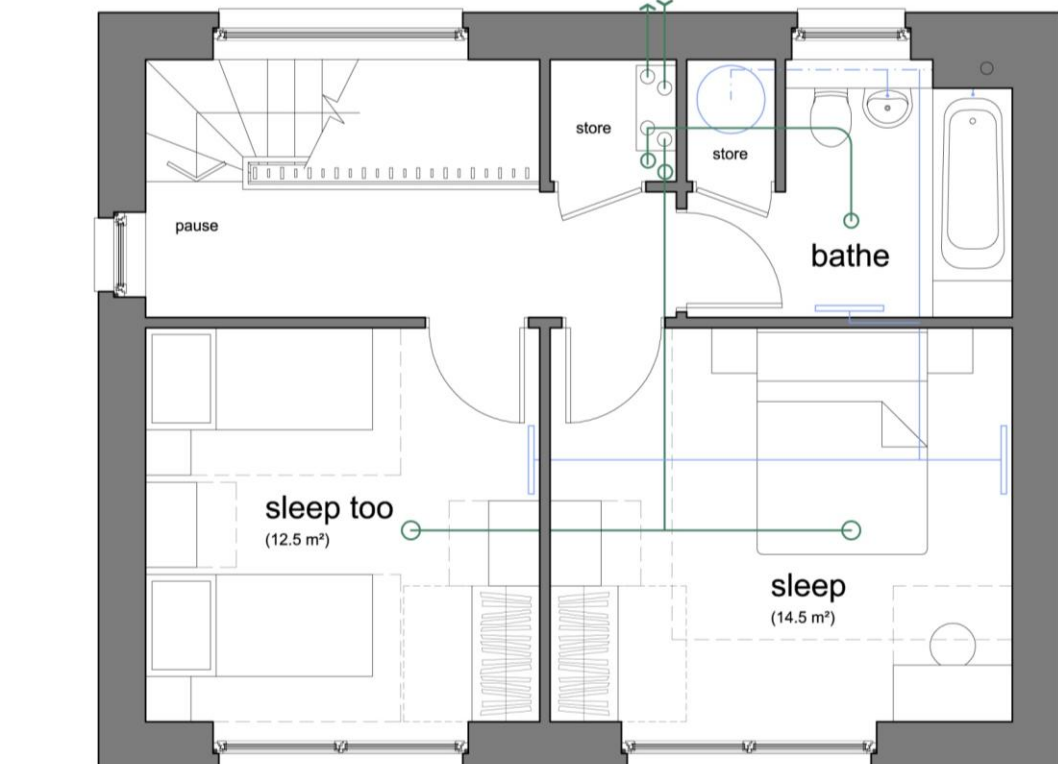
