



Orchard Cottage

A near passive new-build in Whittlesford



An Open Eco Homes online tour



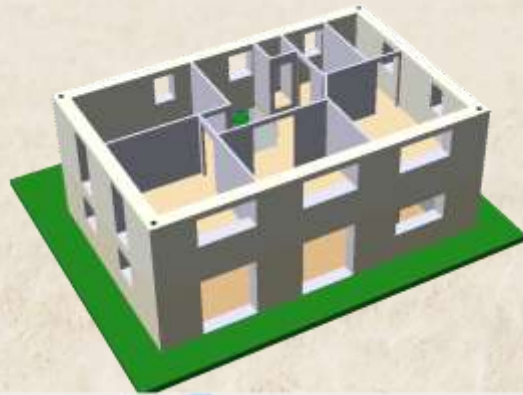
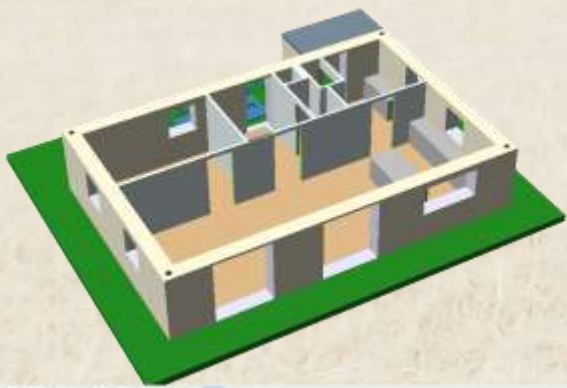
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Design



Previous Property



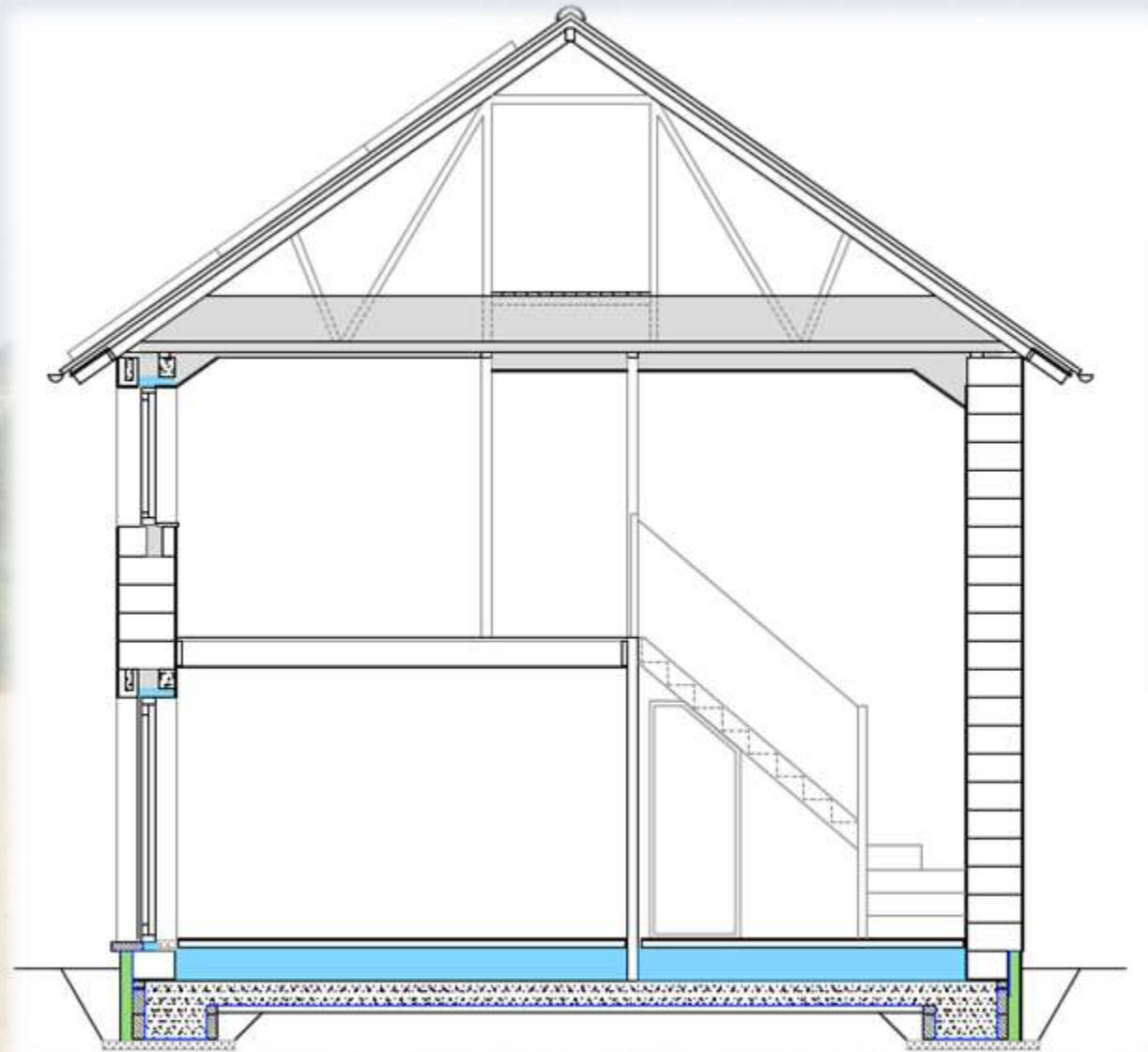
Design Considerations

Client: Low energy in use

- Passive or near passive
- Airtight
- Energy-saving technologies

Architect: Building Biology principles

- Limited use of VOC-containing products
- No PU insulating panels => No timber frame



