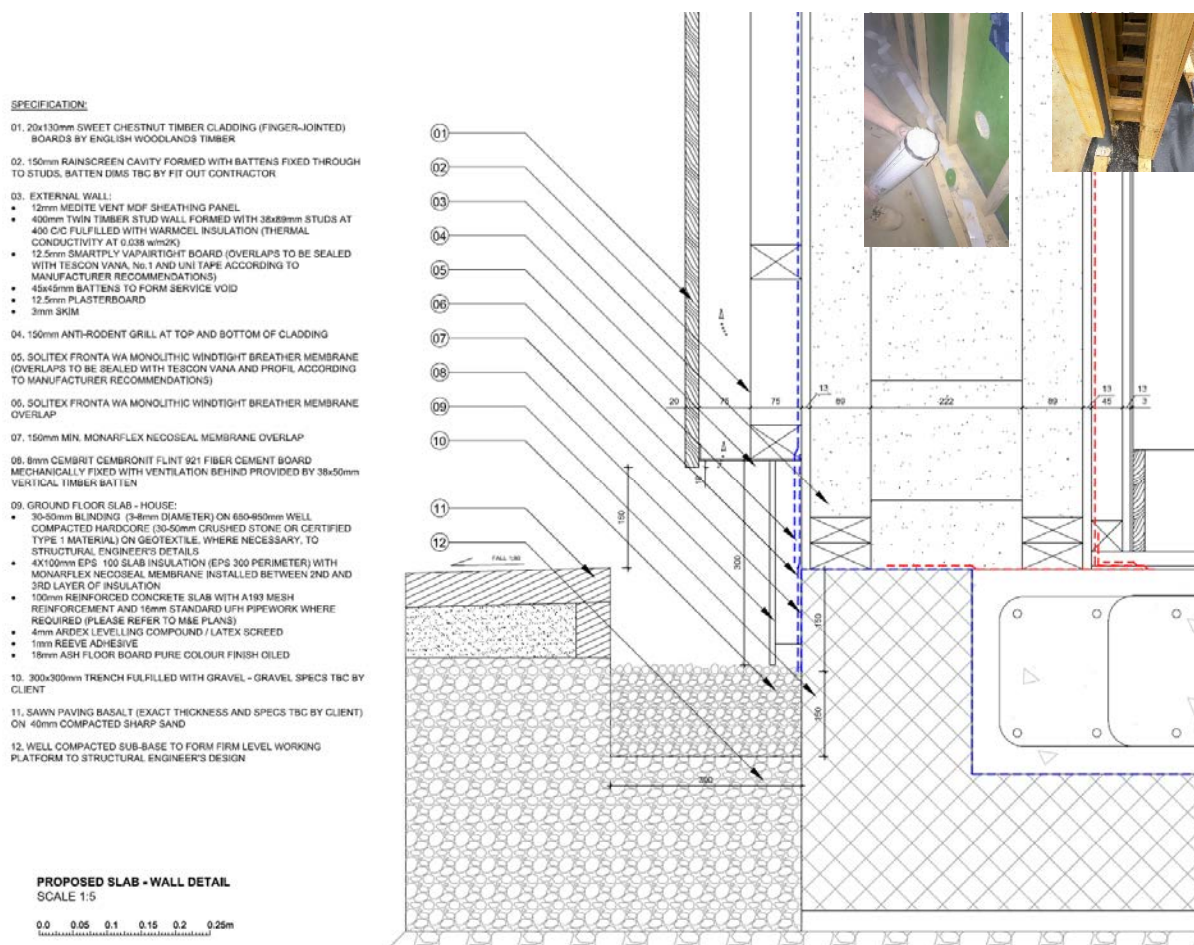
Concrete slab on EPS insulation 400mm, with reduced depth at given point.