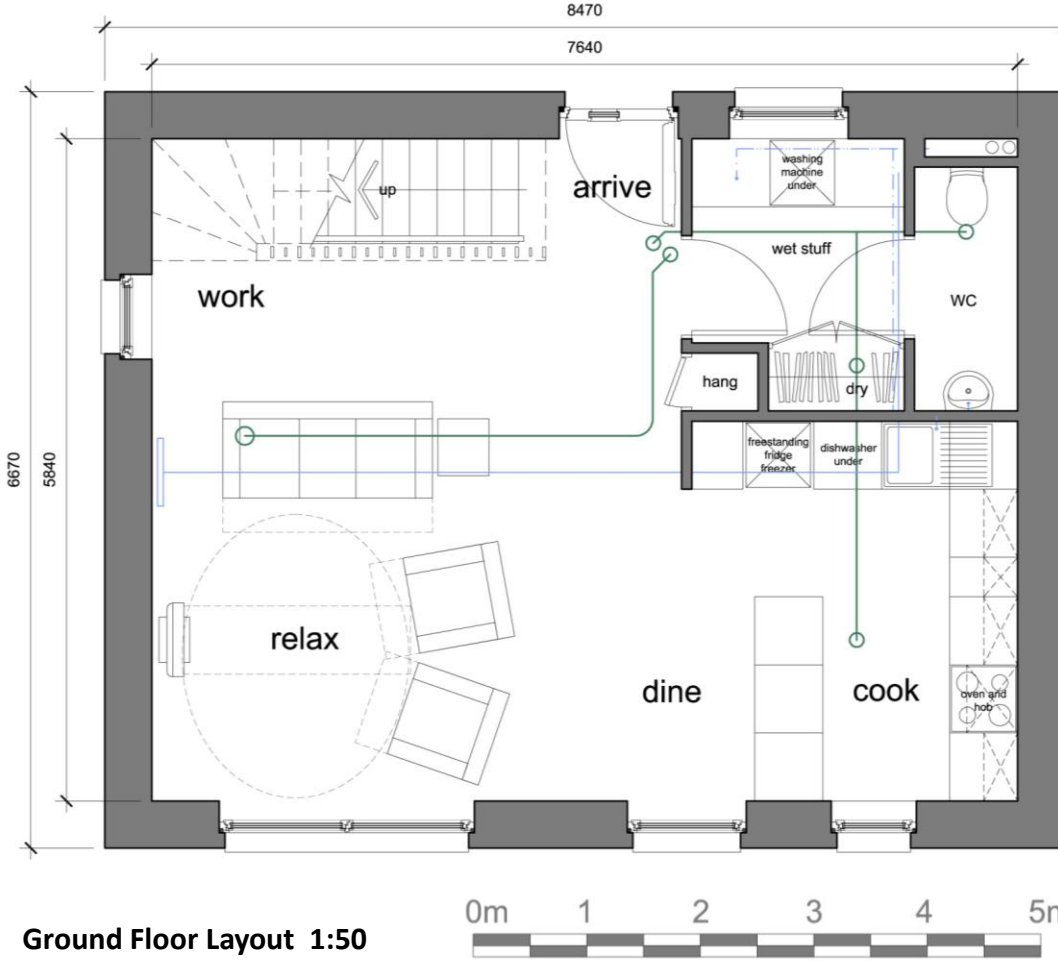


