



What Does Passivhaus costs? Sourcing and supply chain

Nick Newman, bere:architects

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Lead partners:



UK Passivhaus Conference

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PASSIVHAUS LOW COST HOUSING

What does it Cost? Sourcing and Supply Chain

Nick Newman, bere:architects

Richard Whidborne, e-Griffin Consulting Ltd

Passivhaus prototypes, Ebbw Vale



Lime House, Ebbw Vale

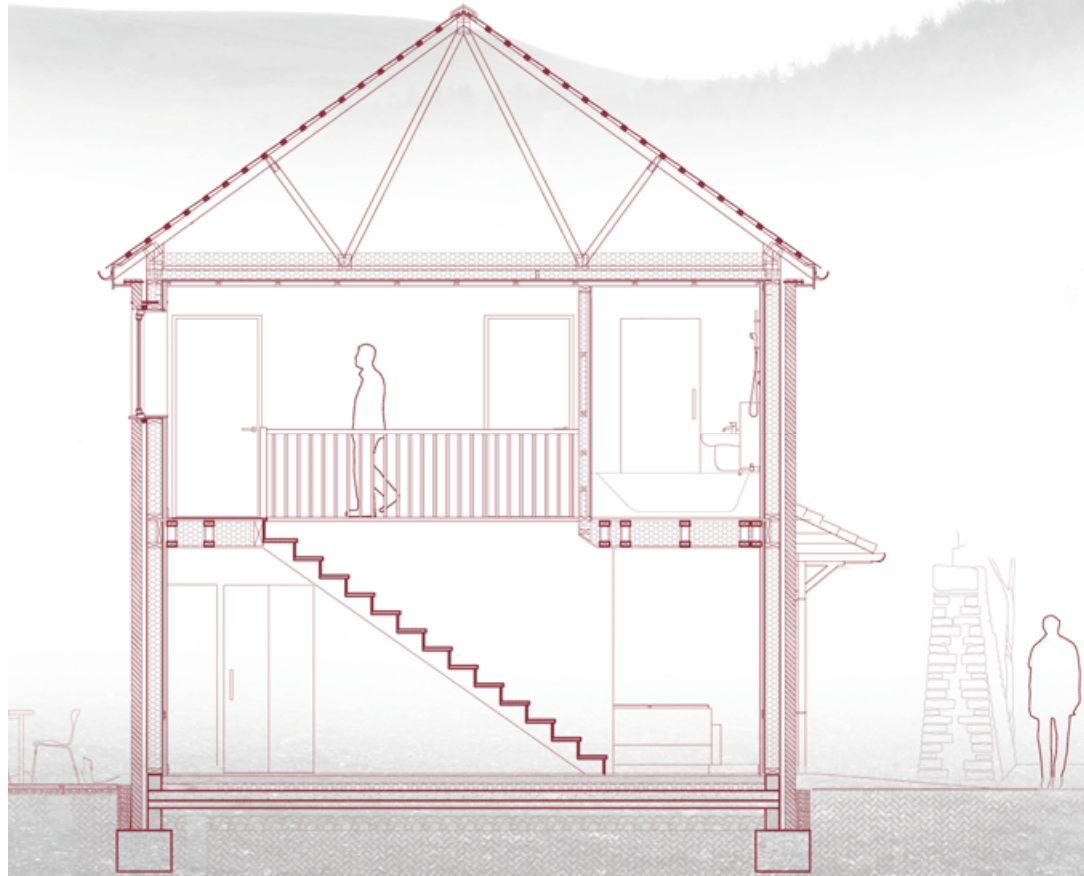


Former steelworks, Ebbw Vale



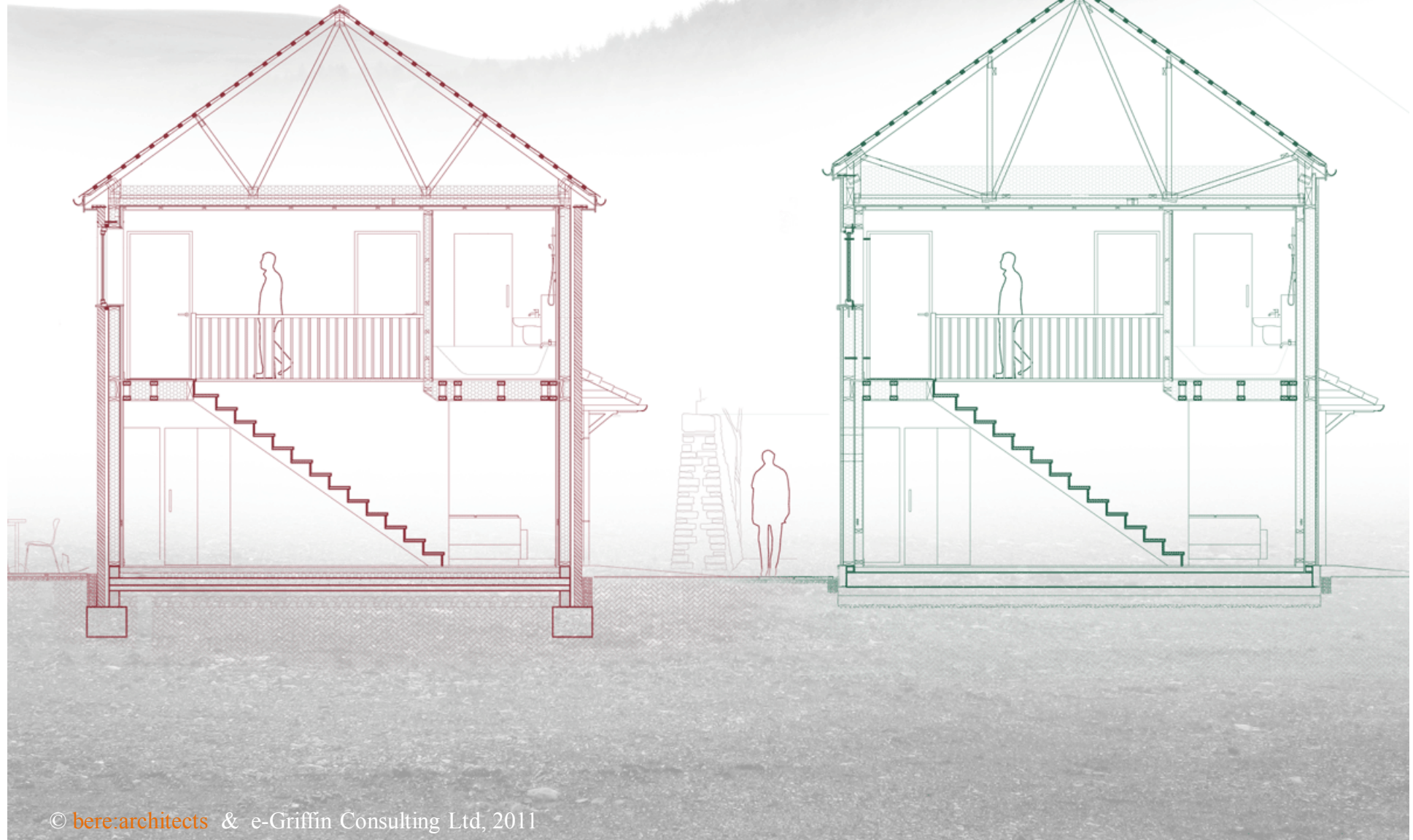


Code level 3 house



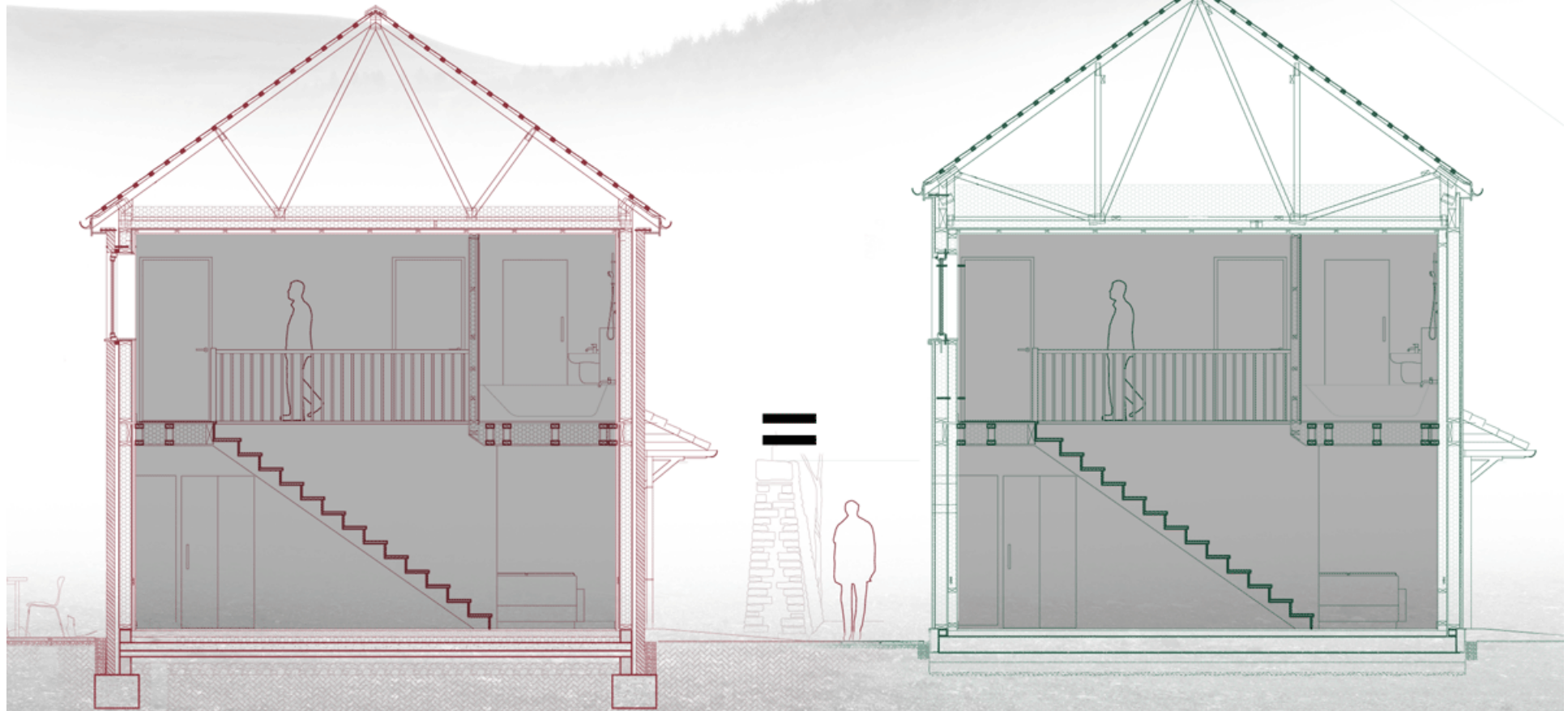
Code level 3 house

Passivhaus



Code level 3 house

Passivhaus



Foundations

Specification:-

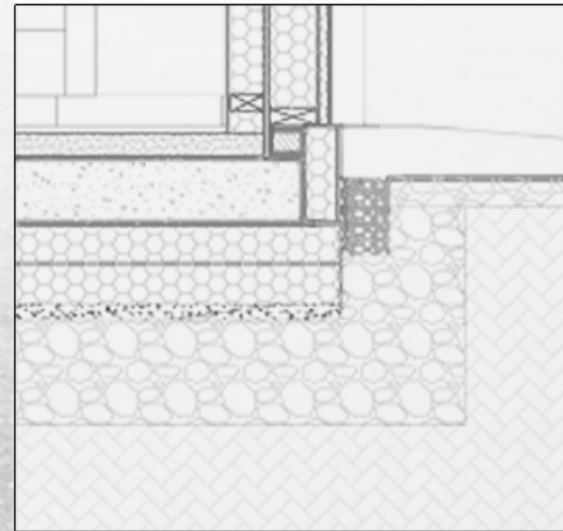
- Deep strip concrete foundations in trenches
- Facing brick/ blockwork cavity wall
- Cavity filled with lean mix concrete
- Hyload damp proof courses
- Air bricks with cavity periscope liners
- Pipe sleeves for drainage and services



Code level 3 house

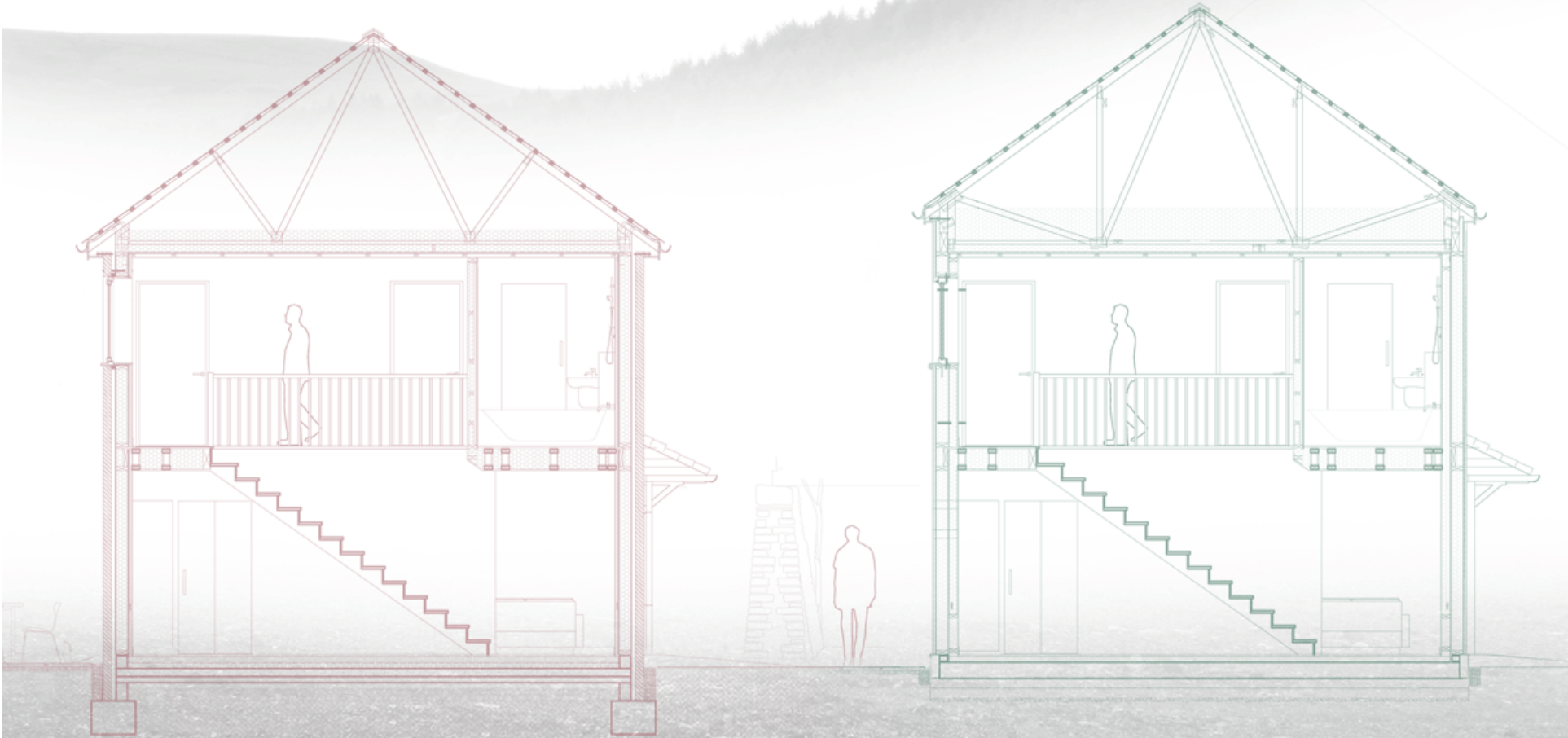
Specification:-

- RIW Sheetseal tanking to edge of slab
- 100mm thick Thermalite blockwork course
- 2 layers of 120mm thick XPS insulation
- vertically to edge with recycled slates
- bonded to vertical insulation
- Pipe sleeves for drainage and services

