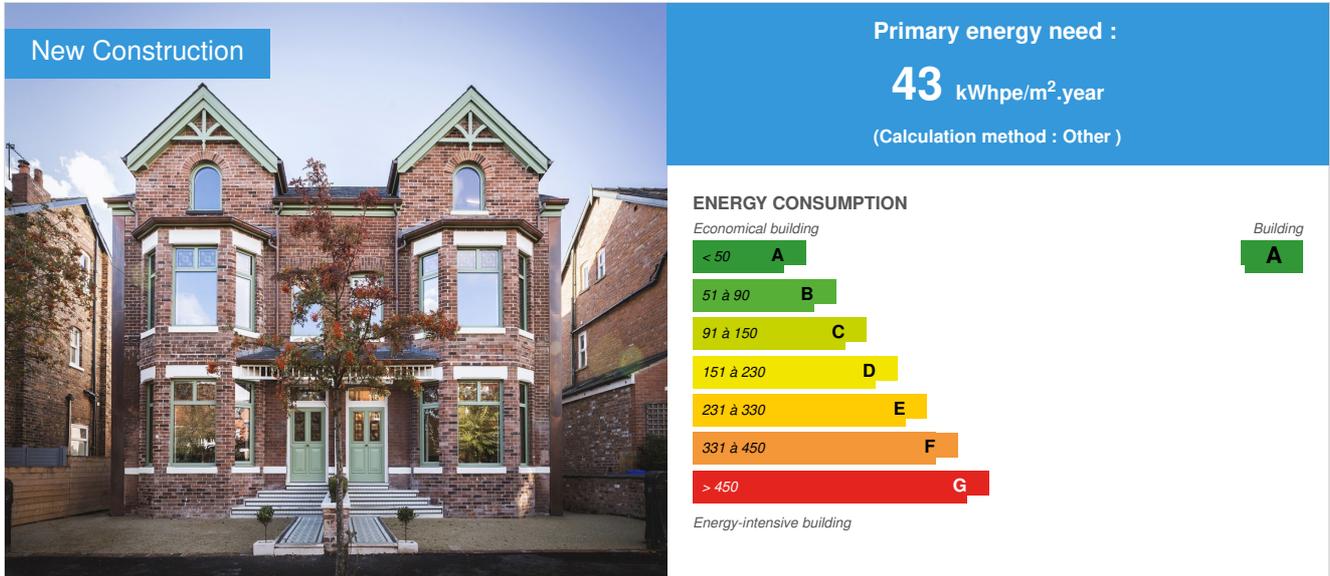


## Zetland Passive House

by Tiffany Chong / 2021-04-01 15:55:04 / International / 6561 / EN



**Building Type** : Isolated or semi-detached house  
**Construction Year** : 1894  
**Delivery year** : 2018  
**Address 1 - street** : - UK - M21 MANCHESTER, United Kingdom  
**Climate zone** : [Cfb] Marine Mild Winter, warm summer, no dry season.

**Net Floor Area** : 374 m<sup>2</sup> Other  
**Construction/refurbishment cost** : 1 010 000 €  
**Cost/m2** : 2700.53 €/m<sup>2</sup>

**Certifications :**



### General information

The Zetland Passive House project is the UK's first certified EnerPHit Plus retrofit. Originally built in 1894, this Passivhaus project is intended to provide a blueprint for retrofitting the UK's 8 million hard to treat homes built prior to 1930. Using natural, breathable building materials and reusing much of the existing fabric, the project is a pioneering example of sustainable low carbon retrofit.

The homes achieved a 95% reduction in space heating demand and a 7-fold reduction in carbon emissions. An 11kW PV system powers the smart hot water tank and a 2kw post heater piggy backing the MVHR system, removing the need for a traditional central heating system.

While Passivhaus certification was a key part of the design, there were several other sustainable design philosophies and technologies adopted in order to minimize its carbon impact:

- Working within the existing footprint, using tiny house design principles to prevent the need to extend, reducing embodied energy

- Retention of existing fabric to minimise waste and maximise thermal mass potential
- Breathable, natural, petrochemical free building fabric
- Healthy internal environment (air filters, humidity control, VOC and CO<sub>2</sub> absorbing materials etc.)

Honouring the UK's architectural history was just as important to the design team as creating a low carbon home. This property features the first Passivhaus stained glass windows and doors, as well as Victorian-style plaster corning and ceiling roses, decorative mosaic tiling, stone steps and ornate porch.