# SELFBUILD ON A SHOESTRING — SIMPLEHAUS



First Floor Layout 1:50



Ground Floor Layout 1:50



Street Elevation

The *Simplehaus* design concept rises to the design challenge of an affordable, self-build home that meets the highest standards of energy efficient design. Utilising the unique combination of buildability and low energy performance provided by the RockShell walling system, coupled with the design rigour and attention to detail of the Passivhaus standard, *Simplehaus* provides a comfortable and spacious home for a family of four that costs less than £60 a year to heat!

Envisaged as an 85m<sup>2</sup> contemporary cottage, *Simplehaus* is based on an uncomplicated aesthetic and an efficient, solar-biased layout, whilst also delivering state-of-the-art efficiency and living standards. Super-insulated fabric, triple-glazed windows and whole house heat-recovery ventilation keep the building cosy and healthy in winter; natural cross-ventilation, tall ceilings and external louvre blinds keep the building cool in summer. The open-plan living area provides space for relaxing, cooking, dining and working. Compact service spaces keep material costs and system heat losses to a minimum yet the layout still accommodates a separate utility including a built-in clothes drying cupboard.

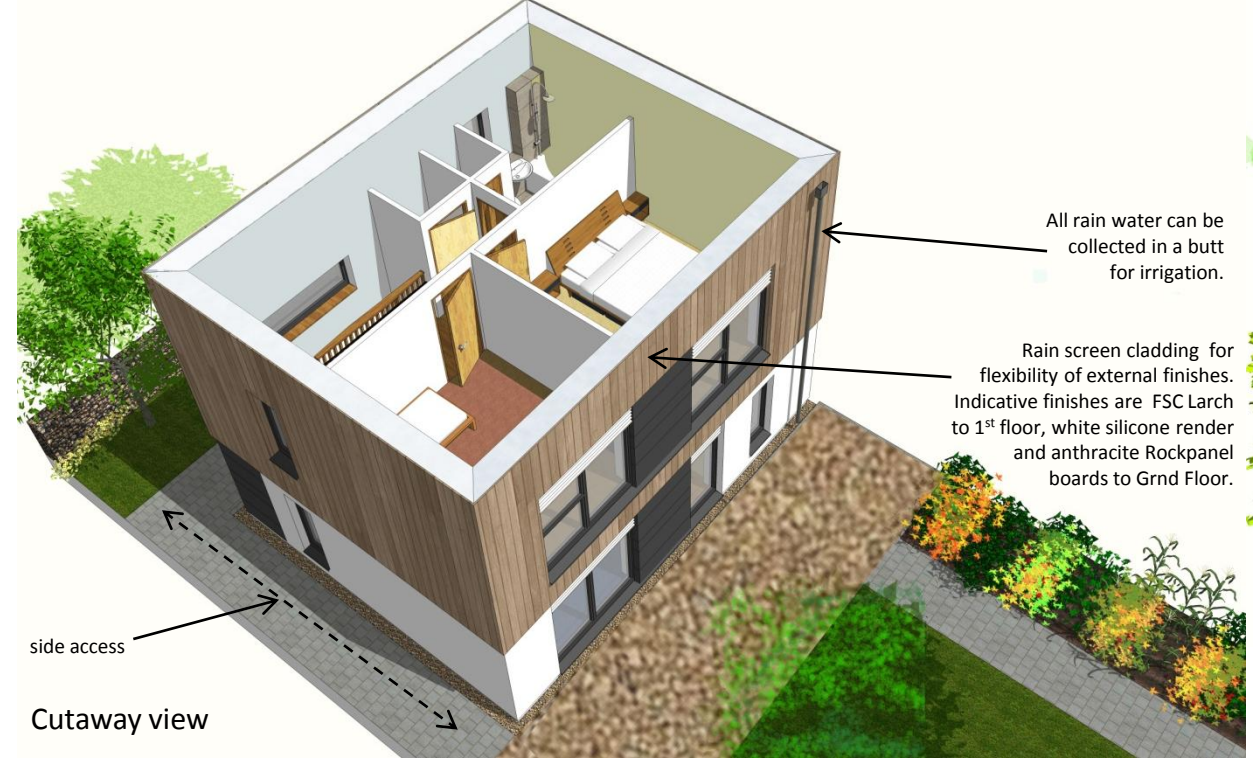
In construction terms, simplicity is key: from the raft concrete floor slab to the modular load-bearing walls (see Rockshell box below) or the engineered timber floor and roof joists, the components have been pared down to the minimum: and yet the building retains the capacity for extending upwards in the future.

The energy statistics are impressive: only 1225 kWh of space heating needed all year, peaking at a lowly maximum of only 1050W! Operational energy costs could also be further supplemented by solar panels in the future.

Specific building demands with reference to the treated floor area		Requirements		Fulfilled?*	
		Value	Requirement	Value	Requirement
Space heating	Treated floor area	82.3 m <sup>2</sup>			
	Annual heating demand	15 kWh/(m <sup>2</sup> a)	15 kWh/(m <sup>2</sup> a)	yes	yes
	Heating load	13 W/m <sup>2</sup>	10 W/m <sup>2</sup>	-	-
Space cooling	Overall specific space cooling demand	-	-	-	-
	Cooling load	-	-	-	-
	Frequency of overheating (> 25 °C)	2.3 %	-	-	-
Primary Energy	Space heating and cooling, dehumidification, DHW, household electricity	111 kWh/(m <sup>2</sup> a)	120 kWh/(m <sup>2</sup> a)	yes	yes
	DHW, space heating and auxiliary electricity	63 kWh/(m <sup>2</sup> a)	-	-	-
	Specific primary energy reduction through solar electricity	-	-	-	-
	Specific primary energy reduction through solar electricity	-	-	-	-
Airtightness	Pressurization test result n <sub>50</sub>	0.6 1/h	0.6 1/h	yes	yes
Passive House?				yes	yes