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8. CONSTRUCTION OF THE EXTERNAL WALLS



Assembly no.		03ud		Wall		Interior insulation?	
Orientation of building element		2-Wall		Heat transmission resistance [m ² K/W]			
Adjacent to		3-Ventilated		interior R _{si}		0.13	
				exterior R _{se}		0.13	
Area section 1	λ [W/(mK)]	Area section 2 (optional)	λ [W/(mK)]	Area section 3 (optional)	λ [W/(mK)]	Thickness [mm]	
Plasterboard	0.250					13	
Service void	0.280	batten	0.130			45	
SmartPly VapAirtight	0.130					13	
Warmcel Insulation	0.038	timber	0.130	timber	0.130	89	
Warmcel Insulation	0.038			timber	0.130	222	
Warmcel Insulation	0.038	timber	0.130	timber	0.130	89	
Meditate vent MDF sheathing board	0.100					12	
Percentage of sec. 1		Percentage of sec. 2		Percentage of sec. 3		Total	
80%		15.0%		5.0%		48.3 cm	
U-value supplement		W/(m ² K)		U-value:		0.107 W/(m ² K)	

DESCRIPTION

400mm Twin timber stud fully filled with blown-in insulation WARMCELL.

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9. CONSTRUCTION OF THE ROOF

SPECIFICATION

- 01, MBC ROOF:
- 15mm SMARTPLY OSB
 - 400mm I-BEAM TIMBER JOISTS AT 400mm C/C FULLY INSULATED WITH WARMCEL (THERMAL CONDUCTIVITY AT 0.035 W/M2K)
 - PRO CLIMA INTELLO PLUS VAPOUR CONTROL LAYER (OVERLAPS TO BE SEALED WITH TESCON VANA, N5,1 AND UNI TAPE AS PER MANUFACTURER RECOMMENDATIONS)

ALL IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS.

02, AMPATOP PROTECTA PLUS ROOF MEMBRANE

03, 50x50mm VENTILATION TIMBER BATTENS, FLY MESH AND TIMBER FRIMINGS FIXED THROUGH TO JOISTS

04, 15mm PLYWOOD DECK - TBC BY SUB-CONTRACTOR SPECIALIST

05, SARNAFEL G 410-19EL FELT (1.5mm) FULLY BONDED TO PLYWOOD WITH CONTACT ADHESIVE SARNACOL 2170 / 2142S, TOP SURFACE COLOUR TBC BY CLIENT, ALL IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS

06, FOLDED ALUMINIUM COPPING AND FLY MESH BY SUB-CONTRACTOR SPECIALIST, RAL COLOUR TBC BY CLIENT

07, 20x50mm TIMBER BATTENS TO FORM CEILING VOID

08, EXTERNAL WALL:

- 12mm MEGATE VENT MDF SHEATHING PANEL
- 400mm TWIN TIMBER STUD WALL FORMED WITH 38x59mm STUDS AT 400 C/C FILLED WITH WARMCEL INSULATION (THERMAL CONDUCTIVITY AT 0.035 W/M2K)
- 12.5mm SMARTPLY VAPOUR TIGHT BOARD (OVERLAPS TO BE SEALED WITH TESCON VANA, N5,1 AND UNI TAPE ACCORDING TO MANUFACTURER RECOMMENDATIONS)
- 45x45mm BATTENS TO FORM SERVICE VOID
- 12.5mm PLASTERBOARD
- 3mm SKIM