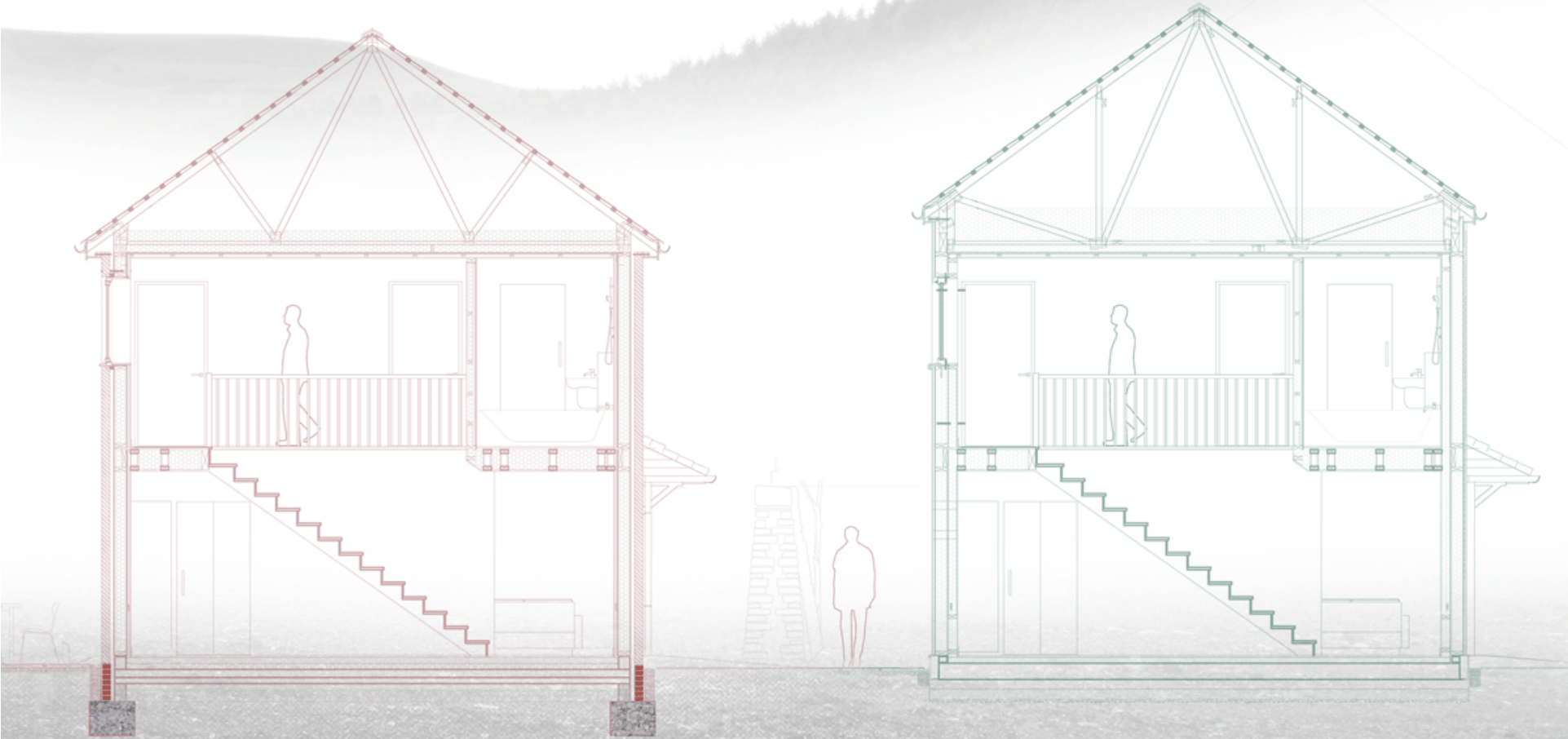


Passivhaus

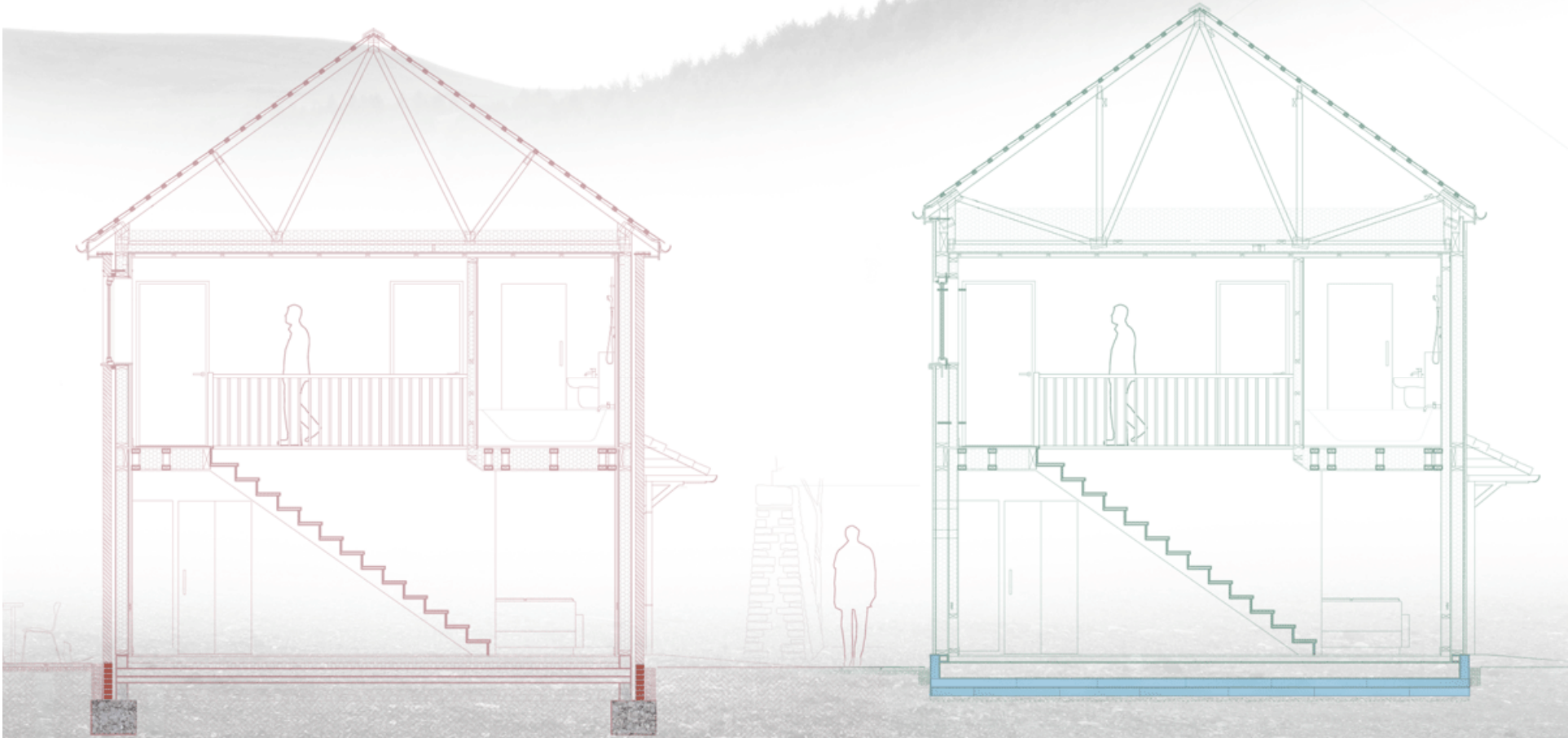
Foundations



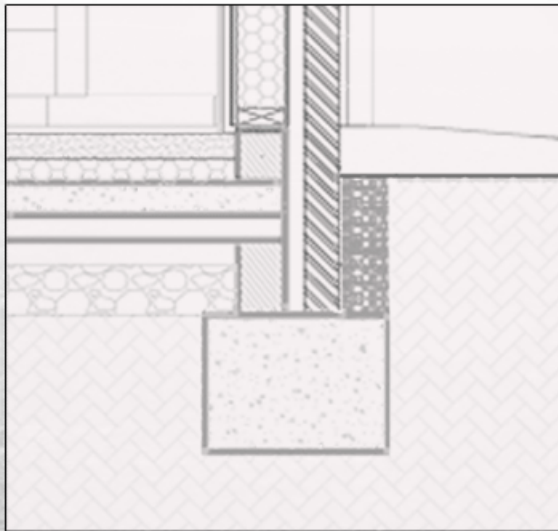
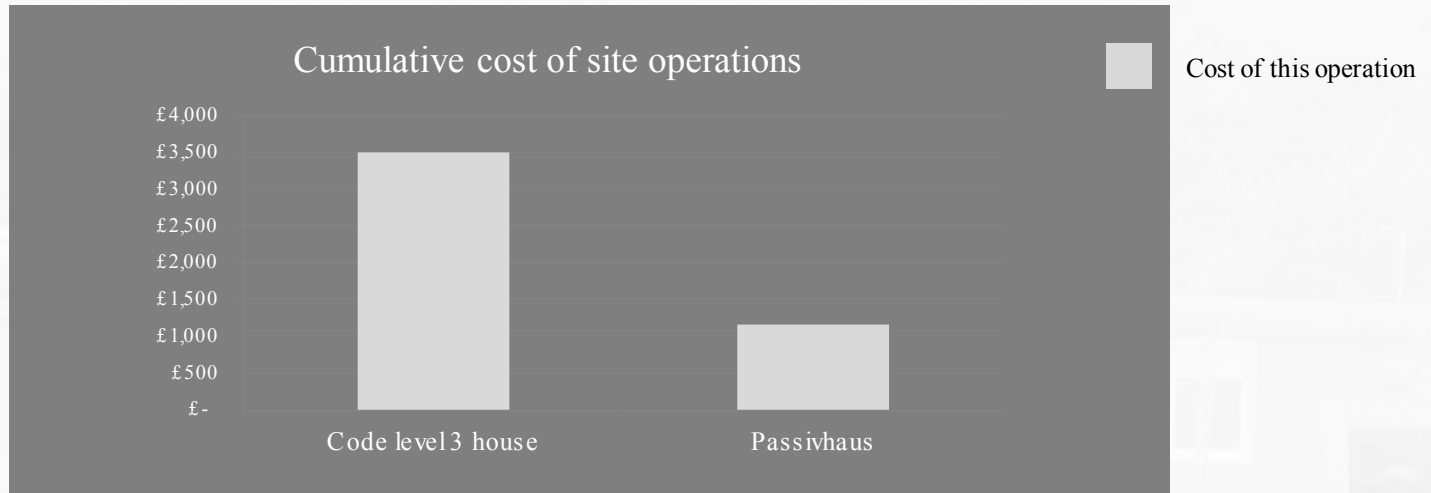
Foundations



Foundations

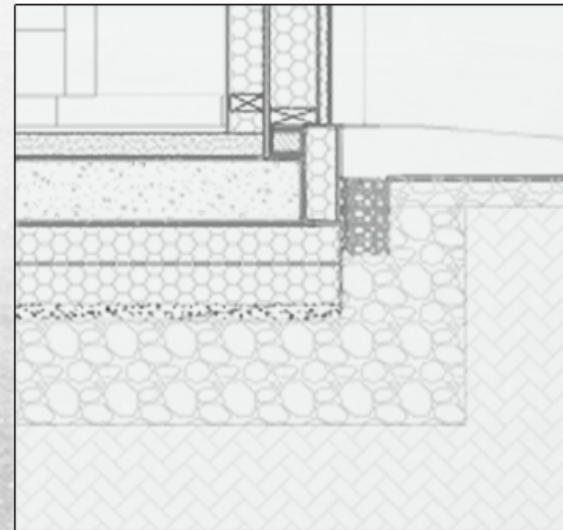


Foundations



Code level 3 house

Cost and Time			
This Operation			
£ 3,501	Cost	£ 1,160	
10 days	Time	2 days	
Total so Far			
£ 3,501	Cost	£ 1,160	
10 days	Time	2 days	



Passivhaus

Ground floor construction

Specification:-

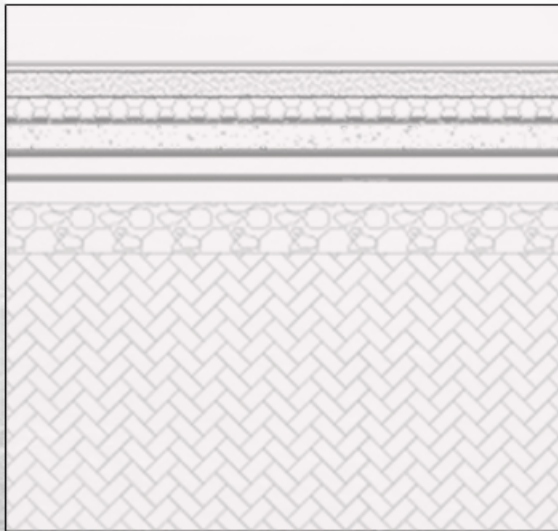
Excavation to reduce levels

Weedkiller

150mm thick beam and block flooring

300 mu dpm + tapes, Radon barrier

80mm thick Floormate 500 insulation
tongued grooved and glued joints



Code level 3 house

Specification:-

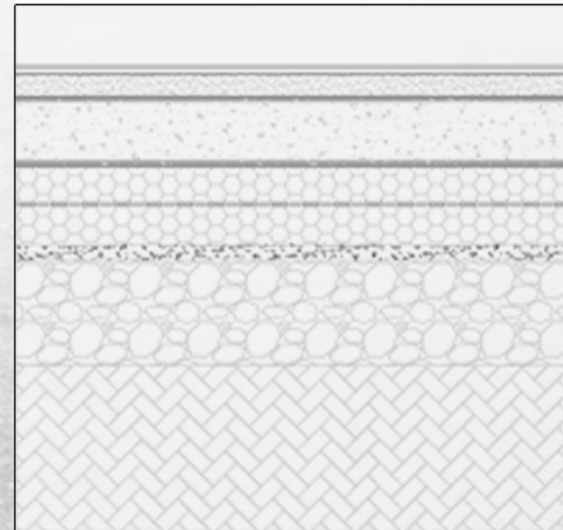
Excavation to reduce levels

50mm thick sand blinding

2 layers 120mm thick XPS insulation with
taped joints

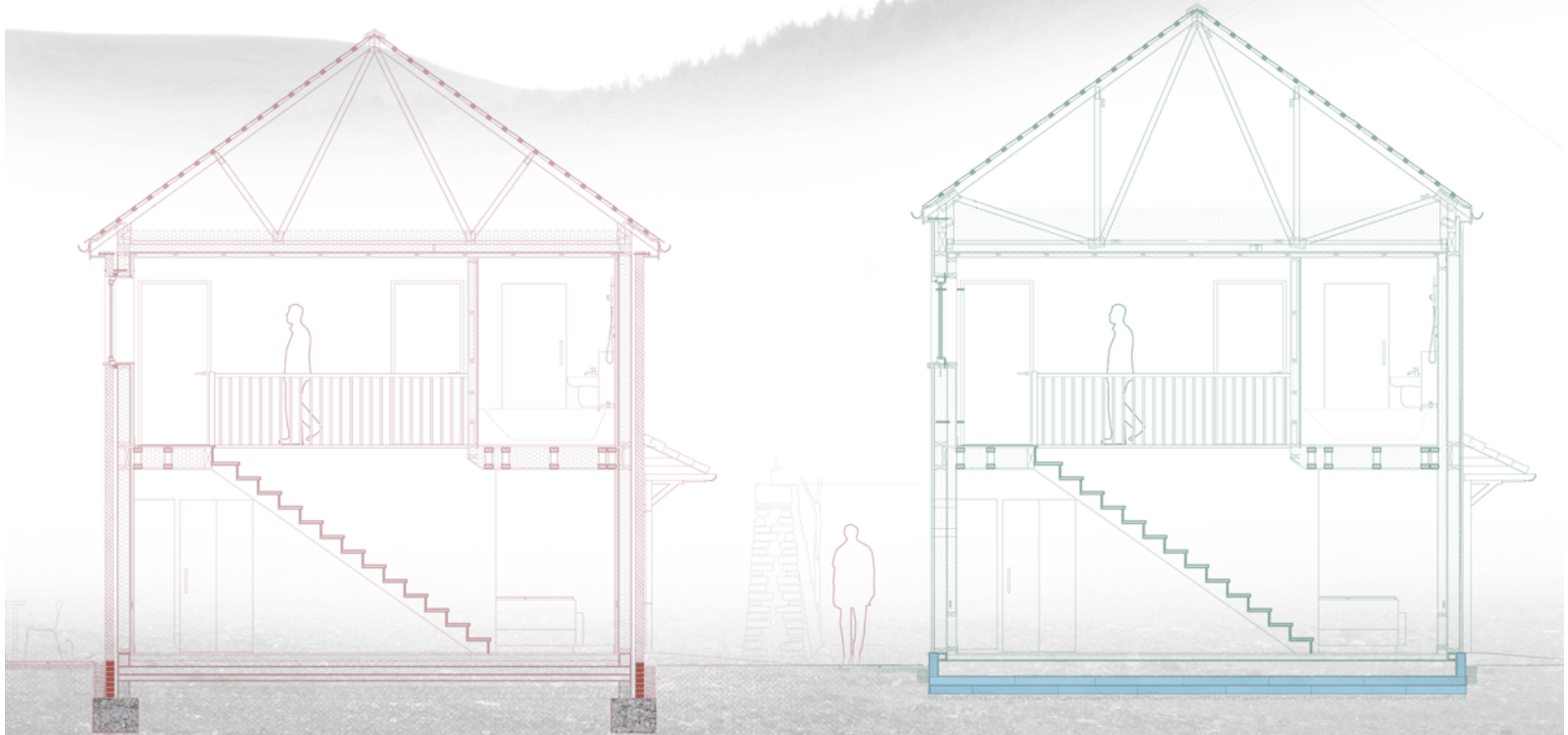
200mm thick reinforced concrete raft slab