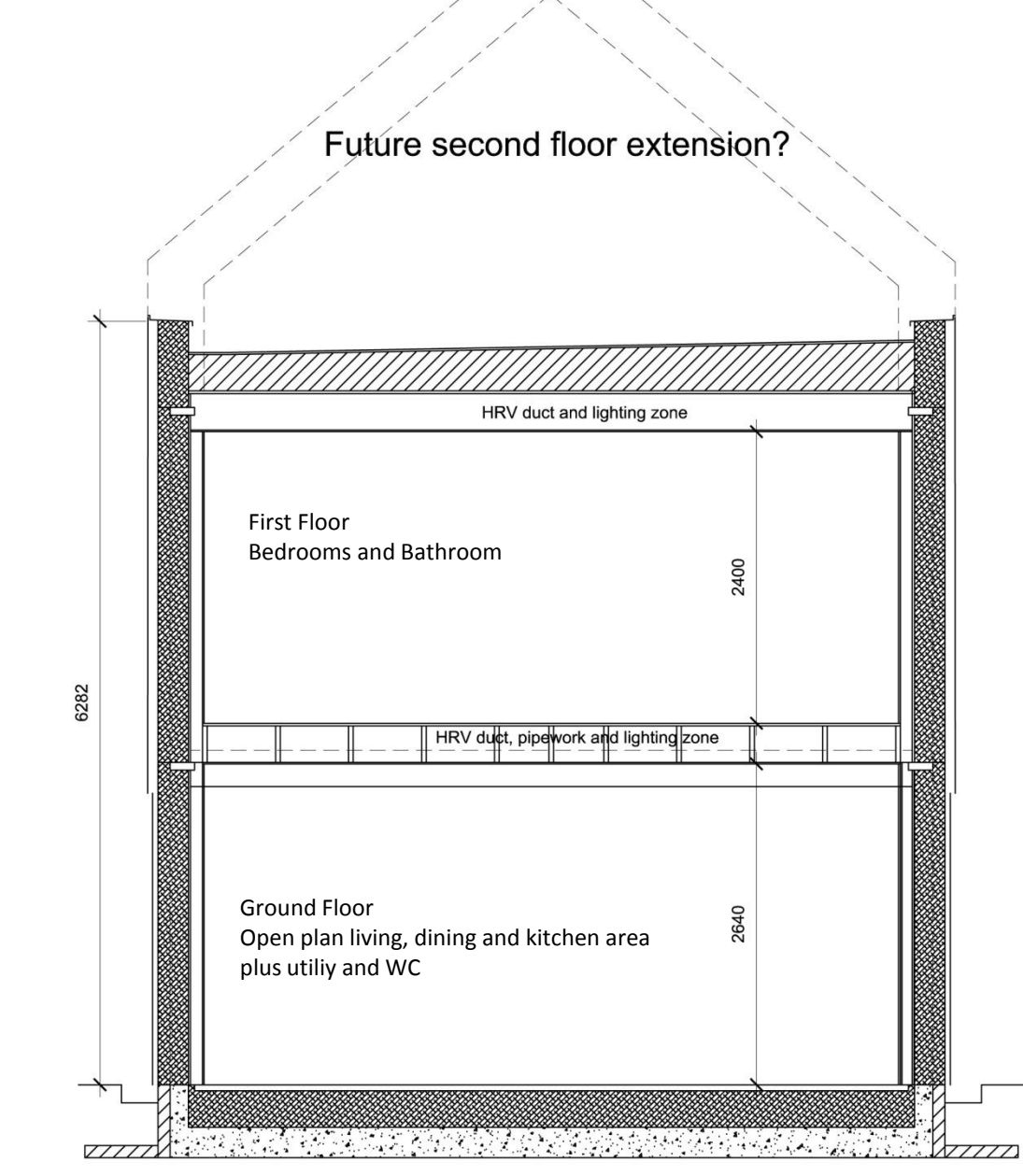
Extract from the PHPP verification



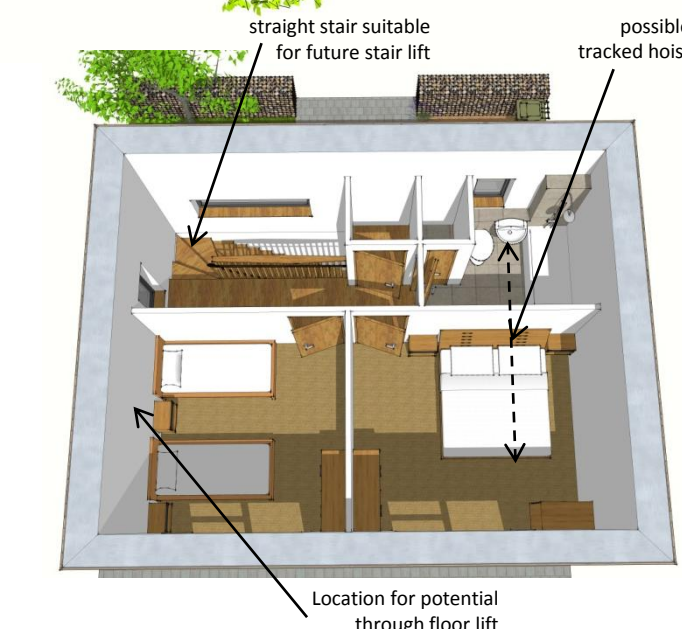
Cutaway view



Extendable Section



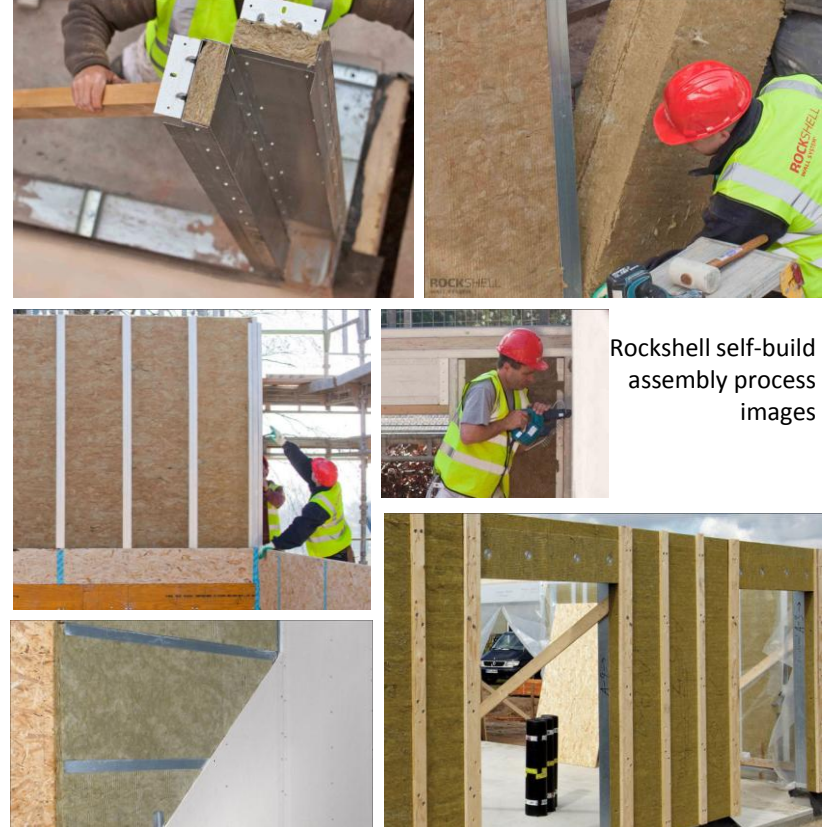
Indicative Plot Layout



### SELF-BUILD with RockShell:

As compared with traditional build techniques, RockShell is extremely quick and easy to install – the Simplehaus shell would only take 3-5 days to erect. Delivered to site in kit-form, RockShell combines 1mm steel posts/channels with insulation slabs, OSB and LVL ties and can be constructed using simple hand tools, which helps to make sites much safer and the build process much quicker. From a health and safety perspective, RockShell offers a number of benefits:

- No mechanical handling required
- System delivered in modular kits requiring minimal cutting on-site
- Generates minimal waste – helps to keep sites safe/tidy
- Dry construction – no wet trades required



Rockshell self-build assembly process images



Works Package	Construction Element	Materials	Labour	Total
Works Package 1	Set up, Clearance, Demolitions....	£ -	£ -	£ -
Works Package 2	Foundations ( <i>up to DPC</i> )	£ -	£ -	£ -
Works Package 3	Ground Floor Slab or Suspended Floor	£ 4,235.00	£ -	£ 4,235.00
Works Package 4	Drainage & Service Trenchwork	£ -	£ -	£ -
Works Package 5	Specialist Building System ( <i>eg timber frame, SIPs, etc if applicable</i> )	£ 10,750.00	£ -	£ 10,750.00
Works Package 6	External & Internal Walls	£ 5,625.00	£ -	£ 5,625.00
Works Package 7	Intermediate Floor Zone ( <i>if applicable</i> )	£ 1,000.00	£ -	£ 1,000.00
Works Package 8	Fireplace & Chimney ( <i>if applicable</i> )	£ -	£ -	£ -
Works Package 9	Roof Structure, Insulation & Covering	£ 2,000.00	£ -	£ 2,000.00
Works Package 10	Joinery ( <i>windows, doors, stairs, skirtings...</i> )	£ 10,125.00	£ -	£ 10,125.00
Works Package 11	Specialist Products ( <i>eg; eco products...</i> )	£ 700.00	£ -	£ 700.00
Works Package 12	Electrical Installation	£ 5,100.00	£ 1,000.00	£ 6,100.00
Works Package 13	Plumbing Installation	£ 1,650.00	£ -	£ 1,650.00
Works Package 14	Heating Installation	£ 1,750.00	£ 500.00	£ 2,250.00
Works Package 15	Plastering ( <i>or dry-lining</i> )	£ -	£ -	£ -
Works Package 16	Kitchen and Utility Units ( <i>+ appliances</i> )	£ 2,925.00	£ -	£ 2,925.00
Works Package 17	Decorations & Wall Ceramics	£ 1,075.00	£ -	£ 1,075.00
Works Package 18	Floor Finishes	£ 1,190.00	£ -	£ 1,190.00
	<b>TOTAL</b>	<b>£ 48,125.00</b>	<b>£ 1,500.00</b>	<b>£ 49,625.00</b>



A Cost Report **must** be provided alongside your design proposals. Please use this Excel spreadsheet to summarise your estimated cost and provide this as the **first** sheet of your report.