09, AMPATOP PROTECTA PLUS ROOF MEMBRANE OVERLAP

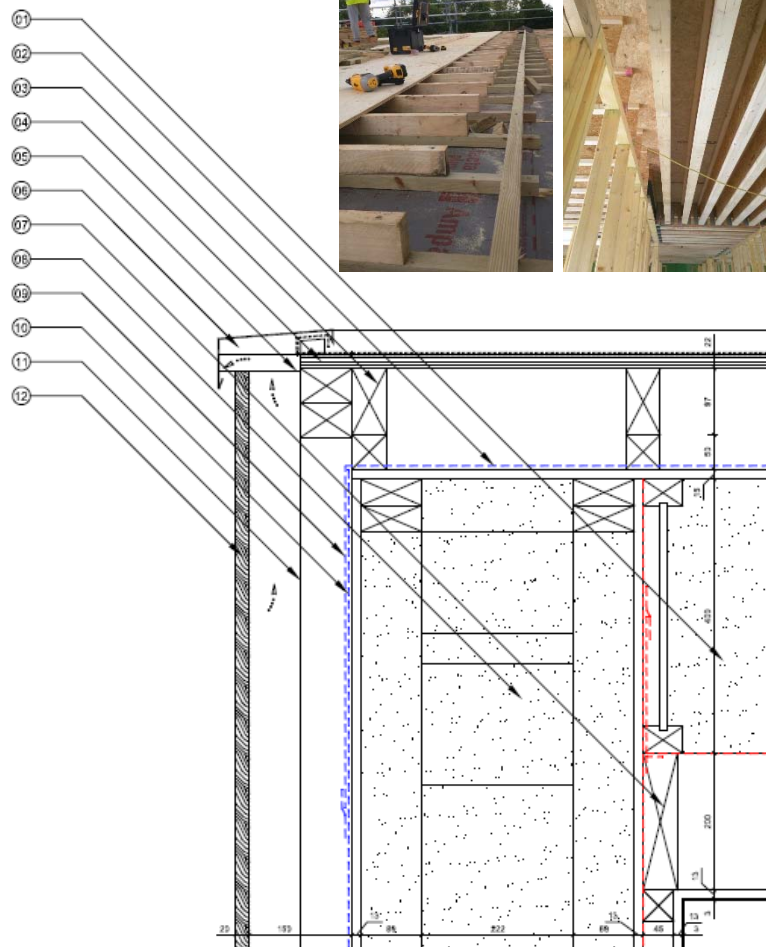
10, SOTEX FRONTO VIA MONOLITHIC WINDTIGHT BREATHER MEMBRANE (OVERLAPS TO BE SEALED WITH TESCON VANA AND PROFIL ACCORDING TO MANUFACTURER RECOMMENDATIONS)

11, 160mm RAINSCREEN CAVITY FORMED WITH BATTENS FIXED THROUGH TO STUDS, BATTEN DIMS TBC BY FIT OUT CONTRACTOR

12, 20x130mm SWEET CHESTNUT TIMBER CLADDING (FINGER JOINTED) BOARDS BY ENGLISH WOODLANDS TIMBER / VINCENT TIMBER - TBC BY CLIENT

PROPOSED EAVES DETAIL SCALE 1:5

0.0 0.05 0.1 0.15 0.2 0.25m



Assembly no.		Building assembly description		Interior insulation?		
01ud		Roof				
		Heat transmission resistance [m ² K/W]				
Orientation of building element		1-Roof	interior R _{si}	0.10		
Adjacent to		3-Ventilated	exterior R _{se}	0.10		
Area section 1	λ [W/(mK)]	Area section 2 (optional)	λ [W/(mK)]	Area section 3 (optional)	λ [W/(mK)]	Thickness [mm]
Plasterboard	0.250					13
Service void	0.280	Batten	0.130			200
Warmcel Insulation	0.038	Flange	0.130	Web	0.180	45
Warmcel Insulation	0.038			Web	0.180	310
Warmcel Insulation	0.038	Flange	0.130	Web	0.180	45
SmartPly OSB	0.130					15
Percentage of sec. 1		Percentage of sec. 2		Percentage of sec. 3		Total
80%		17.3%		2.7%		62.8 cm
U-value supplement		U-value:		0.096 W/(m ² K)		