300 mu dpm and tapes, Radon barrier

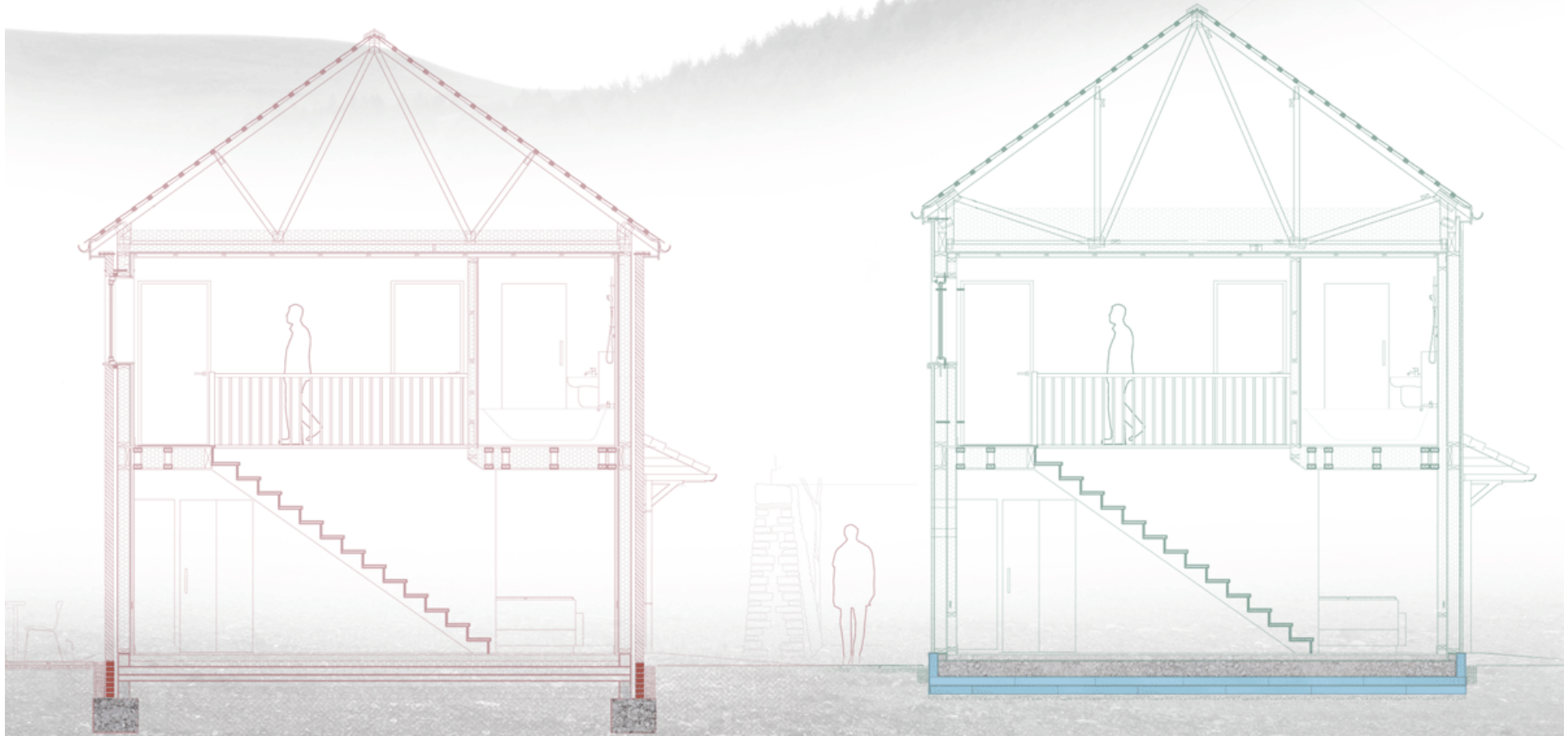


Passivhaus

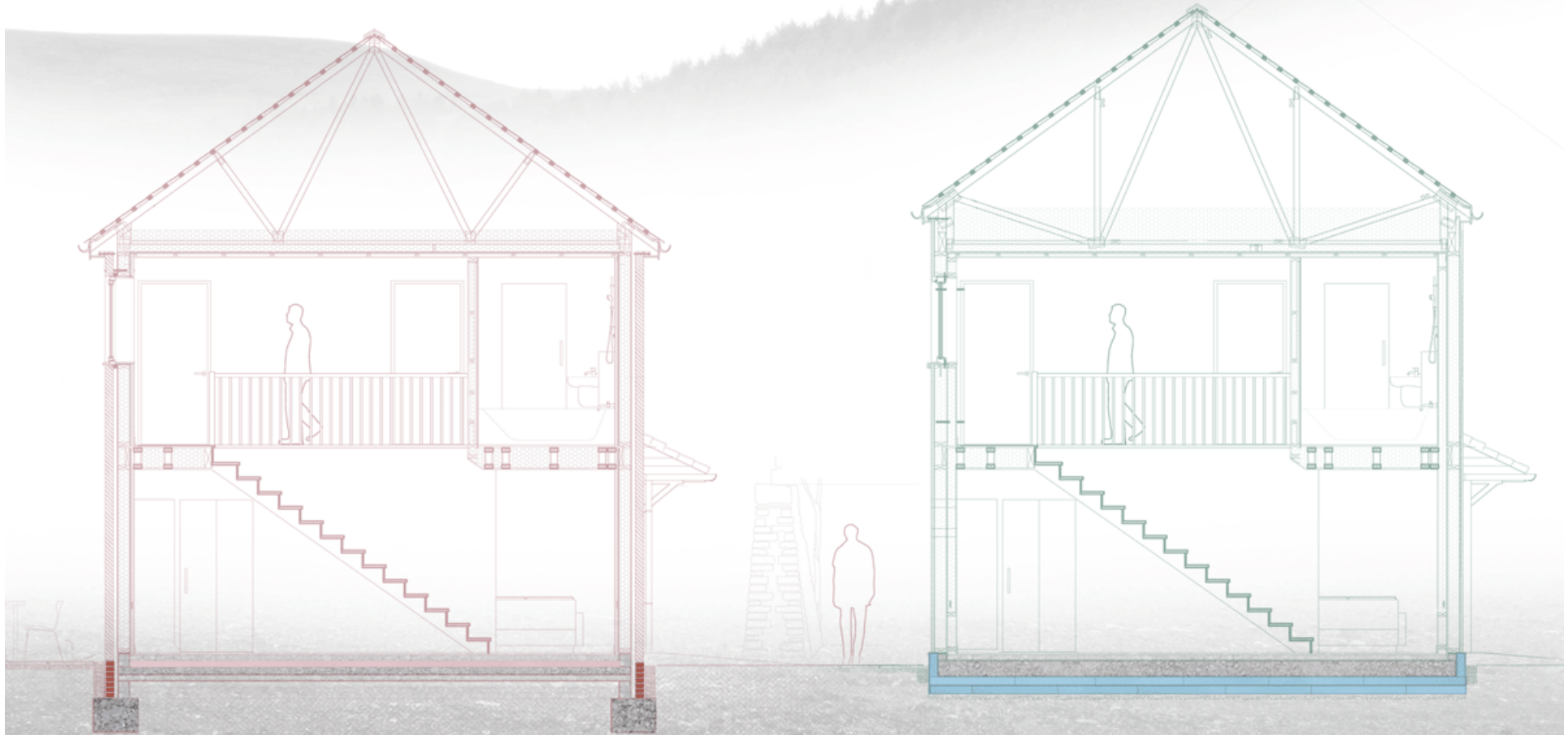
Ground floor construction



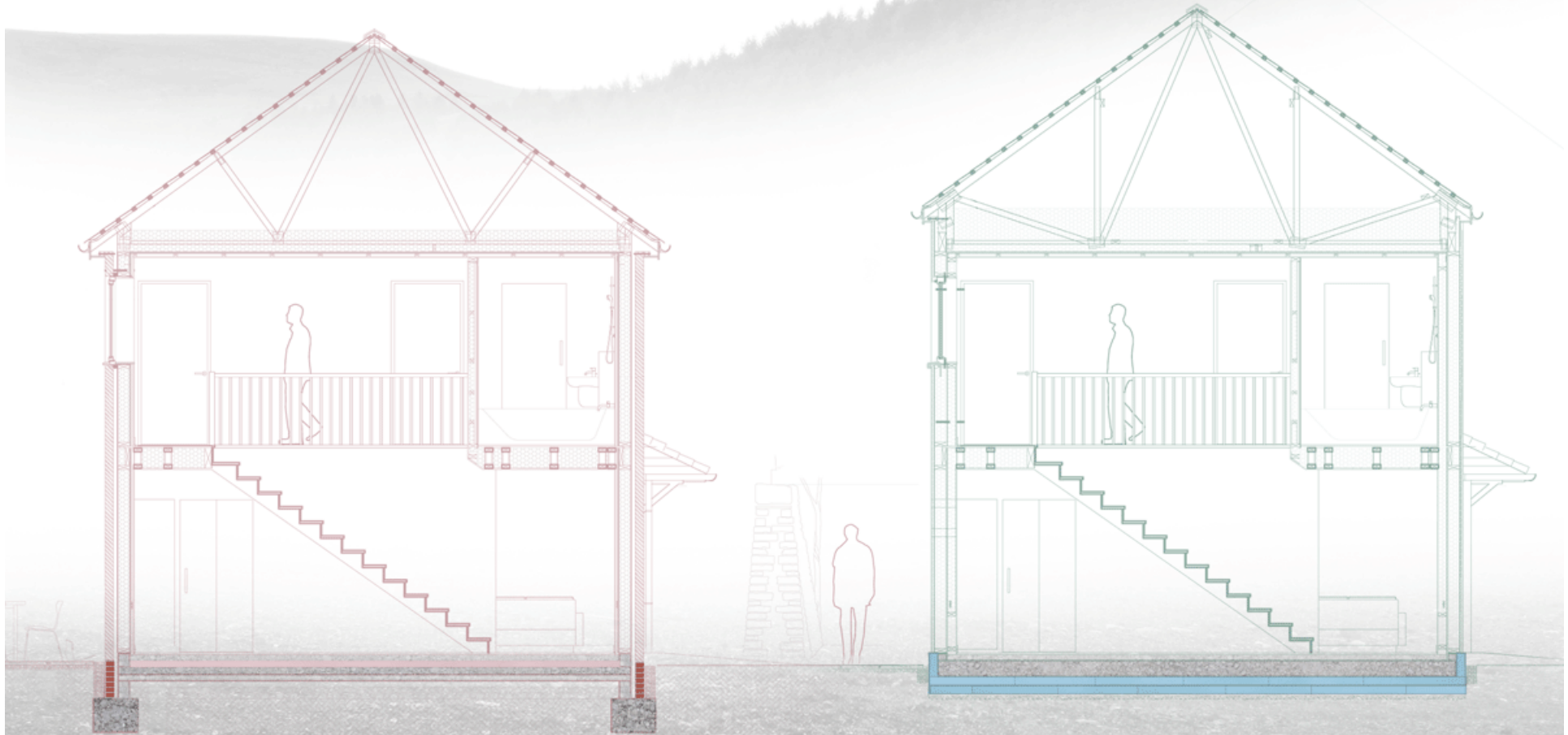
Ground floor construction



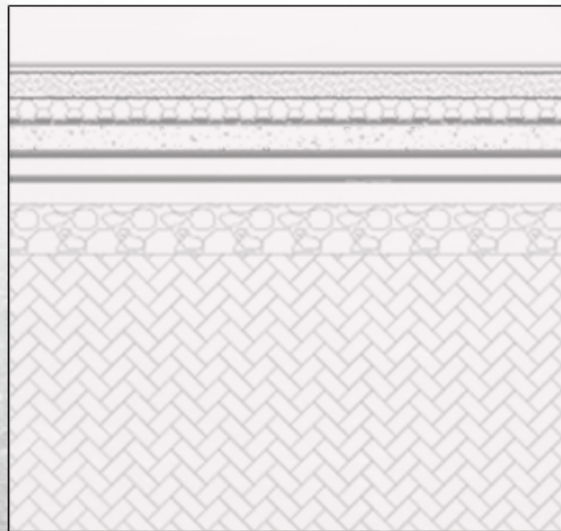
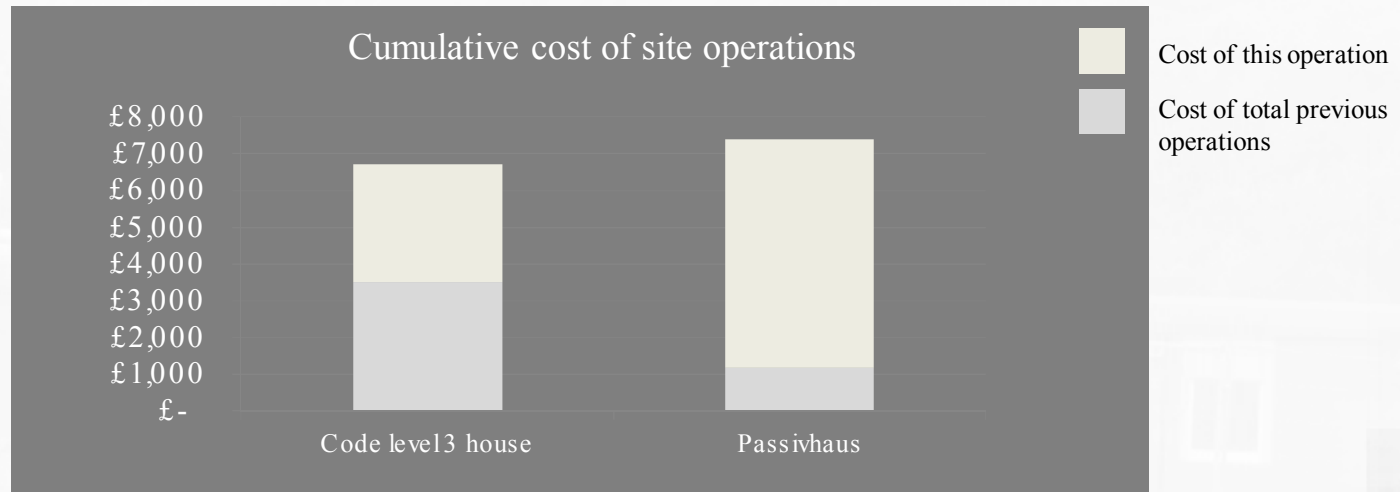
Ground floor construction