Works Package	Construction Element	Description	Materials	Labour	Total	Construction Notes
Works Package 1	Set up, Clearance, Demolitions....	assume clean site, no allowance	£ -	£ -	£ -	
Works Package 2	Foundations ( <i>up to DPC</i> )	foundations included in ground floor build-up	£ -	£ -	£ -	
Works Package 3	Ground Floor Slab or Suspended Floor	250 thick concrete floor slab with 150x350mm perimeter upstand; 300 rockfloor rigid mineral wool insulation above with screed topping; all associated excavation: £75/m2 rate x 56.5m2	£ 4,235.00	£ -	£ 4,235.00	Self-build excavation by hand, in-situ concrete slab and upstands in timber formwork, reinforcement mesh, local Building Inspector sign-off no allowance
Works Package 4	Drainage & Service Trenchwork	excluding service connections, 4.5m max trenches dug by hand - no cost	£ -	£ -	£ -	Self-build excavation by hand, location of water, waste, electric, gas, reduced to max 4.5m distance to road:
Works Package 5	Specialist Building System ( <i>eg timber frame, SIPs, etc if applicable</i> )	RockShell external wall system: wall assembly comprising 1mm thick steel l-profiles and channels, 250mm thick dense Rockwool insulation slabs and an interior 18mm OSB lining: PH u-value 0.127 W/m2K: budget quote	£ 10,500.00	£ -	£ 10,500.00	Self-build construction using 600mm-wide wall modules: see <a href="http://www.rockshell.uk.com/downloads">http://www.rockshell.uk.com/downloads</a> , no specialist equipment needed, local Building Inspector sign-off no allowance
Works Package 6	External & Internal Walls	Mini-scaffold tower cost for work above ground floor, could be re-sold after use	£ 250.00	£ -	£ 250.00	Self-build wall construction using mini-scaffold tower
		External walls: render, timber board and Rockpanel cladding shown - but could be anything, allow £25/m2 rate @ 175m2 ext wall area	£ 4,375.00	£ -	£ 4,375.00	Self-build external cladding using mini-scaffold tower
Works Package 6		Internal walls: 75mm timber stud with plasterboard both sides + internal plasterboard to external wall: budget quote	£ 1,250.00	£ -	£ 1,250.00	
		Works Package 7	Intermediate Floor Zone ( <i>if applicable</i> )	first floor timber joist construction with OSB deck, plasterboard ceiling: budget quote	£ 1,000.00	£ -
Works Package 8	Fireplace & Chimney ( <i>if applicable</i> )	none	£ -	£ -	£ -	
Works Package 9	Roof Structure, Insulation & Covering	flat roof timber joist construction, external PIR insulation to falls, OSB decking, reinforced waterproof concrete trowelled finish	£ 2,000.00	£ -	£ 2,000.00	Self-build timber roof structure with no hot works to waterproof roof finish - work access via mini-scaffold tower
Works Package 10	Joinery ( <i>windows, doors, stairs, skirtings...</i> )	PH standard triple-glazed timber windows & external door: Rational Aura budget quote: approx £9,085	£ 9,085.00	£ -	£ 9,085.00	Self-build window installation including air-tight seals lapped to window frames by supplier
Works Package 11	Specialist Products ( <i>eg: eco products...</i> )	sw timber stair: top-winder timber stair £500 including wall fixing brackets: budget quote	£ 575.00	£ -	£ 575.00	
		internal sw timber doors: budget quote at £45/door inclu. ironmongery x 7	£ 315.00	£ -	£ 315.00	
		sw skirtings @ £4/2.4m x 33m	£ 150.00	£ -	£ 150.00	
Works Package 11		roof drainage to rainwater harvesting: aluminium hoppla & rwp to water butt, budget quote	£ 150.00	£ -	£ 150.00	
		external blinds for solar shading to south facing windows: budget quote	£ 550.00	£ -	£ 550.00	
Works Package 12	Electrical Installation	power, lighting, fire alarm: budget quote for 3 bed house	£ 2,600.00	£ 500.00	£ 3,100.00	Self-build electrical installation with connection and sign-off by UK-registered electrician, exclu. professional fees
Works Package 13	Plumbing Installation	MVHR - total kit including ductwork: PH certified Paul Focus 200: budget quote	£ 2,500.00	£ 500.00	£ 3,000.00	Self-build MVHR installation with specialist work and commissioning by PH/UK registered engineer, exclu. professional fees
		sanitary appliances, cold water supply and waste: Bath Empire quote £400 shower/bath/wc suite + toilet/basin £200 =£600 + pipework	£ 1,650.00	£ -	£ 1,650.00	Self-build plumbing installation with sign-off by local Building Inspector - no allowance