Design Technologies

PV Array

- 16 x 245W panels reused from previous property
- Feed-in Tariff retained
- Re-alignment from east to south-facing has produced 50% increase in generation



Design Technologies

Apollo 'Generated Electricity Manager'

- Monitors export of electricity from PV array
- Turns immersion heater in hot water tank up or down to use as much of this surplus electricity as possible
- Saves 4-5 kWh per day for a family of 4
- £250 initial cost, payback period <1 year vs electrical heating of water*

*No gas on site, no boiler in a passive house



Design Technologies

Showersave heat exchanger

- 2-metre twin-walled copper pipe
- Warm water from shower waste flows cold water coming in to HW tank or to shower
- Up to 2/3rds of waste heat can be recovered



Design Technologies

Mechanical Ventilation and Heat Recovery (MVHR)

- Brings fresh air in via a heat-exchanger
- Reduces heat losses through ventilation to almost zero
- Cools in Summer
- Almost, but not entirely, silent



Design Technologies

Porotherm clay blocks

- Common in Europe, less so in UK
- With or without rockwool filling
- Thin-joint (1-2mm) mortar system
- Easy to use, high dimensional stability
- Single-skinned wall is possible
- Material cost is high (~£5/block)
- Brittle material creates constraints with regard to fixings



Design Technologies

Glazing

- Internorm triple-glazed windows
- Two pairs of French windows have a fourth pane of glass, with a venetian blind inside
- Very effective at keeping heat out in sunny weather



Design Technologies

Cool Pantry

- 3m² storage area
- North-facing
- Outside the thermal envelope of the house
- External-spec door between pantry and utility room
- Cool in summer, cold in winter
- Unventilated



Construction



Timeline

2012

2012

2013

2014

2015

2016

2017

2018

2019

2020

2021

2021

Purchase

Initial Brief - renovate or extend

Rebuild Decision - initial architect sketches

Attended trade show

Appointed Gale & Snowden as Architects - new Brief

External Design Complete

Planning Application

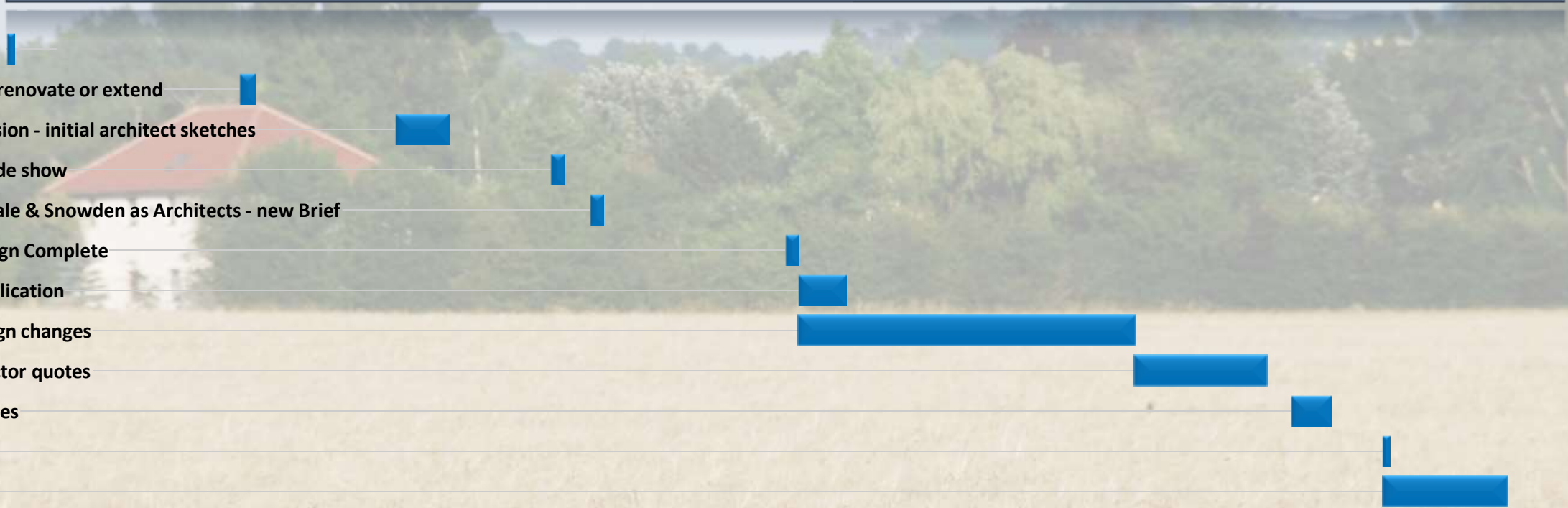
Internal Design changes

Main Contractor quotes

Revised Quotes

Demolition

Construction



Other Factors

- Visualisation
- Finance
- Building Control
- Quantity Surveyor





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