Ground floor construction

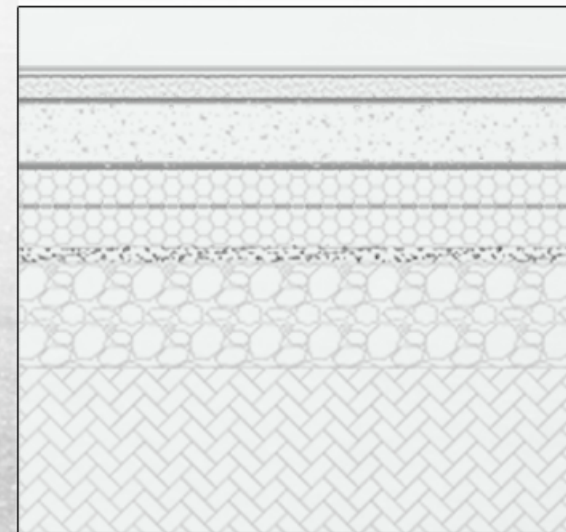


Ground floor construction



Code level 3 house

Cost and Time			
This Operation			
£ 3,209	Cost	£ 6,233	
3 days	Time	7 days	
Total so Far			
£ 6,711	Cost	£ 7,392	
13 days	Time	9 days	

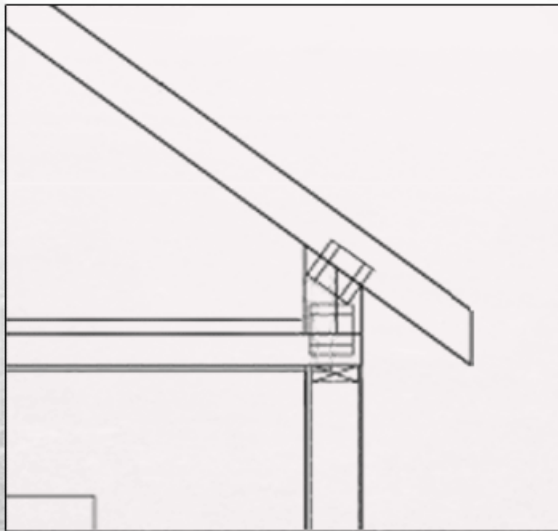


Passivhaus

Frame

Specification:-

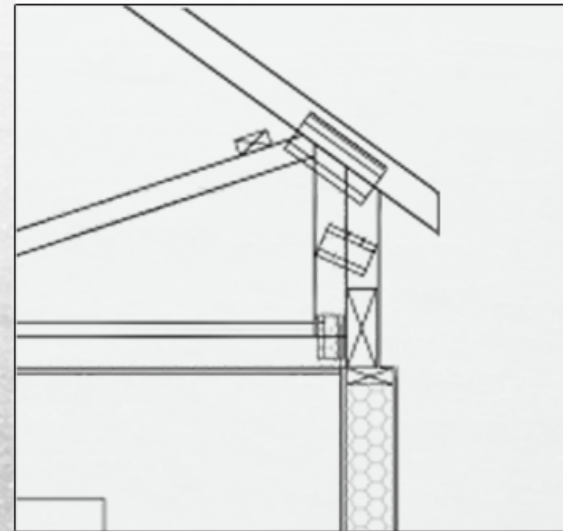
Standard open panel timber frame with
140mm thick studs
Eco-upper floor joists
Standard timber trussed rafters
Binders and bracing



Code level 3 house

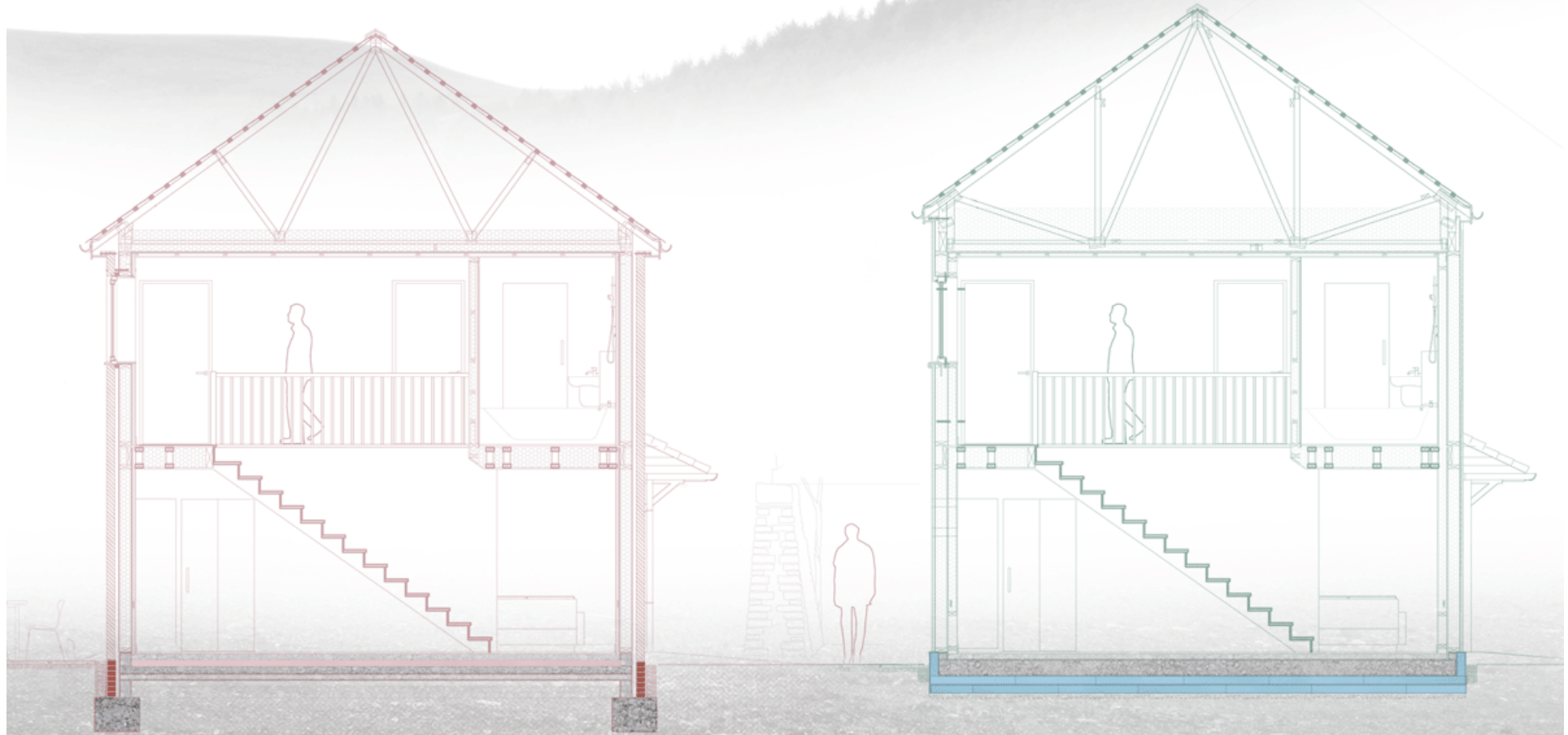
Specification:-

Passivhaus timber frame with 140mm
thick studs, 140mm thick Knauf
FrameTherm insulation
18mm thick OSB boarding internally
Vapour barrier externally
Eco-upper floor joists with metal web to
support MHVR
Special timber trussed rafters with deep
eaves height to accommodate thick roof
insulation and prevent thermal bridging
Binders and bracing