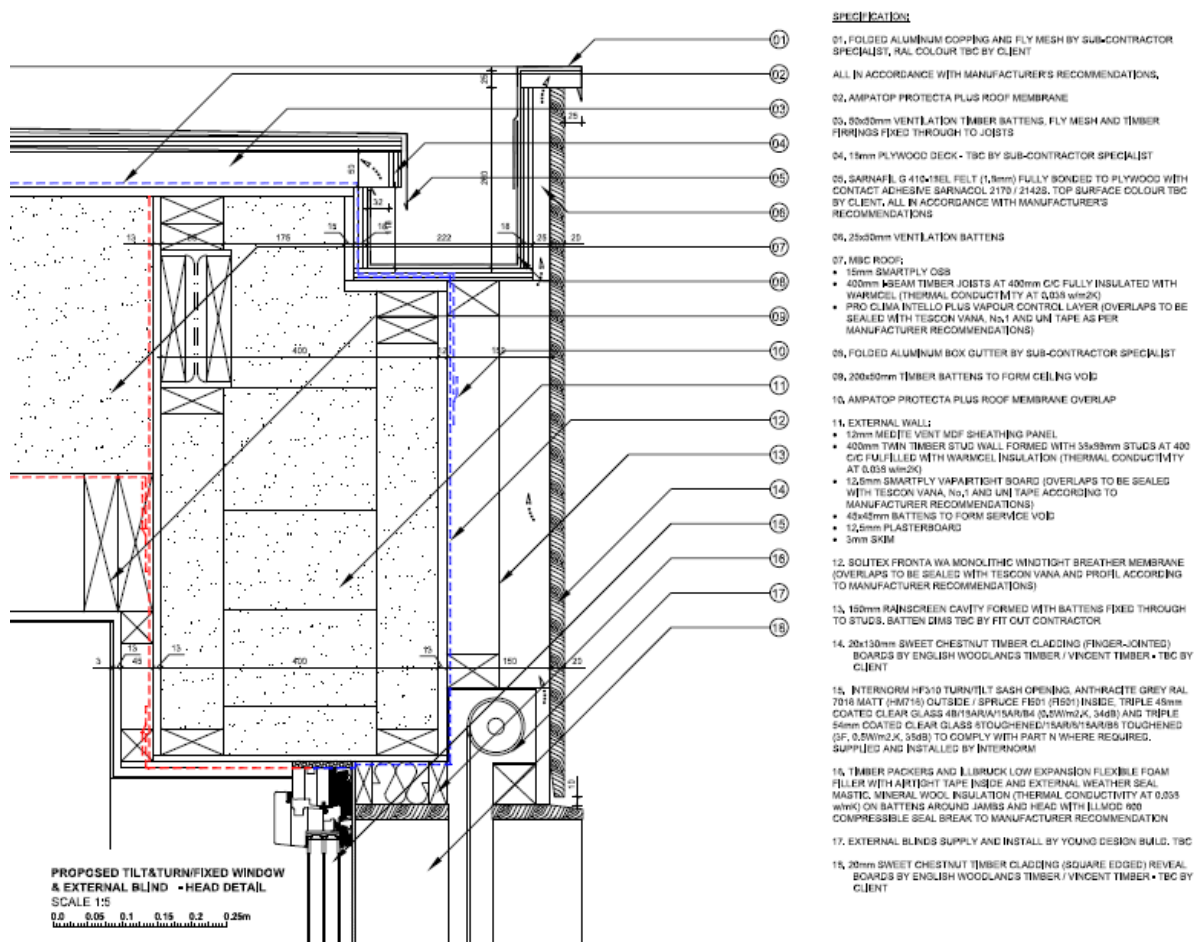
DESCRIPTION

400mm I-beams fully filled with blow-in insulation WARMCELL.

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Window frame																	Window frame			
		U-Value				Frame width				Glazing edge thermal bridge				Installation thermal bridge				Curtain wall facades:		
ID	Description	left	right	bottom	above	left	right	bottom	above	Ψ _{glazing edge left}	Ψ _{glazing edge right}	Ψ _{glazing edge bottom}	Ψ _{glazing edge top}	Ψ _{installation left}	Ψ _{installation right}	Ψ _{installation bottom}	Ψ _{installation top}	X _{gc} value Glass carrier		
		W/(mK)	W/(mK)	W/(mK)	W/(mK)	m	m	m	m	W/(mK)	W/(mK)	W/(mK)	W/(mK)	W/(mK)	W/(mK)	W/(mK)	W/(mK)			
01ud	HF310 Window Fixed	0.72	0.72	0.72	0.72	0.076	0.076	0.106	0.076	0.036	0.036	0.036	0.036	0.030	0.030	0.030	0.040	0.040		
02ud	HF310 Window Opening	0.86	0.86	0.86	0.86	0.114	0.114	0.144	0.114	0.033	0.033	0.033	0.033	0.030	0.030	0.030	0.040	0.040		
03ud	AT410 Door	0.78	0.78	0.78	0.78	0.100	0.100	0.100	0.100	0.000	0.000	0.000	0.000	0.040	0.040	0.100	0.040			
04ud	HF310 Door	0.86	0.86	0.86	0.86	0.114	0.114	0.144	0.114	0.033	0.033	0.033	0.033	0.030	0.030	0.030	0.100	0.040		
05ud	HS330 Door	1.05	1.05	1.43	1.72	0.171	0.171	0.155	0.179	0.037	0.037	0.037	0.034	0.030	0.030	0.100	0.040			
06ud	HS330 Window	1.35	1.35	1.85	1.35	0.058	0.058	0.058	0.059	0.042	0.042	0.041	0.043	0.030	0.030	0.100	0.040			
07ud	Rooflight Lamulux FE energy save	0.61	0.61	0.61	0.61	0.116	0.116	0.116	0.116	0.029	0.029	0.029	0.029	0.087	0.087	0.087	0.087	0.080		