The project has been an invaluable knowledge sharing exercise visited by more than 300 architects, policymakers, developers and thousands of homeowners. The Zetland Passive House has been featured in more than 50 media outlets, including the cover issue of Passive House + magazine.

## See more details about this project

[https://passivehouse-database.org/index.php?lang=en#d\\_5807](https://passivehouse-database.org/index.php?lang=en#d_5807)

## Photo credit

Rick McCullagh  
<http://www.rickmccullagh.co.uk/>

## Stakeholders

### Contractor

Name : Kit Knowles (Ecospheric) and Chris Rodgers (Guy Taylor Associates)

### Construction Manager

Name : Kit Knowles (Ecospheric) Ian Jones (Environmental Building Services)

### Stakeholders

Function : Others  
 Kit Knowles (Ecospheric)

Function : Certification company  
 Kym Mead (Mead Consulting)

Function : Construction company  
 Ecospheric Ltd

Function : Construction company  
 Ecospheric Windows & Doors Ltd

Function : Others  
 Phillips Building Services

Function : Others  
 EBS (Environmental Building Services)

Function : Others  
 ColdProof

Function : Others  
 John George Fine Cabinetry

## Energy

### Energy consumption

Primary energy need : 43,00 kWhpe/m<sup>2</sup>.year

Calculation method : Other

**Breakdown for energy consumption :** Primary energy needs corresponds to Passivhaus PE value. Annual heating demand 12 kWh/(m<sup>2</sup>a) calculated according to PHPP Heating load 11 W/m<sup>2</sup> Generation of renewable energy 55 kWh/(m<sup>2</sup>a) based on the projected area

## Envelope performance

**Envelope U-Value :** 0,17 W.m<sup>-2</sup>.K<sup>-1</sup>

**More information :**

Exterior wall

Front walls: Victorian facing brick, 38mm cavity, 13mm Fermacel, 145mm Steico I-joists with Steico Floc blown cellulose in between, 80mm Steico Protect Dry, 10mm

Side walls: 14mm Therma lime render, 80mm Steico Protect Dry, 240mm Steico I-joists with Steico Floc blown cellulose in between, 250mm double layer of Victorian wire cut bricks with finger cavity, 10mm Thermalime plaster. U-value: 0.116 W/(m<sup>2</sup>K)

Outrigger walls: Organowood cladding, Facade membrane, 300mm Steico I-joists with Steico Floc blown cellulose in between, Proclima Intello Membrane, 15mm gypsum plasterboard & skim. U-value: 0.132 W/(m<sup>2</sup>K) U-value = 0.116 W/(m<sup>2</sup>K)

Basement floor / floor slab Pine chevron or tiles with grout, 18mm Magply magnesium board, Proclima Intello Membrane, Steico I-joists/original floor joists with Steico Floc blown cellulose in between, 80mm Steico Protect Dry.

U-value: 0.133 - 0.165 W/(m<sup>2</sup>K)

U-value = 0.133 W/(m<sup>2</sup>K)

Roof

Hook fixed slate on battens, Siga Majcoat, 60mm Steico Special Dry, 145mm - 300mm Steico I-joists mounted on 75mm original rafters with Steico Floc blown cellulose in between, Siga Majrex membrane, 15mm gypsum plasterboard & skim.

U-value: 0.108-0.148 W/(m<sup>2</sup>K)

U-value = 0.108 W/(m<sup>2</sup>K)

Frame

Viking Windows AS supplied by Ecospheric, SW14 and DK88 Triple glazed timber windows with U<sub>w</sub>-value 0.68 - 0.72 W/(m<sup>2</sup>K). Features stained glass (World first!), curved units and traditional door conservation profiles.

U<sub>w</sub>-value = 0.68 W/(m<sup>2</sup>K)

Glazing

Saint Gobain

U<sub>g</sub> ranges - 0.45 - 0/62 W/(m<sup>2</sup>K) U<sub>g</sub>-value = 0.45 W/(m<sup>2</sup>K) g-value = 1 %

Entrance door

Viking Windows AS supplied by Ecospheric Windows & Doors Ltd. SW14 and DK88 Doors triple glazed timber doors with 0.68 - 0.8 W/(m<sup>2</sup>K). Features stained glass, traditional mouldings and french doors.