Passivhaus

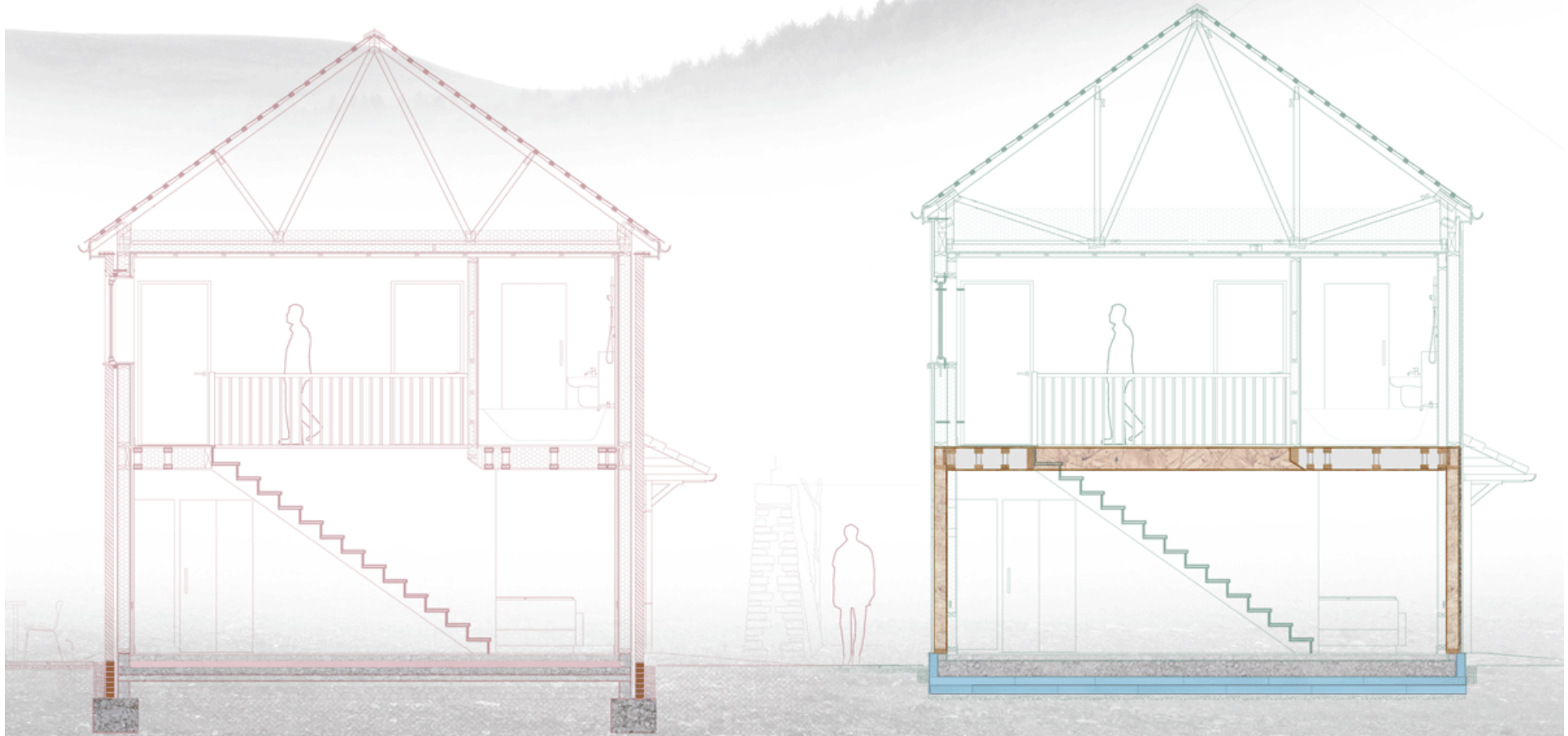
Frame



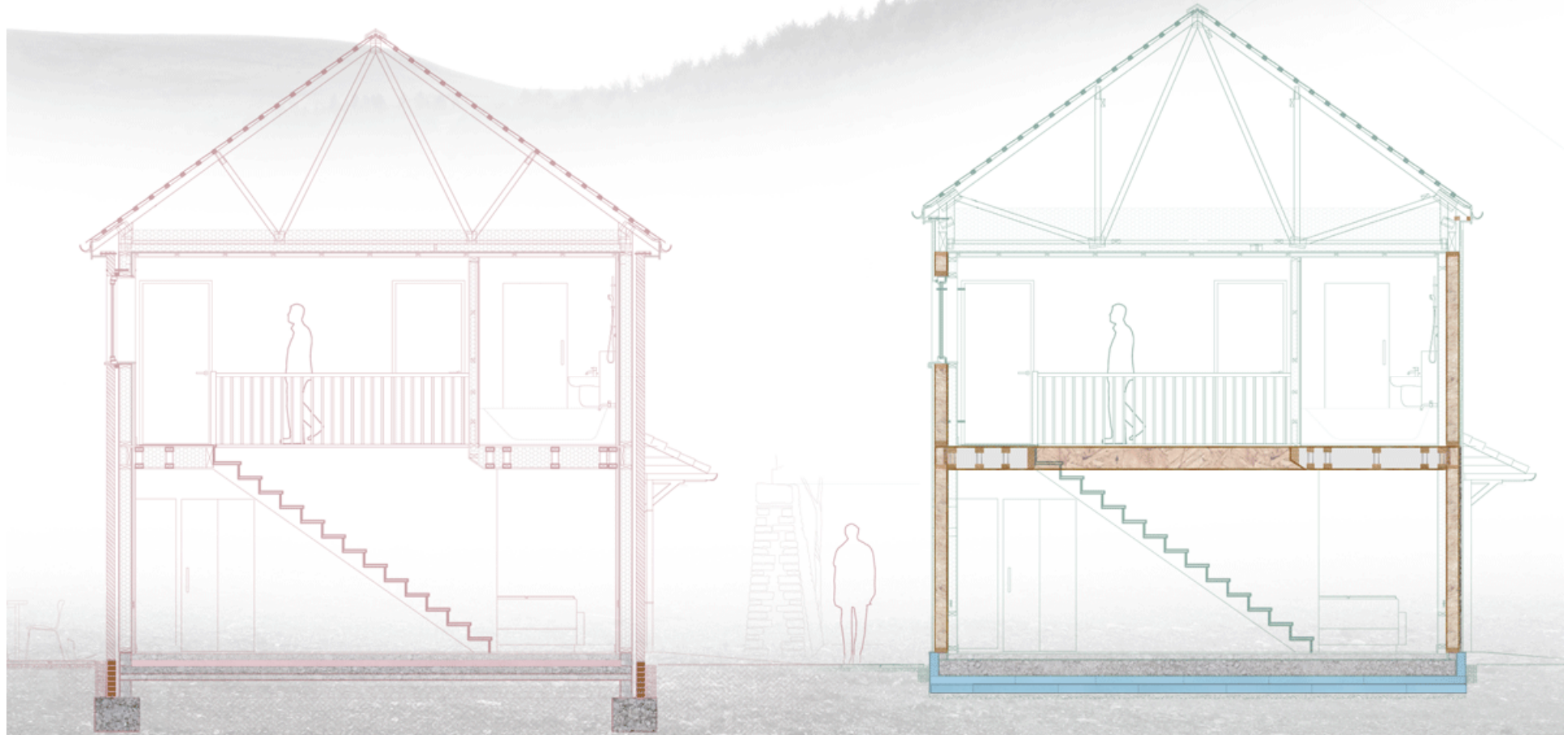
Frame



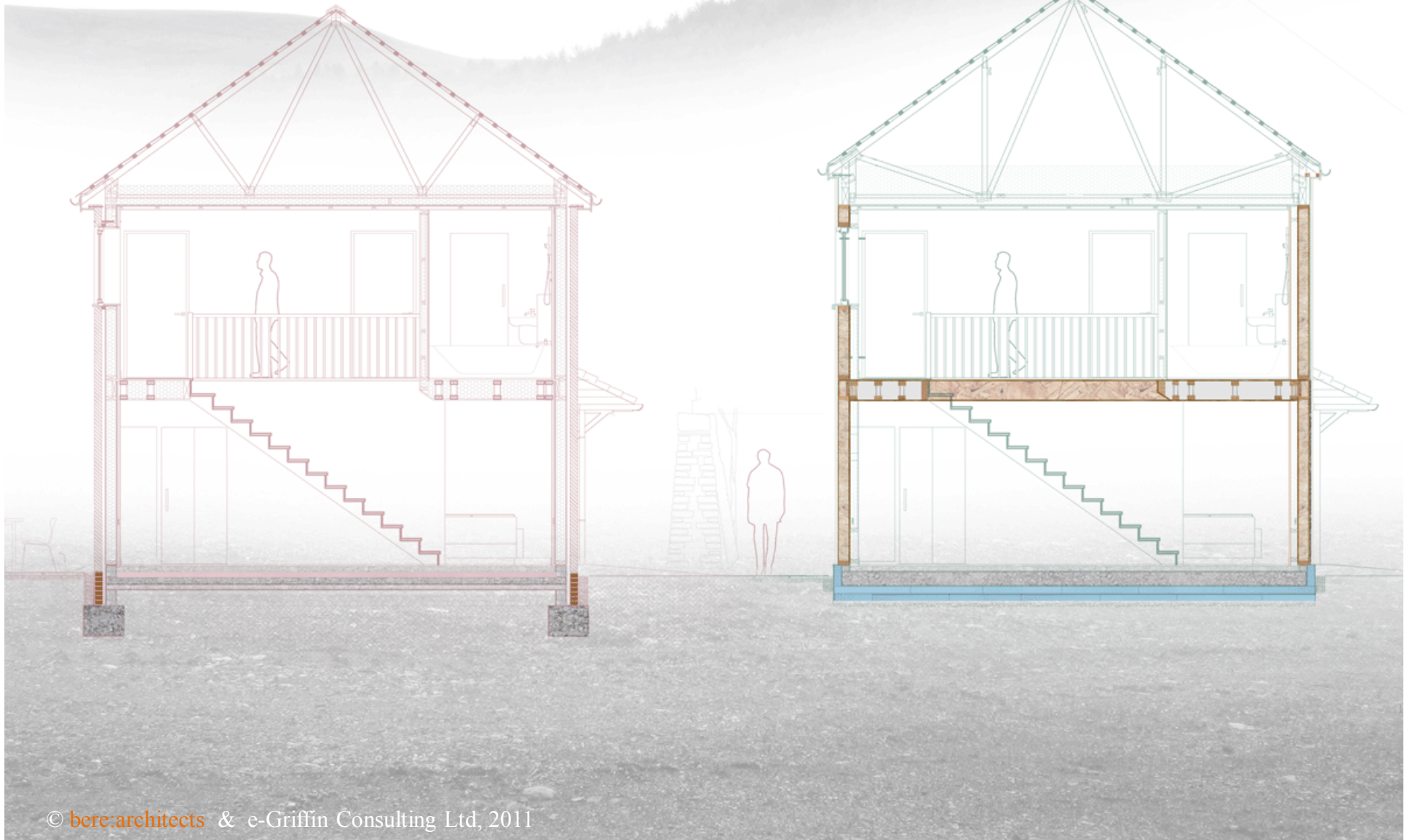
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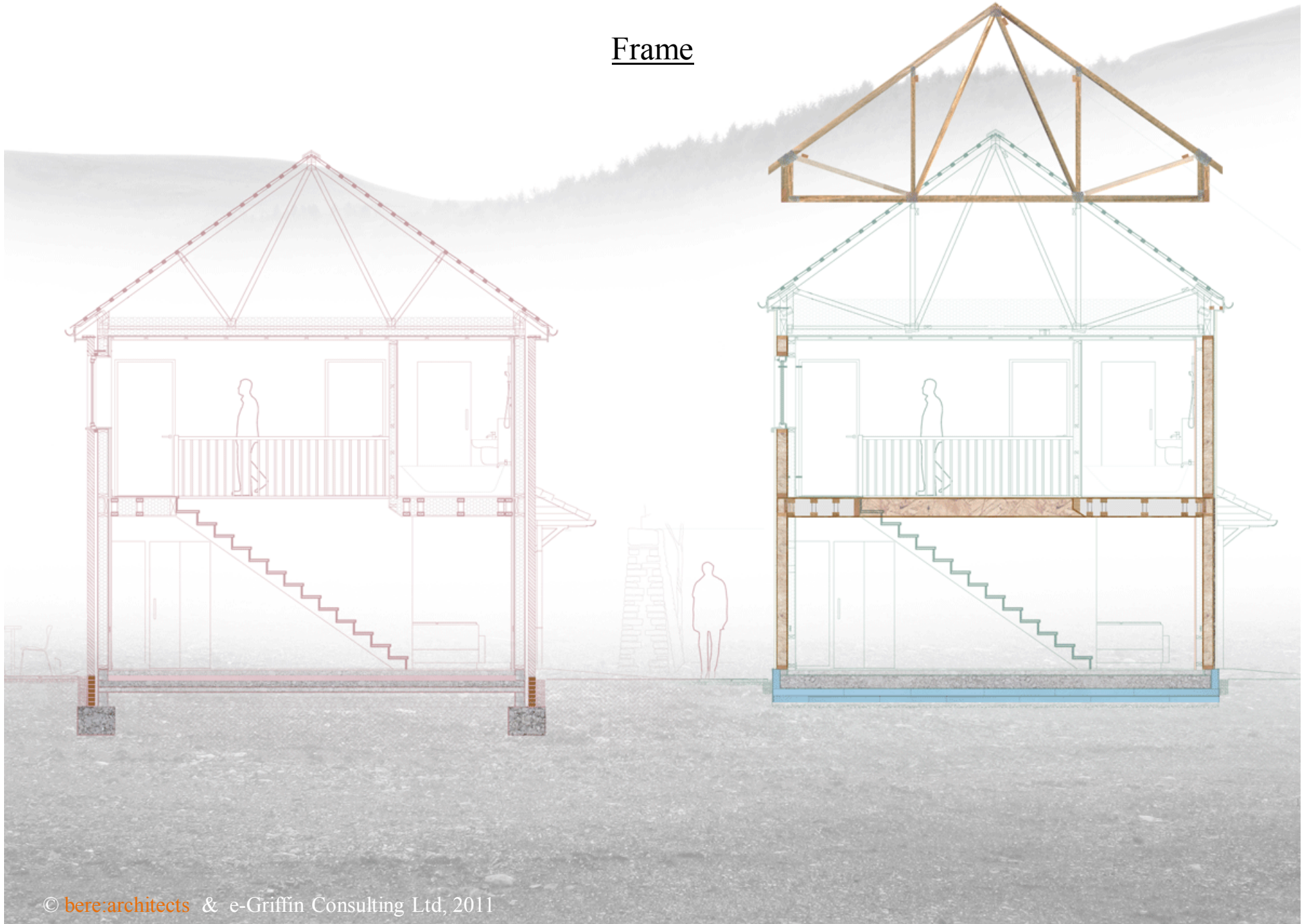
Frame



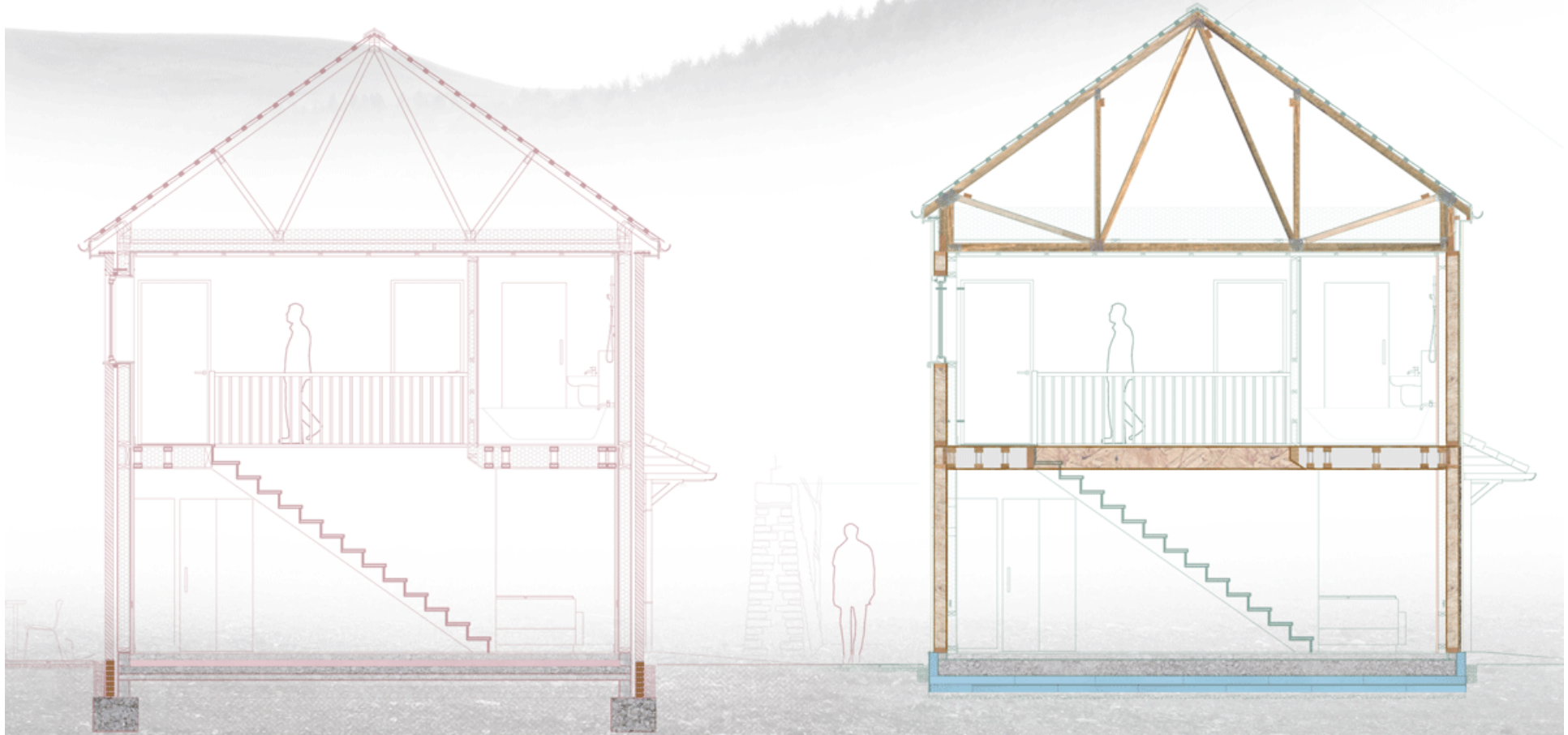
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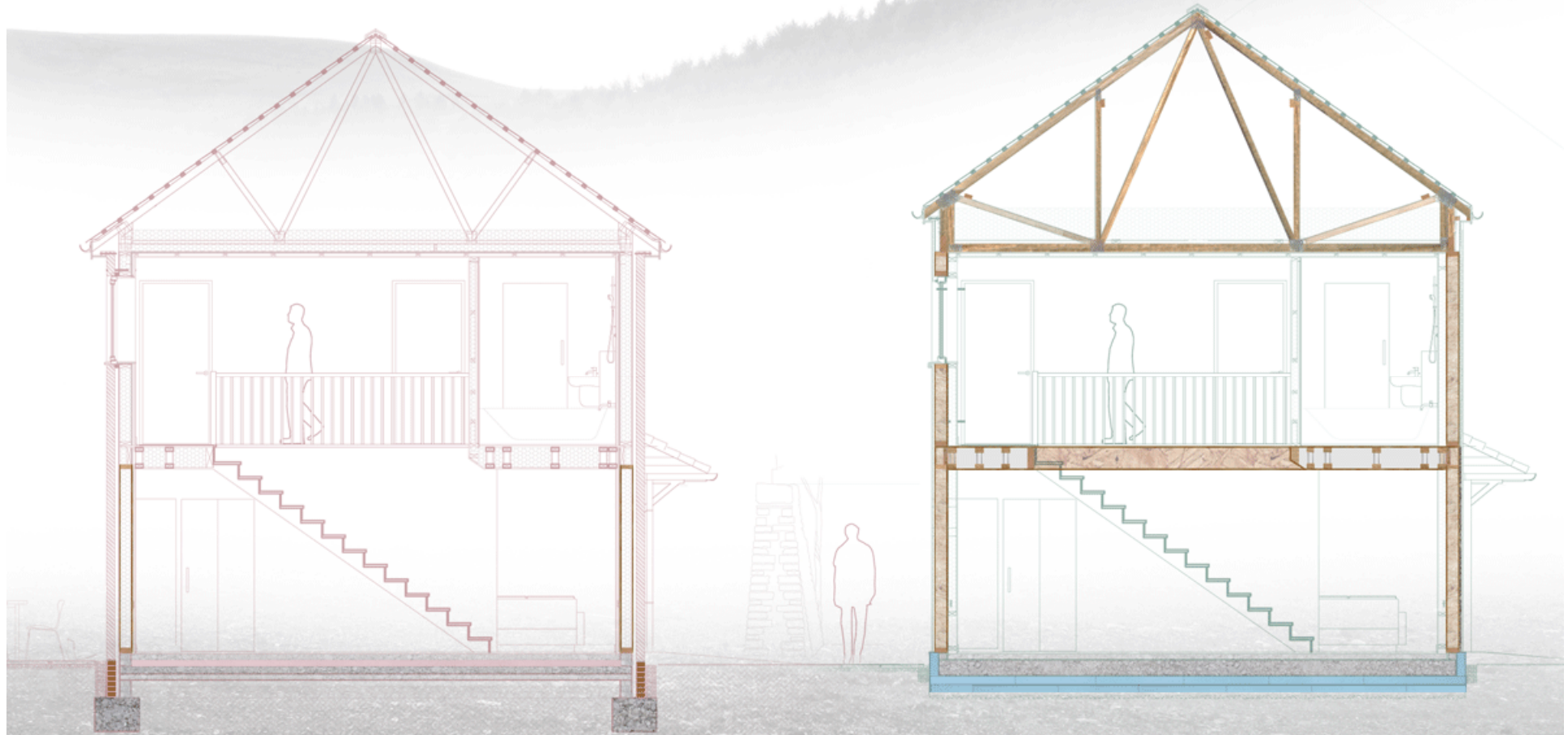
Frame