11. AIRTIGHTNESS

 FanTestic	version: 5.9.22	licensed to: Melin Energy Consultants
Test date: 2017-03-10	By: Rhys Davies	
Building address: The Deerings Harpenden, Hertfordshire England AL5 2PF		

Building and Test Information	
Test file name:	51 The Deerings
Customer:	Trunk Low Energy Building Ltd
Building volume:	886.5
Floor Area:	173.1
Envelope Area:	650

Results	
Air flow at 50 Pa, V_{50} [m ³ /h]	501.5
Air changes, n_{50}	0.57
Equivalent leakage area at 50 Pa [cm ²]	249.0
Permeability at 50 Pa [m ³ /h/m ²]	0.771

DESCRIPTION

The airtight membrane was defined by the 12.5mm smartply vaportight board (green in photos) internally fixed to the inner side of the structure and all junctions sealed with Tescon vana tape. The floor was considered airtight already as it was done in concrete. All junctions were sealed with Tescon tape as well.

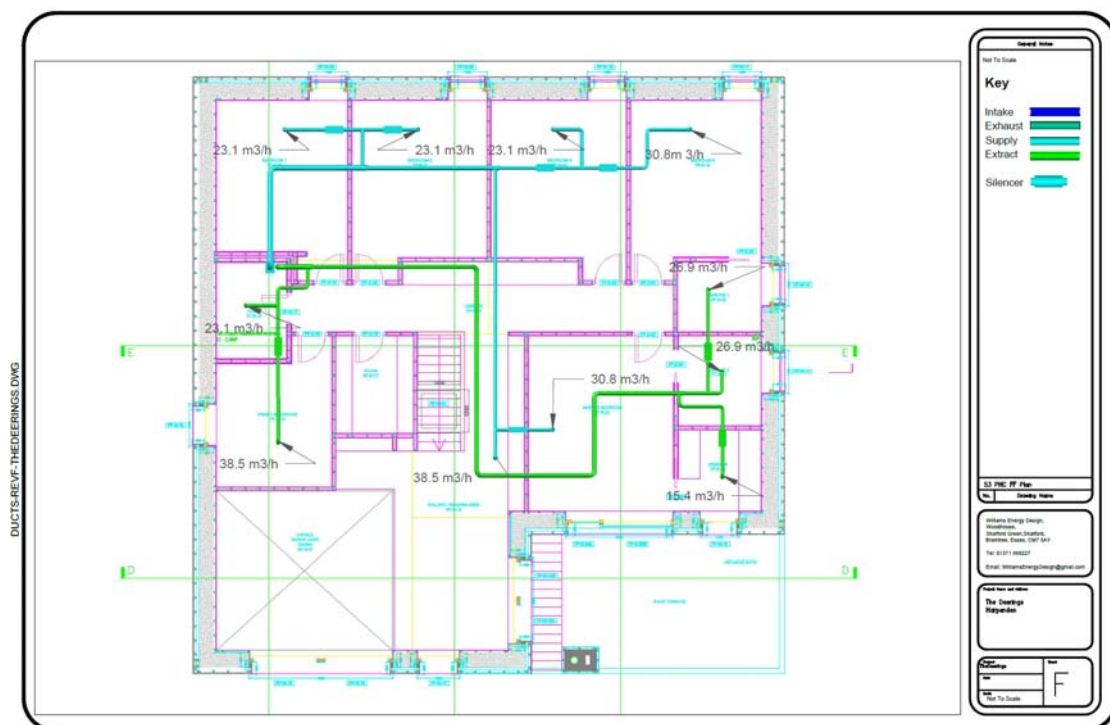
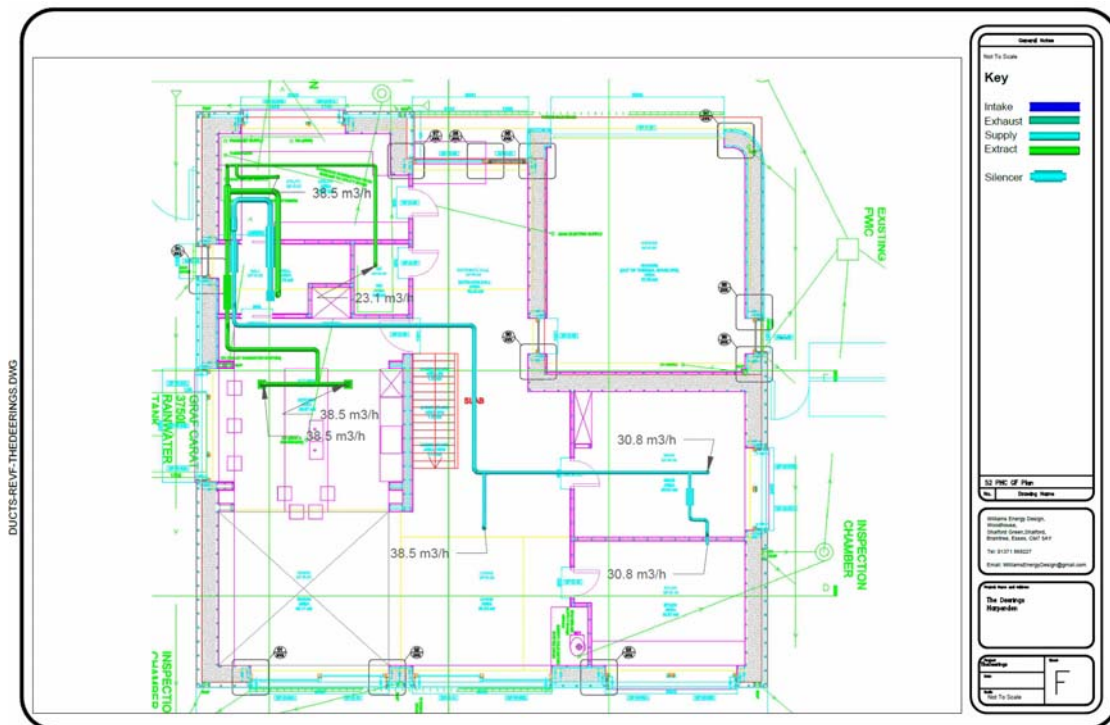


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12. VENTILATION LAYOUT



DESCRIPTION

Rigid ducting system with attenuators and risers within the intermediate floor, false ceiling at First floor and internal partition walls.

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13. VENTILATION UNIT



DESCRIPTION

Paul Novus 450 – serial No. 19016 installed in utility room cupboard at Ground floor.

Installation and commissioning by Roderick Williams

Effective Heat Recover: 87.7%

Electrical Efficiency (Wh/m³): 0.29

14. HEAT SUPPLY


The heat system was form by a gas boiler, wood burning stove, solar thermal panels and energy store 500 litres.