U<sub>d</sub>-value = 0.8 W/(m<sup>2</sup>K)

**Air Tightness Value :** 1,00

## Renewables & systems

### Systems

**Heating system :**

- Others
- Wood boiler

**Hot water system :**

- Individual electric boiler

**Ventilation system :**

- Double flow heat exchanger

**Renewable systems :**

- Solar photovoltaic

11kW Photovoltaic System that enables the properties to produce more energy than they consume - by Environmental Building Services

## Environment

### Urban environment

Situated in the heart of Chorlton, a leafy suburban neighbourhood of Manchester, the residents of the Zetland Passive House can access everything they need by

foot or bicycle. Chorlton's popular independent shops, public schools, and neighbourhood parks are all within a 5 minute walk (500m) from the property. The city centre can be accessed via the tram or bus system, which is also 500 metres from the passive house. This project exemplifies low carbon design from construction, build, to lifestyle.

## Costs

### Construction and exploitation costs

Total cost of the building : 2 100 000 €

## Health and comfort

### Water management

Grey water recycling toilets

### Indoor Air quality

Airtight, mould free, solid lime plaster interiors capable of mopping up dangerous VOCs, setting down excess CO2 & buffering moisture for the ultimate healthy living environment.

Bespoke solid timber & brass kitchen with Welsh slate worktops & A++ rated appliances - by John George Fine Cabinetry

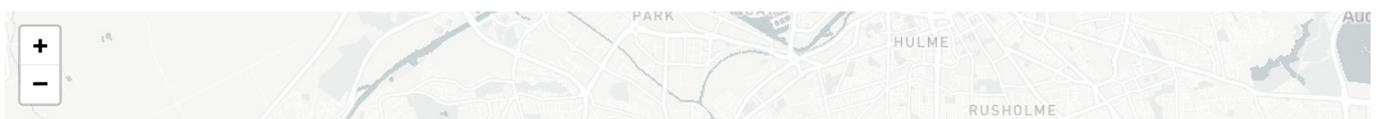
Unlacquered antibacterial copper electric switches throughout to help stop spread of disease within the household.

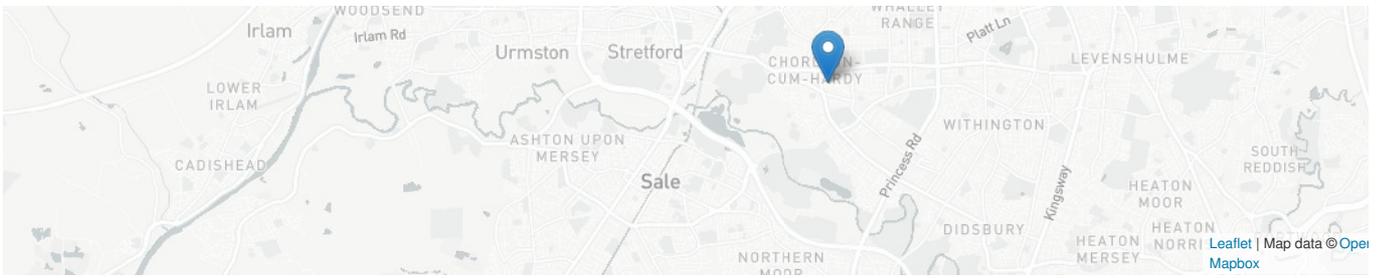
Nobel prize winning super material Graphene has been formulated into our paints to prevent cracking - by Graphenstone

## Contest

### Reasons for participating in the competition(s)

- 11kW Photovoltaic System that enables the properties to produce more energy than they consume - by Environmental Building Services
- Airtight, mould free, solid lime plaster interiors capable of mopping up dangerous VOCs, setting down excess CO2 & buffering moisture for the ultimate healthy living environment.
- Bespoke solid timber & brass kitchen with Welsh slate worktops & A++ rated appliances - by John George Fine Cabinetry
- Unlacquered antibacterial copper electric switches throughout to help stop spread of disease within the household.
- Nobel prize winning super material Graphene has been formulated into our paints to prevent cracking - by Graphenstone
- Copper rainwater goods with 120 year life span.
- DibT woodburning stove drawing combustion air from outside the thermal envelope - by Wiking
- Grey water recycling toilets - by Sanlamere
- EMF (Electromagnetic Field) free design and LED lighting throughout.
- Windows angled towards the sun (within insulation thickness) to maximise solar gains.
- Thermostatically controlled roof light with rain sensor for passive cooling - by Fakro
- Breathable roof build up featuring world first intelligent membrane adopting biomimicry - by Siga
- Sustainable Urban Drainage (SUDS) featuring recycled tyres and recycled stone - by Sudstech





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