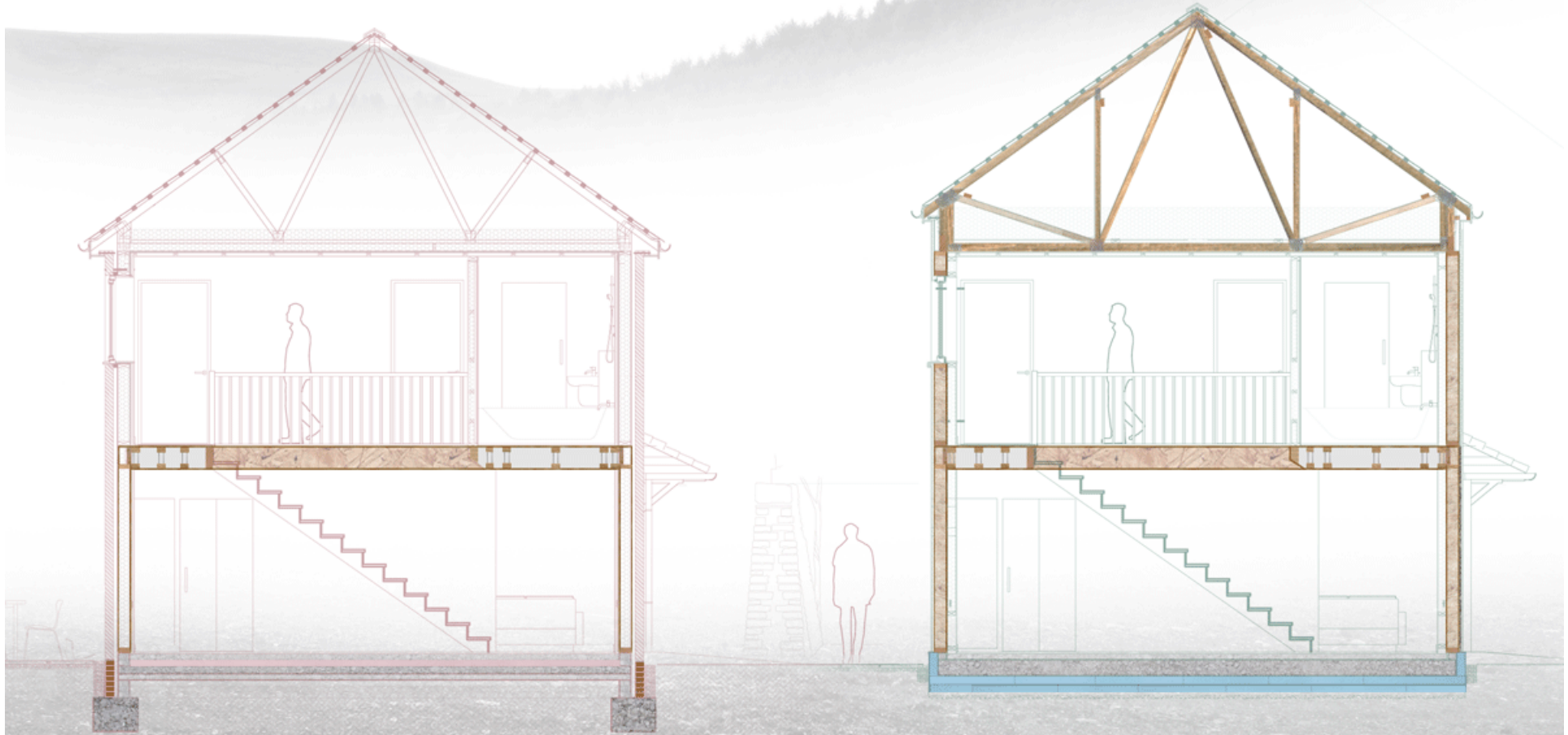
Frame



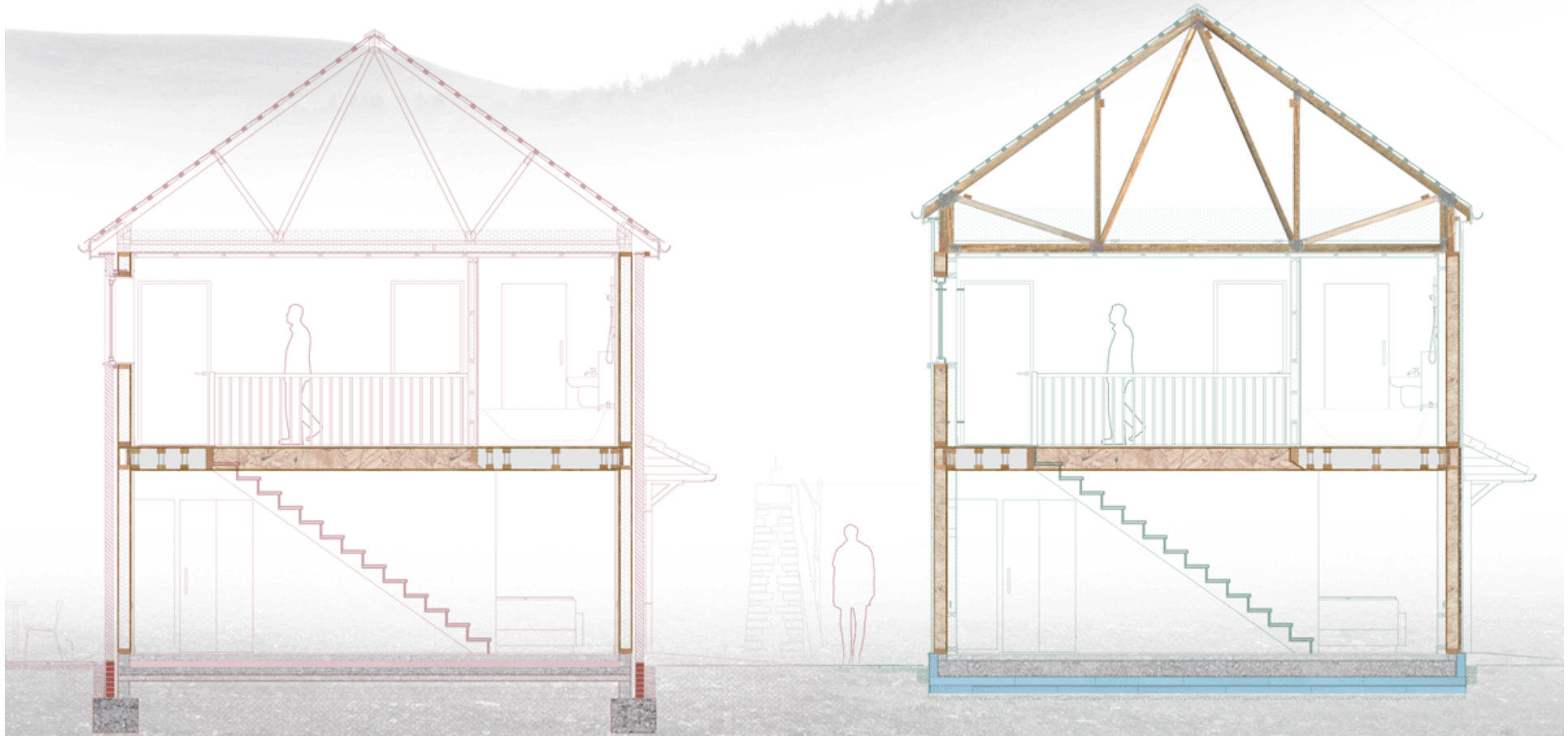
Frame



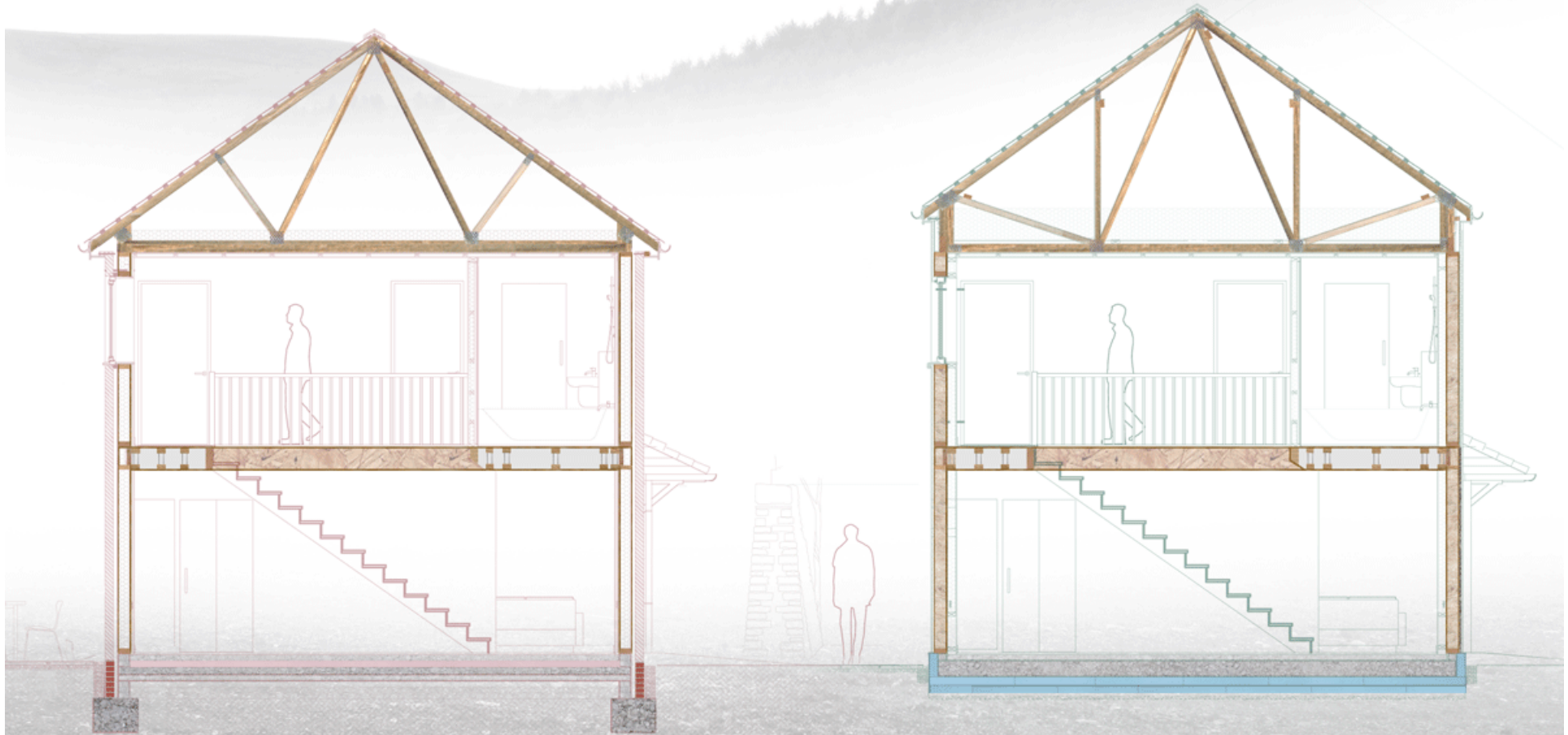
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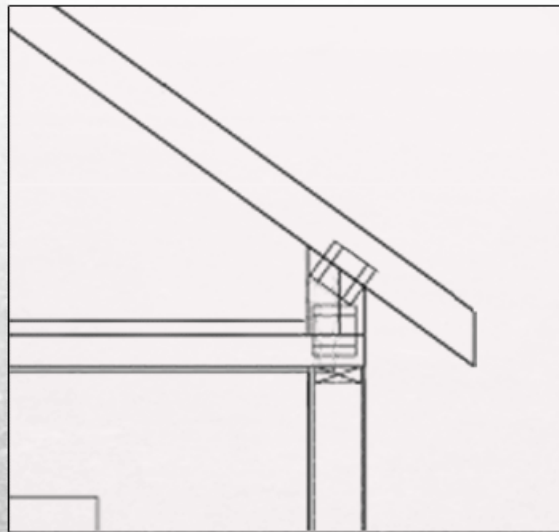
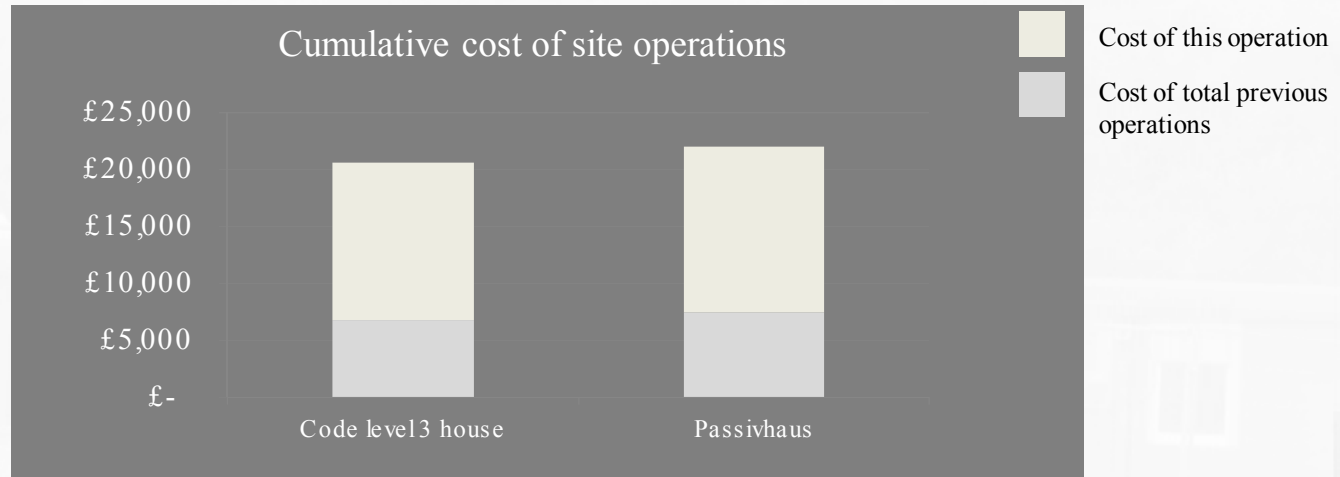
Frame



Frame

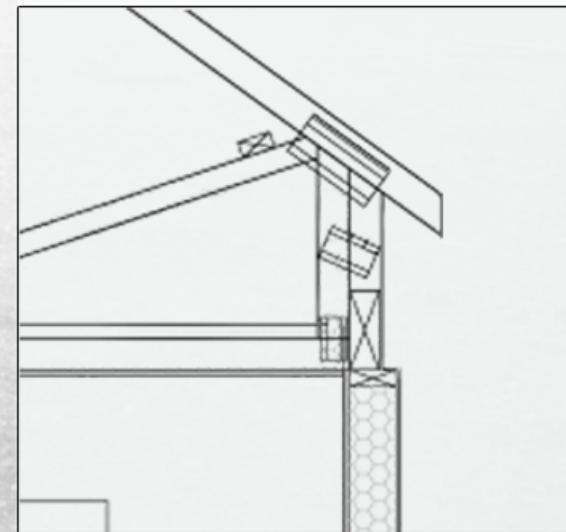


Frame



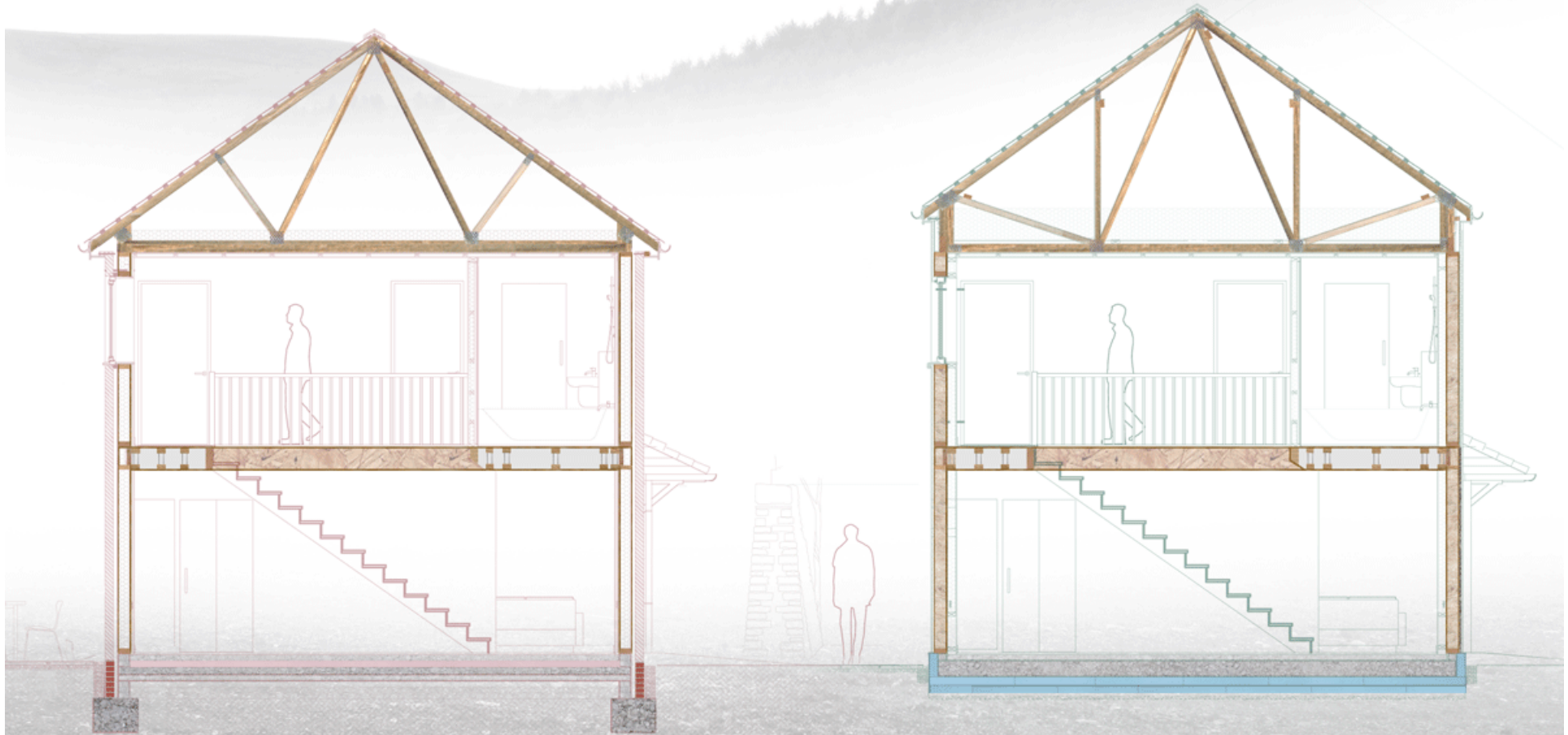
Code level 3 house

Cost and Time			
This Operation			
£ 13,864	Cost	£ 14,602	
10 days	Time	10 days	
Total so Far			
£ 20,574	Cost	£ 21,994	
23 days	Time	19 days	