DESCRIPTION

- Worcester Greenstar 24Ri ERP boiler
- Rokossa Wasserfuhrender Kaminofen IG2 wood burning stove
- Small Solar company – Solar thermal panels
- Energystore Biosolar 500 litre

15. PHPP VERIFICATION PAGE

Passive House Verification									
				Building: No 51 Street: The Deerings Postcode/City: AL5 2PF Harpenden Province/Country: Hertfordshire GB-United Kingdom/ Britain Building type: Detached House Climate data set: GB0002a-Silsøe Climate zone: 3: Cool-temperate Altitude of location: 122 m					
				Home owner / Client: Daniel Luhde-Thompson & Sarah MacLaren Street: No 51 The Deerings Postcode/City: AL5 2PF Harpenden Province/Country: Hertfordshire GB-United Kingdom/ Britain					
				Mechanical system: Williams Energy Design Street: Woodhouse Postcode/City: CM75AY Braintree Province/Country: Essex GB-United Kingdom/ Britain					
				Certification: WARM: Low Energy Building Practice Street: 3 Admirals Hard Postcode/City: PL1 3RJ PLYMOUTH Province/Country: DEVON GB-United Kingdom/ Britain					
Architecture: Gresford Architects Ltd. Street: Unit B13, Bradbury Street Postcode/City: N16 8JN London Province/Country: London GB-United Kingdom/ Britain Energy consultancy: Francisco Cerezuela - Gresford Architects Ltd. Street: Unit B13, Bradbury Street Postcode/City: N16 8JN London Province/Country: London GB-United Kingdom/ Britain				Year of construction: 2017 No. of dwelling units: 1 No. of occupants: 3.2					
				Interior temperature winter [°C]: 20.0 Internal heat gains (IHG) heating case [W/m²]: 2.2 Specific capacity [Wh/K per m² TFA]: 72					
				Interior temp. summer [°C]: 25.0 IHG cooling case [W/m²]: 2.2 Mechanical cooling:					
Specific building characteristics with reference to the treated floor area									
		Treated floor area m²	342.7		Criteria		Alternative criteria	Fulfilled? ²	
Space heating	Heating demand kWh/(m²a)	12.0	≤	15	-			yes	
	Heating load W/m²	9	≤	-	10				
	Frequency of overheating (> 25 °C) %	2	≤	10				yes	
	Frequency excessively high humidity (> 12 g/kg) %	0	≤	20				yes	
Airtightness	Pressurization test result n ₅₀ 1/h	0.5	≤	0.6				yes	
Non-renewable Primary Energy (PE)	PE demand kWh/(m²a)	45	≤	120				yes	
Primary Energy Renewable (PER)	PER demand kWh/(m²a)	37	≤	-	-			-	
	Generation of renewable energy kWh/(m²a)	25	≥	-	-			-	
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.								Passive House Classic? yes	
Task:		First name:		Surname:		Signature:			
2-Certifier		Micheal		Roe					
Certificate ID		Issued on:		City:					
15921_WARM_PH_20170523_FW		01/04/17		Plymouth					

16. CONSTRUCTION COST

Client prefers not to disclose it

17. YEAR OF CONSTRUCTION

2017

18. DESIGN AND ARCHITECTURE

Gresford Architects were appointed to develop the construction stage design and site supervision during the construction of the project.

The architectural team was formed by Tom Gresford, Managing Director, Sarrah El-Bushra, Lead architect and I, Technical architect, and Passivhaus Designer.

