UK PASSIVHAUS AWARDS 2015

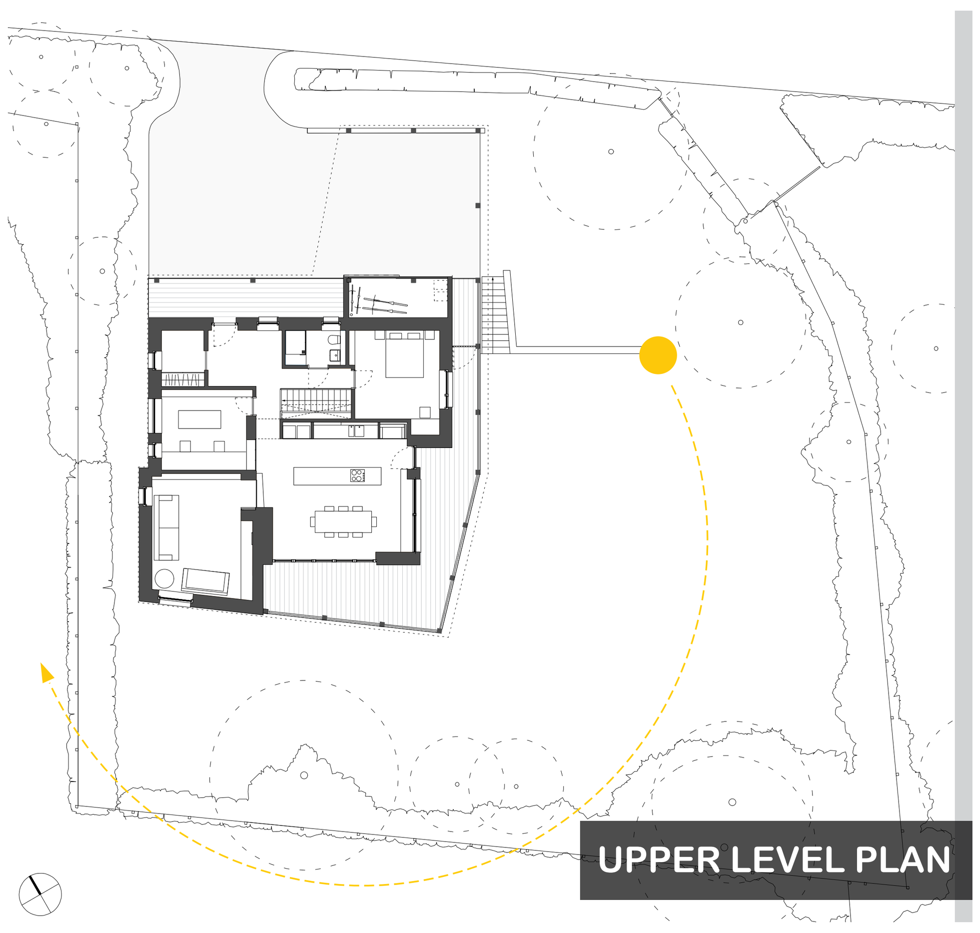
DUNDON PASSIVHAUS

PREWETT BIZLEY ARCHITECTS

Passivhaus Trust Awards 2015

SOUTH-EAST ELEVATION

Set at the foot of a wooded hill, the Dundon Passivhaus overlooks the expansive landscape of the Somerset levels. The house is intended to sit unobtrusively in the landscape, emerging from the hillside but rooted in its context. A particular aim of the project was to see how far we could we push the possibilities of a certified Passivhaus. The thermal envelope is defined by thick, timber-framed walls clad with green oak boards. On three sides the shallow pitched roof extends beyond the footprint to create sheltered outdoor spaces that catch the sun at different times of day. An out-rigger structure of green oak posts frames views through the covered spaces, binding the building into the landscape. The roof overhangs work in harmony with the energy strategy by providing summer shading to the large areas of glazing.



UPPER LEVEL PLAN

KITCHEN / DINING ROOM AND TERRACE

SOUTH-EAST ELEVATION

KITCHEN/DINING ROOM

Project Overview

Name: Dundon Passivhaus
Location: Somerset, UK
Building Type: Single family house
Construction type: Softwood timber frame, green oak outrigger structure and cladding, concrete slab and retaining wall, steel roof.
Completed in: March 2015
Occupancy status: Occupied since November 2012
Construction Cost: £1695/sqm GEA ; £2377/sqm TFA