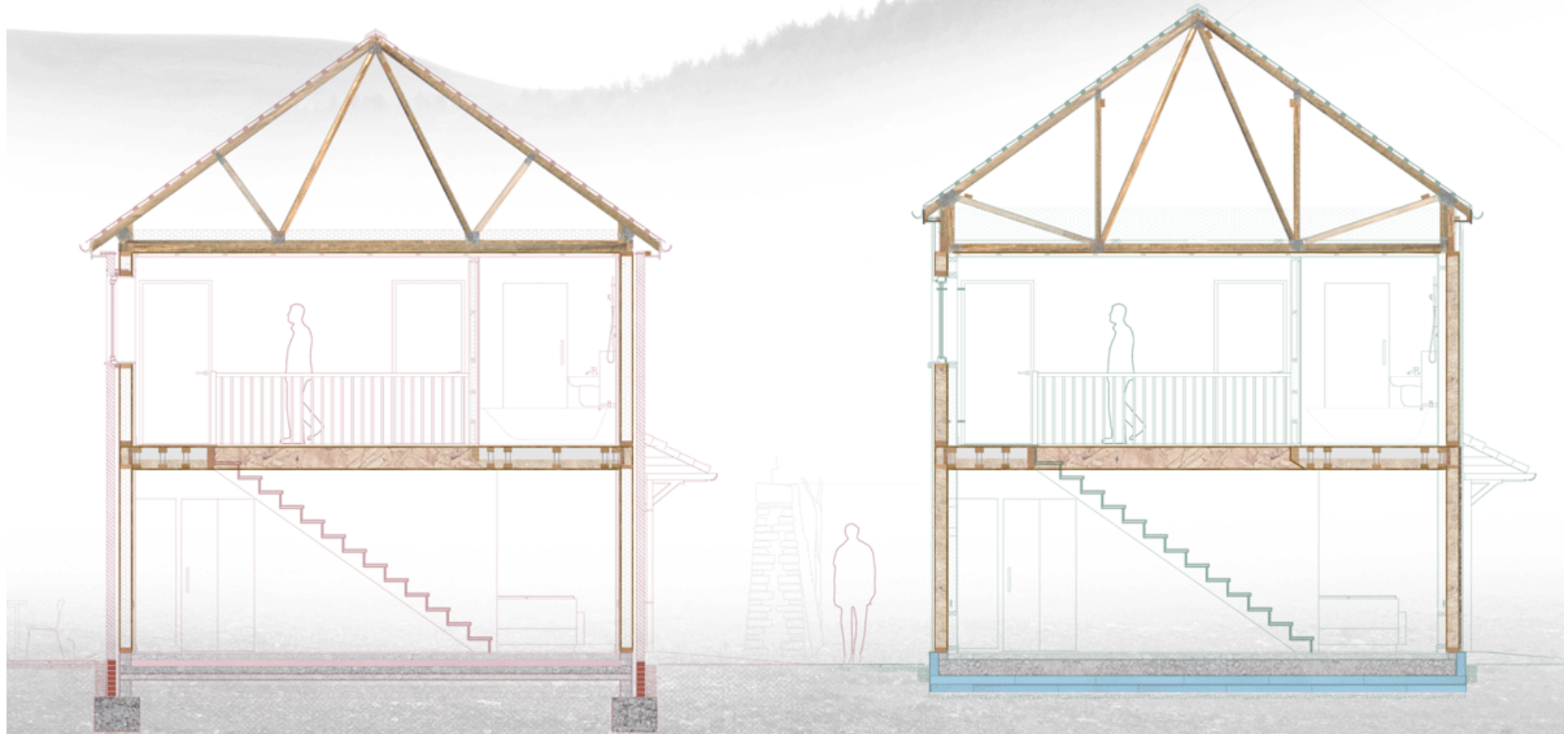


Passivhaus

Upper floor



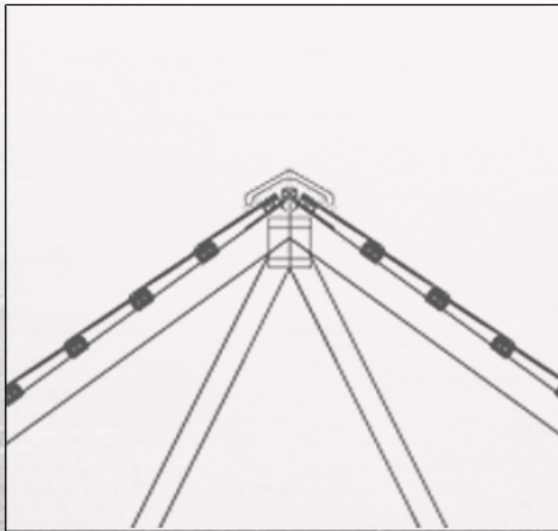
Upper floor



Roof

Specification:-

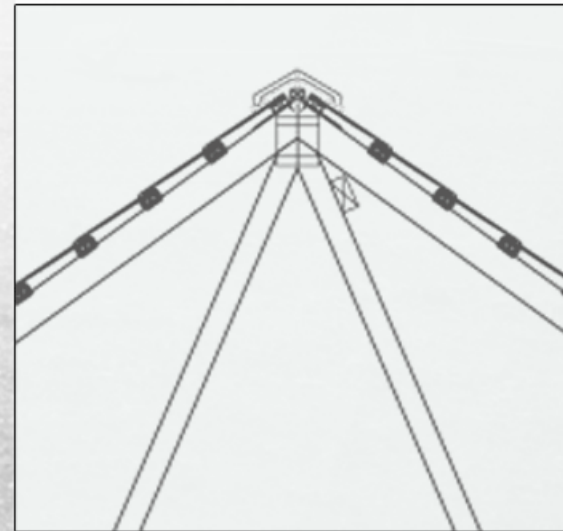
150mm thick Knauf insulation quilt
Concrete tile roof covering
Upvc rainwater goods
Painted timber fascias and eaves soffits
Fascia ventilation grille strip



Code level 3 house

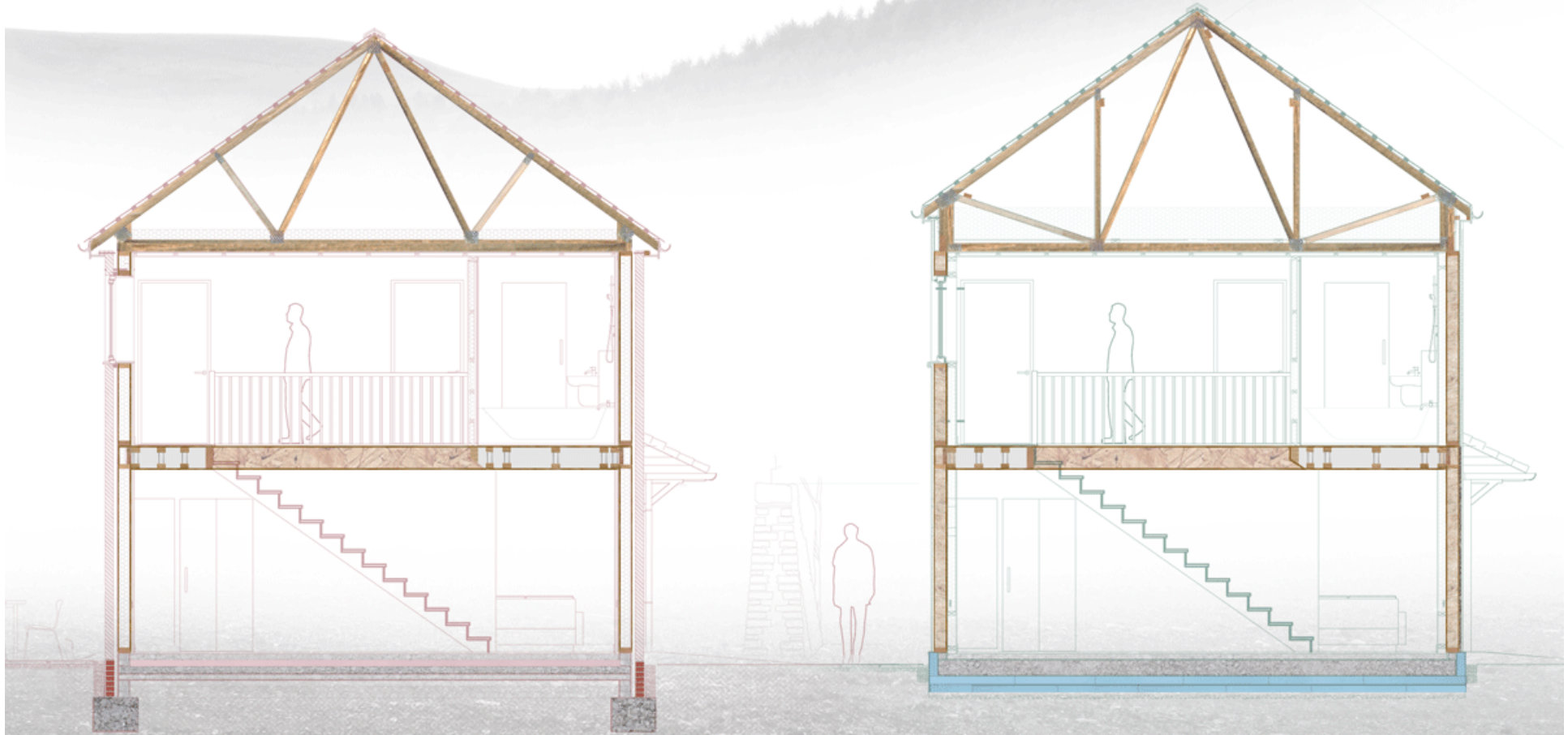
Specification:-

3 layers Knauf FrameThermRoll 40
insulation totalling 420mm thick
18mm thick OSB boarding to underside
of trussed rafters
Concrete tile roof covering
Upvc rainwater goods
Painted timber fascias and eaves soffits
Fascia ventilation grille strip