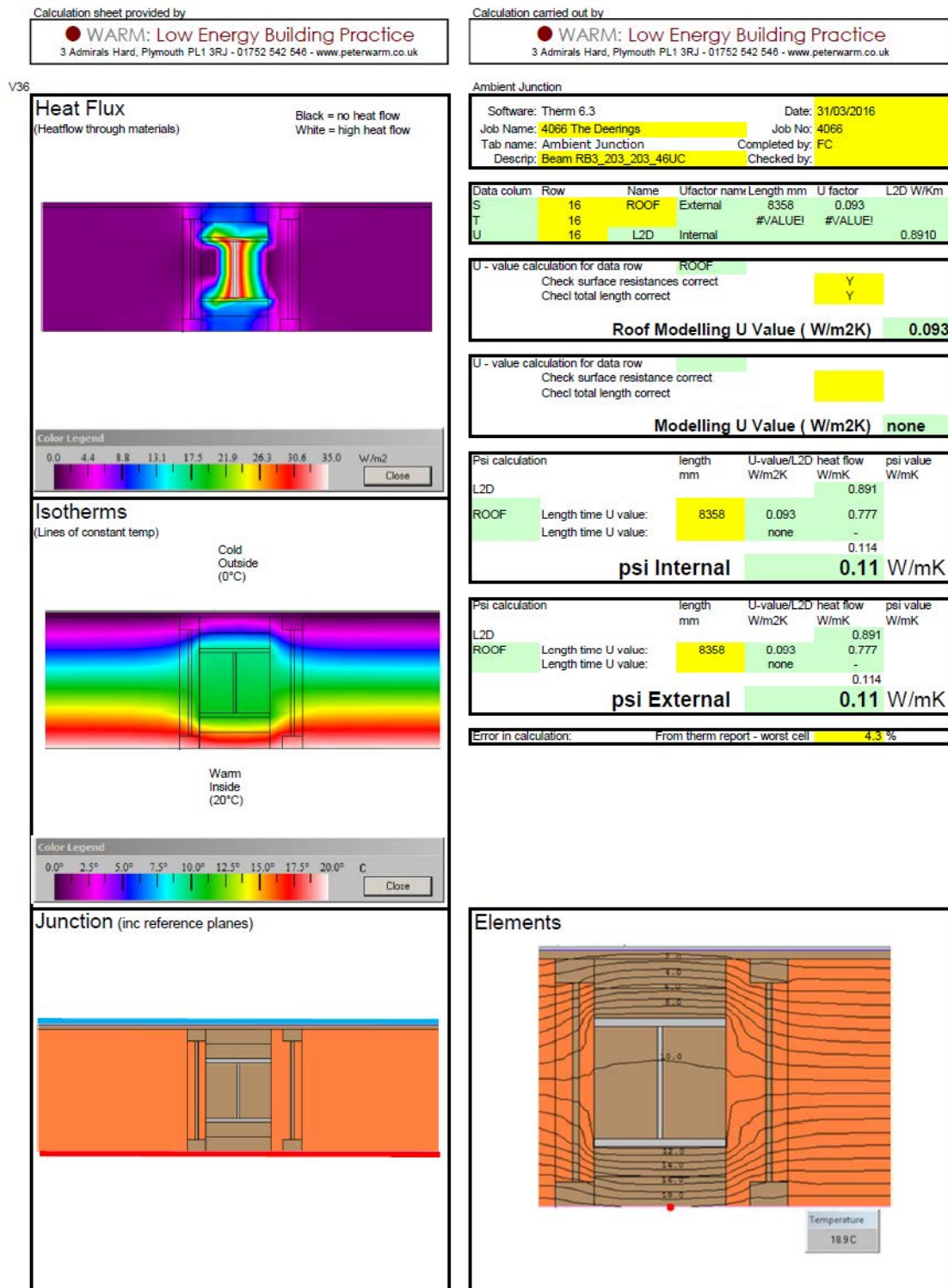
19. BUILDING SERVICES

Green Building Store provided the design and materials for the ventilation system.

The client himself was in charge of designing and getting all materials to site related to the heating system as described earlier.

20. BUILDING PHYSICS

WARM and I worked together in the building physics of the project, agreeing on the final thermal bridges reflected in the PHPP, such the chimney operation, SVPs, the raft insulation downstand or the structural steel required. Below there is an example of TB calc I had to provide.





23. PUBLICATIONS

The Project has been covered in the Passivhaus Plus magazine, AJ Journal and several magazines specialised in housing and interior design.

<https://passivehouseplus.ie/magazine/new-build/wood-works-sleek-but-large-herts-passive-house-goes-heavy-on-timber?highlight=WyJkZWVyaW5ncyJd>

<https://passivhaustrust.org.uk/news/detail/?nid=746#.WpbHf2acYUH>

It has won the RIBA East Award 2018.

<https://www.architecture.com/awards-and-competitions-landing-page/awards/riba-regional-awards/riba-east-award-winners/2018/the-deerings>

It has been shortlisted in several awards in 2018 and 2019.

<https://www.architectsjournal.co.uk/news/riba-reveals-east-region-awards-shortlist/10029704.article>

<http://www.structuraltimberawards.co.uk/winners-and-finalists/2018-finalists>

<https://www.frameawards.com/longlist>

<https://www.guarnieri.co.uk/news/2018/8/31/shortlisted-for-homebuilding-renovating-awards-2018>