Sustainability Features

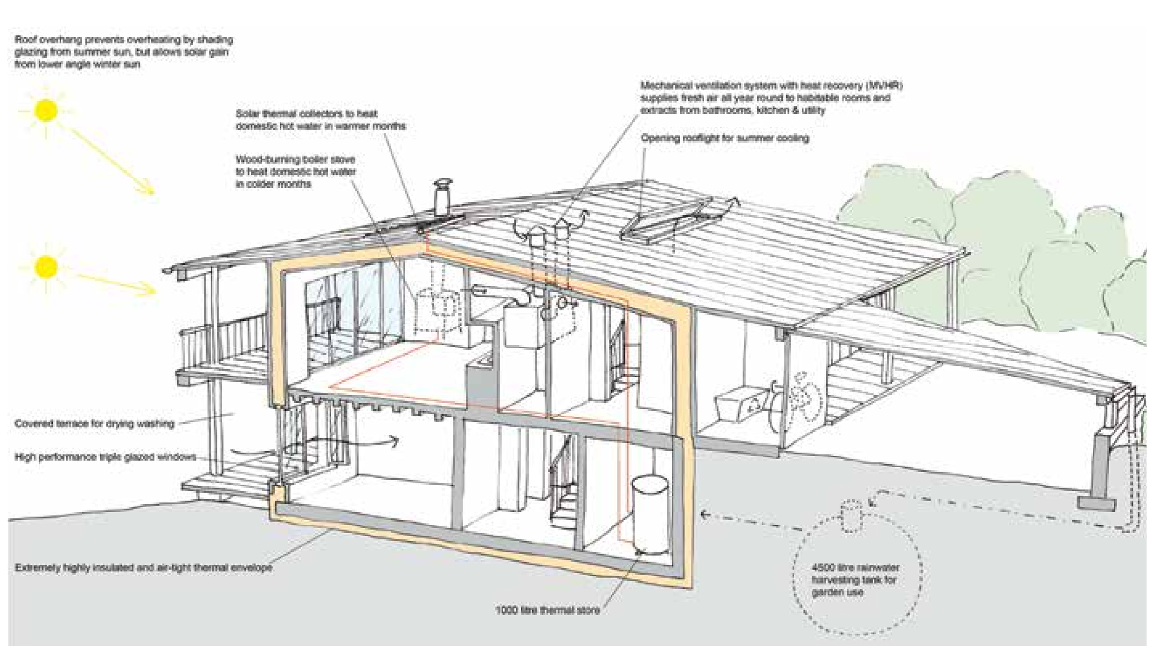
Primary Energy Demand: 120 kWh/m^{2}a
Space Heating Demand: 14 kWh/m^{2}a
Heating Load: 10W/m^2, No cooling
Ventilation strategy: Paul Novus 300 MVHR
Space Heating: HW towel rails & 2kW electric duct heater
Water Heating: 4 m^2 Solar thermal array and 15 kW wood boiler stove (13.8kW to water, 1.2kW to room)
Shading strategy: Overhanging roof & balconies
U values: Exterior wall,: 0.12 Roof: 0.11, Floor: 0.12, Windows: 0.78, Doors: 0.74
Planning permission for PV array when funds available.

Measured Performance

Primary Energy Demand: 85 kWh/m^{2}a
DHW: 7.5 kWh/m^2 (41% solar, 1% electricity, 58% wood)
Space heating: 86% electricity, 14% wood (although no electric heater currently operational)
Actual electricity use: 26.6 kWh/m^2 (£776=£3.81/m^2), 25% higher than predicted (21.4 kWh/m^2) because building work has been on-going, both of us work from home full time and Emily bakes bread twice a week.
Est energy from actual wood burned: 5.33 kWh/m^{2}a
CO2 emissions: 22.2 kg/m^{2}a
Actual annual energy cost: £989/year = £4.85/m^2
If PV were installed and all wood bought in this would reduce to £2.03/m^2

Air pressure result: 0.57 ACH @50Pa
TFA: 204 m^2

Quote:
Architecture doesn't have to be sacrificed for excellent energy performance.



TEAM CREDITS

Client: Emily & Graham Bizley; Architect: Prewett Bizley Architects; Structural Engineer: Structural Solutions; PH Certifier: Warm; Main contractor: Self-build - Graham Bizley; Ground work: GA Doble; Timber Frame: Allwood; Windows & Doors: SIGG supplied by JPW construction; Folding/sliding doors: Solarlux; Rooflight: Vitral, Roof: ARM Roofing; Wall & roof insulation: Warmcel installed by Tinhay; Staircase: Ben Fowler; MVHR: Green Building Store; Solar & Boiler stove installation: 1World Solar; Kitchen & Snug joinery: Heartwood

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