Works Package	Construction Element	Description	Materials	Labour	Total	Construction Notes
Works Package 14	Heating Installation	gas boiler for hot water and wet radiator space heating	£ 1,750.00	£ 500.00	£ 2,250.00	Self-build hot water, heating and boiler installation with gas connection & sign-off by GasSafe registered engineer, exclu. professional fees
Works Package 15	Plastering <i>(or dry-lining)</i>	plasterboard dry-lining, taped & sealed joints only - included in internal walls	£ -	£ -	£ -	
Works Package 16	Kitchen and Utility Units <i>(+ appliances)</i>	kitchen & utility joinery: budget quote	£ 1,450.00	£ -	£ 1,450.00	
		kitchen & utility appliances: washing machine, electric induction hob + oven, fridge/freezer, no dishwasher, budget quotes	£ 1,475.00	£ -	£ 1,475.00	
Works Package 17	Decorations & Wall Ceramics	water based paint for walls & ceilings, minimal tiling to wet areas: budget quote	£ 1,075.00	£ -	£ 1,075.00	
Works Package 18	Floor Finishes	un-treated t&g timber engineered floating floor throughout £14/m2 rate + oil finish	£ 1,190.00	£ -	£ 1,190.00	
<b>TOTAL</b>			<b>£ 48,125.00</b>	<b>£ 1,500.00</b>	<b>£ 49,625.00</b>	

GI area (m2) : 85  
cost rate (£/m2) : 583.82  
(self-build)

## SimpleHaus: Specification Summary

SimpleHaus is a Passivhaus-standard, energy-efficient, sustainable design that has been accurately modelled in PHPP by our Certified Passivhaus Designer.

The small, compact 2-storey detached house has a Gross Internal Area of 85m<sup>2</sup>, inevitably with a high proportion of exposed external envelope area to internal floor area (Heat Loss Form Factor 3.8) making it essential that the external building fabric specification performs well in terms of thermal insulation and air-tightness (something which many self-builds fail to achieve).

Therefore, we have specified a high-performance, thermally efficient construction system that is relatively easy to self-build using standard building tools - rather than more traditional construction that requires high performance finishes which are difficult to build and maintain in use.

A robust and maintenance-free, reinforced concrete ground floor slab with 300mm rigid mineral wool insulation provides a solid, thermally efficient base to the self-build - giving u-value of 0.073 W/m<sup>2</sup>K.

A RockShell external wall system comprises 1mm thick steel I-profiles and channels, 250mm thick dense Rockwool insulation slabs and an interior 18mm OSB lining - all with a Passivhaus compliant U-value of 0.127 W/m<sup>2</sup>K.

The simple timber & light-weight steel structure and construction components have a low environmental impact with low embodied carbon compared to most building materials.

The simple form of the house and the Rockshell wall system can support any number of external cladding material options - we have shown a combination of rendered board, timber boards and stonewool RockPanel.

A timber joist and OSB deck flat roof construction with 360mm PIR insulation under a 9mm waterproofing layer of lightweight, mesh re-inforced trowelled concrete provides a simple thermal capping to the building: U-value of 0.06 W/m<sup>2</sup>K.

The high performance triple-glazed, timber framed window and external door specification (with integrated air-tightness seals pre-fixed to the frame) ensures good thermal performance (average window u-value of 0.86 W/m<sup>2</sup>K) and a self-build achievable Passivhaus air-tightness of 0.6 1/h.

The Paul Focus 200 MVHR unit is Passivhaus Institute certified and the whole-house, self-build MVHR installation would need to be commissioned by a Certified Passivhaus consultant. We have allowed costs for some professional input for this - prior to commissioning - along with the critical electrical and gas service connections to the house.

The simple, compact layout and construction allows for easy internal adjustment for future elderly use or an extension through the roof without requiring major alterations to the internal organisation.

Finally, we have purposefully avoided expensive renewable energy generation systems as we do not require them due to the low-energy, Passivhaus design. However, the simple flat roof construction could be mounted with solar roof panels if desired.