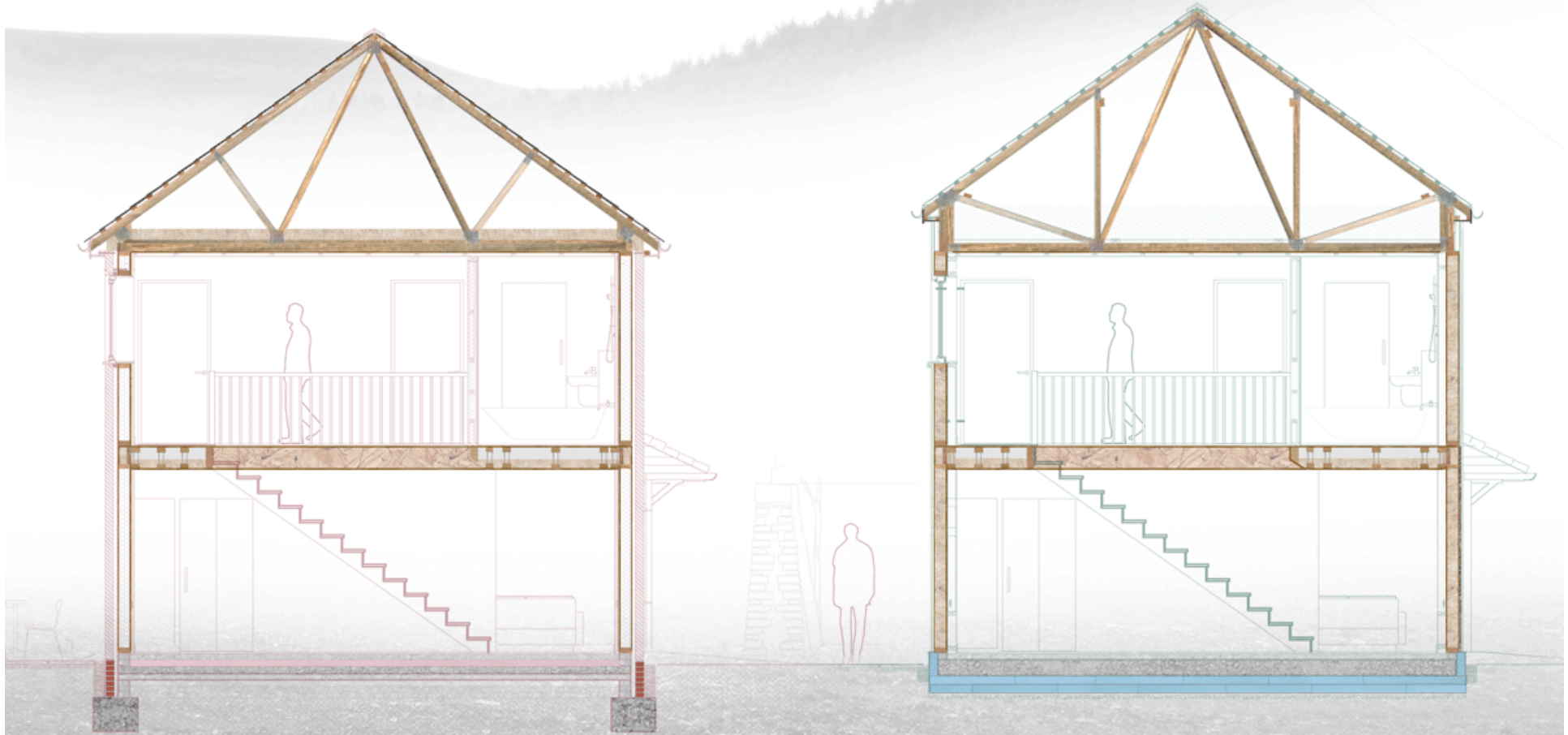


Passivhaus

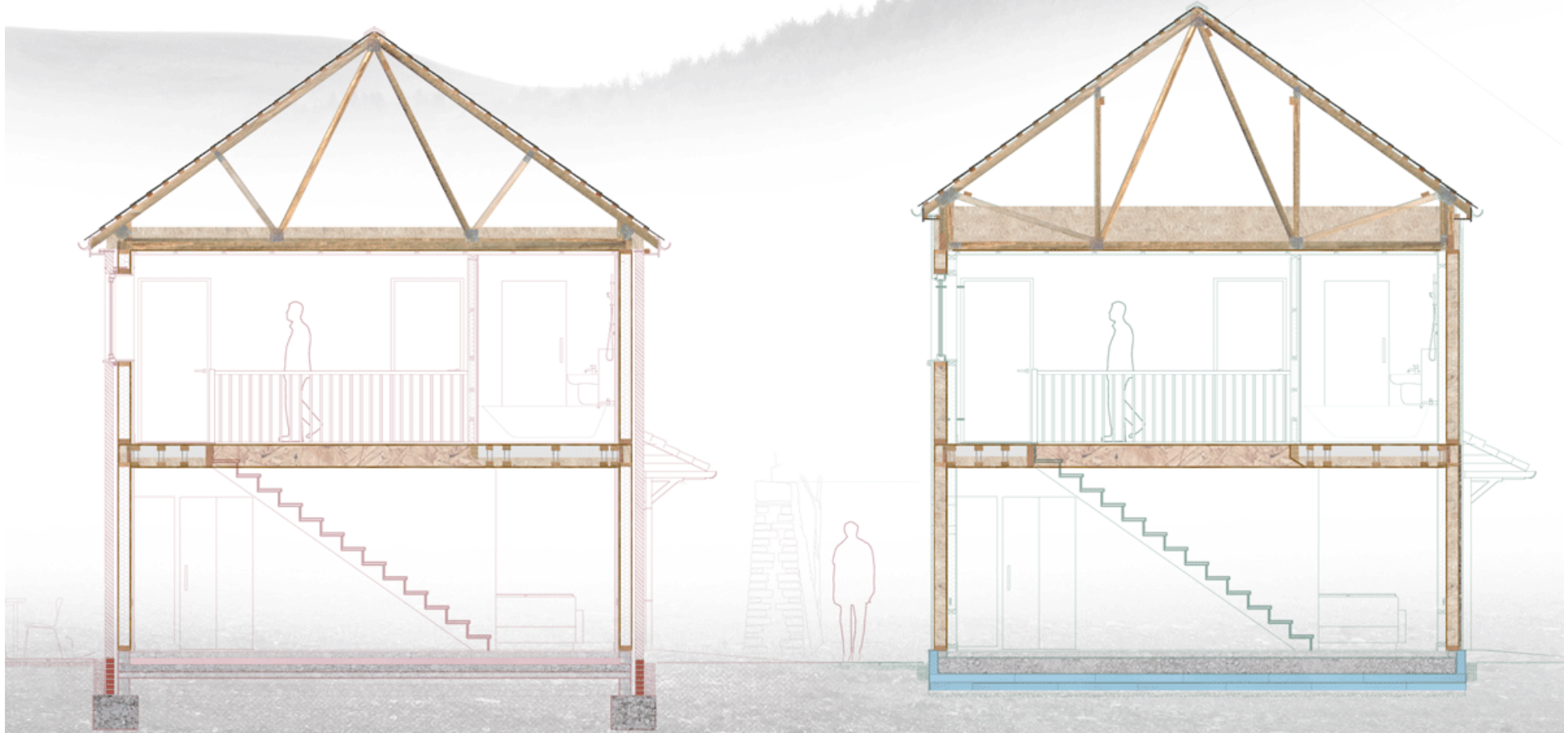
Roof



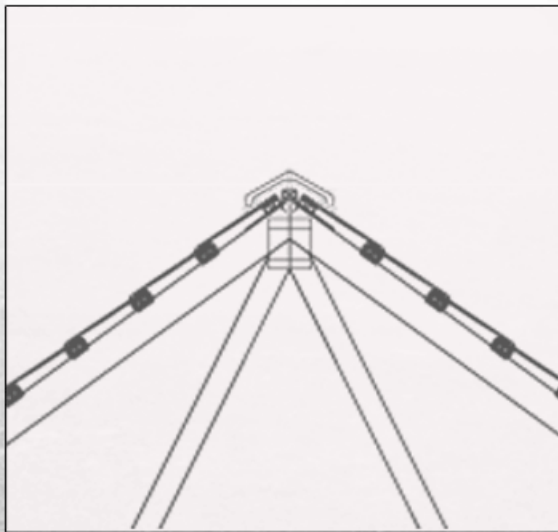
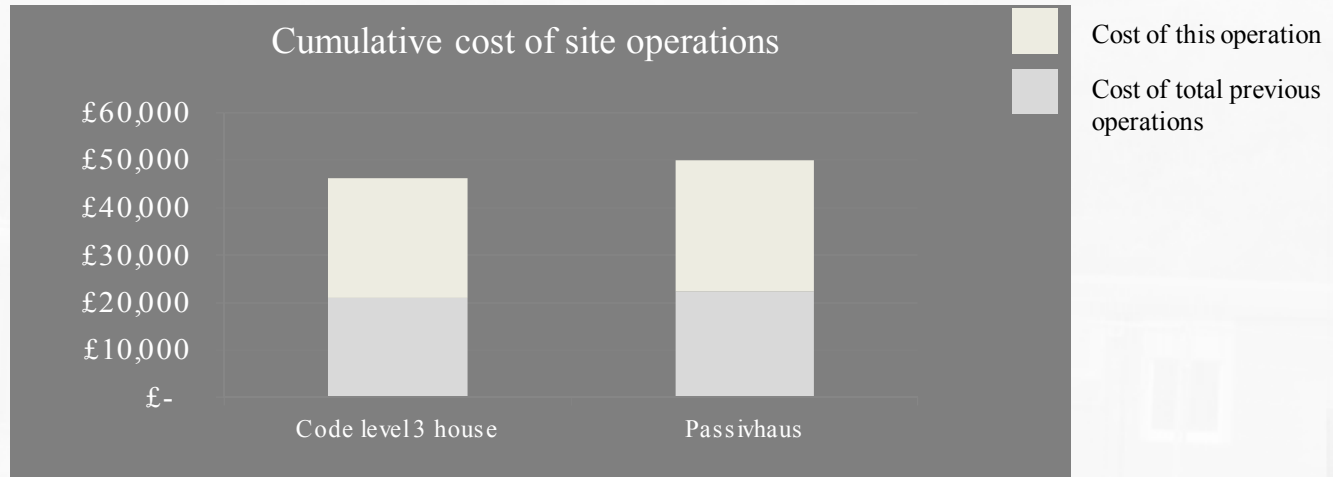
Roof



Roof

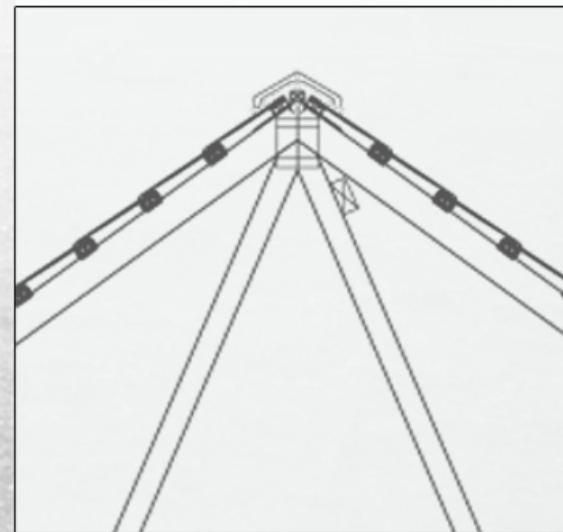


Roof



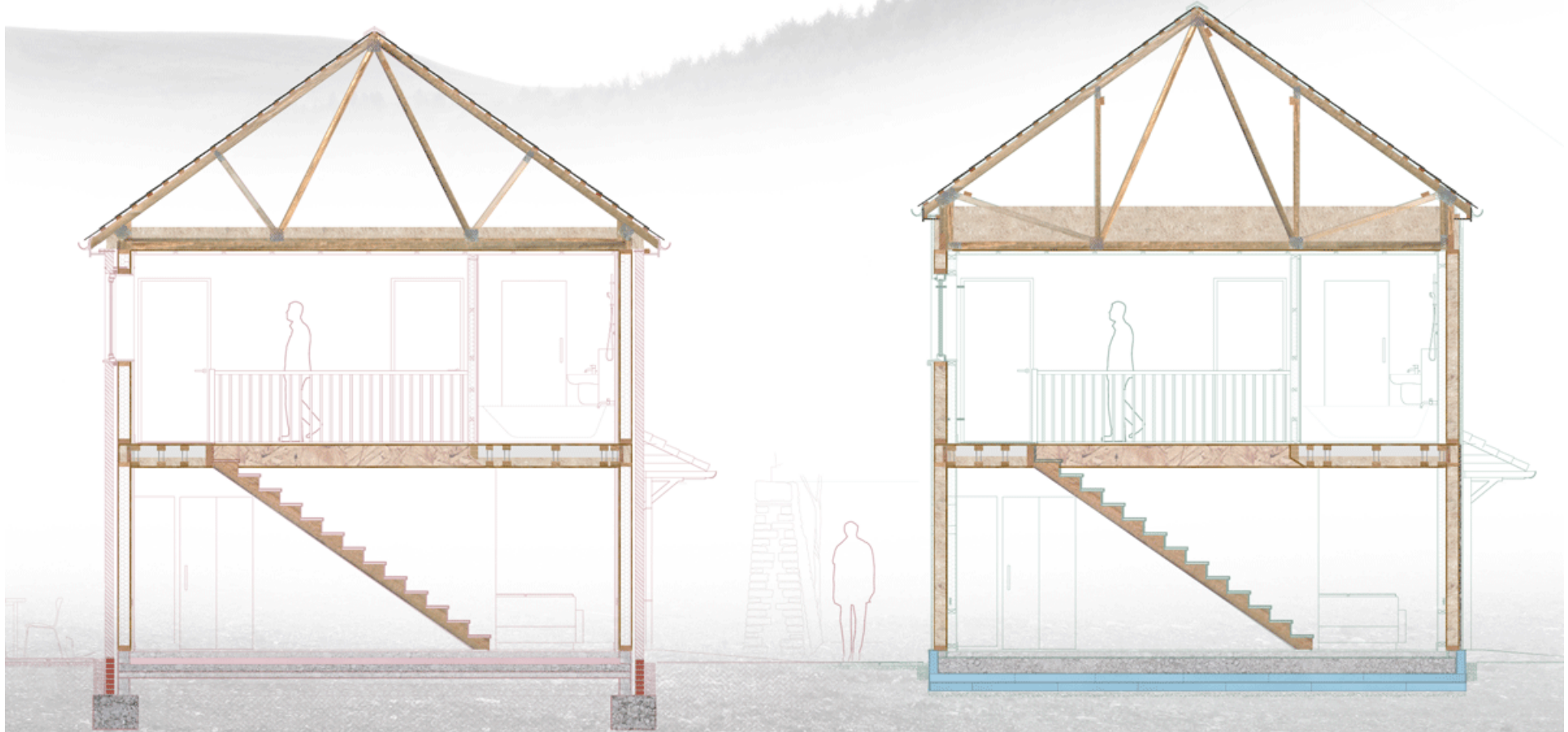
Code level 3 house

Cost and Time			
This Operation			
£ 4,424	Cost	£ 5,212	
4 days	Time	5 days	
Total so Far			
£ 25,340	Cost	£ 27,547	
28 days	Time	25 days	



Passivhaus

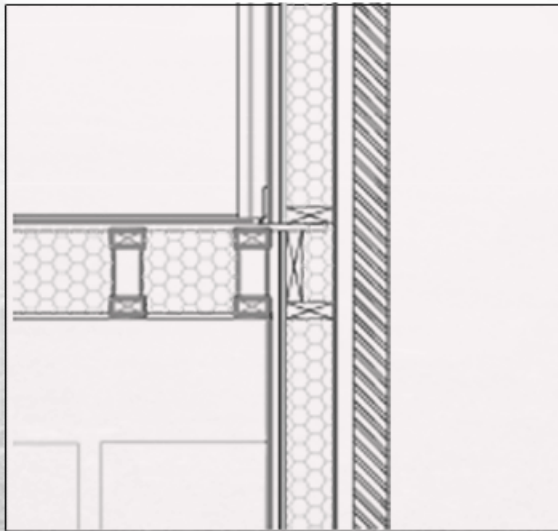
Staircase



External Walls

Specification:-

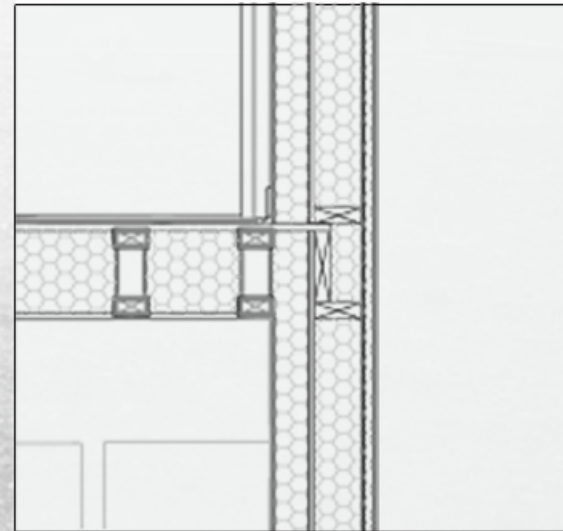
Half brick thick facing brick skin
50mm wide cavity with stainless steel ties
140mm thick Knauf FrameTherm insulation
18mm thick OSB boarding externally
Vapour barrier externally
18mm thick OSB boarding internally



Code level 3 house

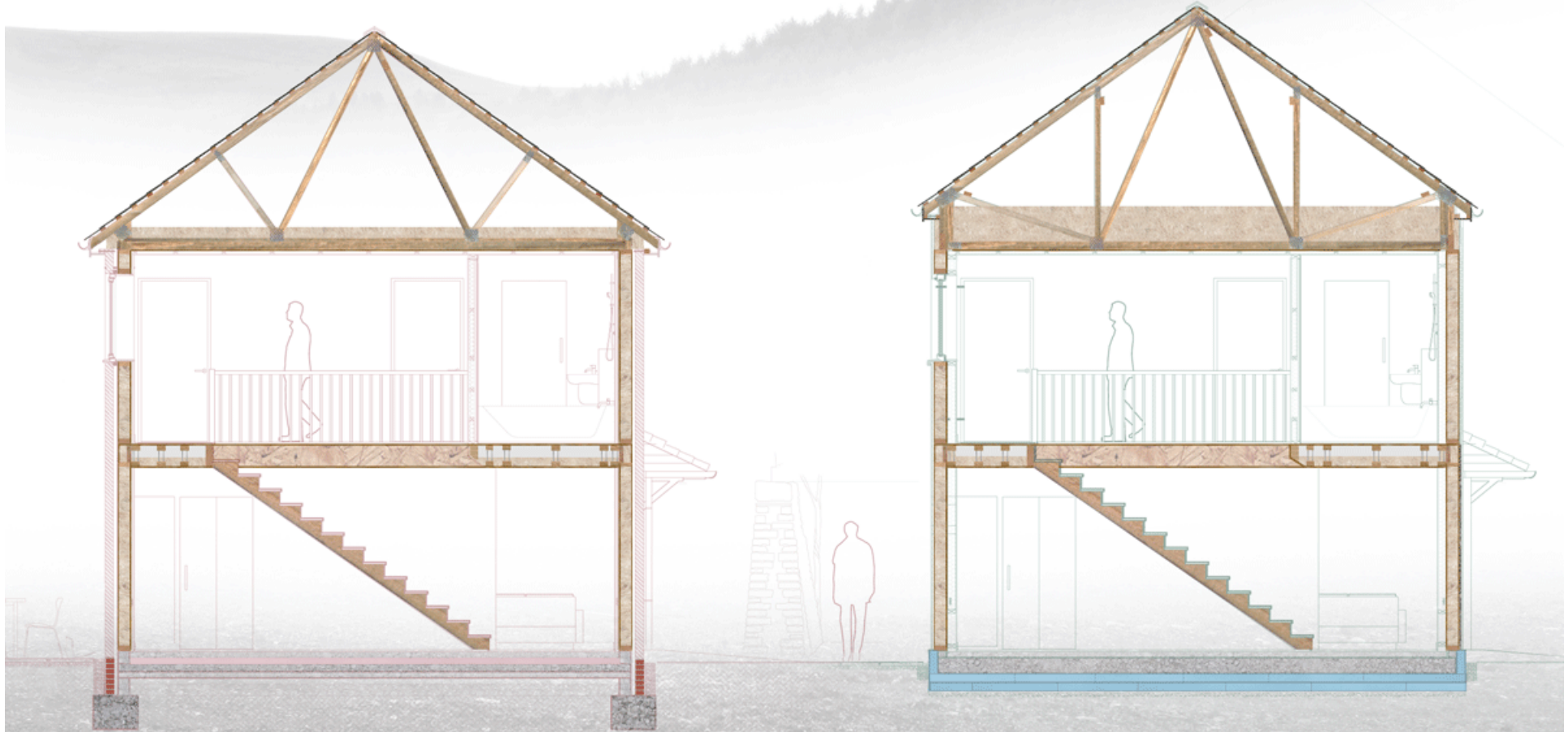
Specification:-

Lime render basecoat and finish
25mm thick Ty Mawr Celenet woodwool
boarding externally
9mm thick panelvent boarding externally
Vapour barrier externally
18mm thick OSB boarding internally
Intello air-tightness membrane
100mm thick Steicoflex wood fibre
insulation between 100 x 50mm timber
studwork



Passivhaus

External Walls



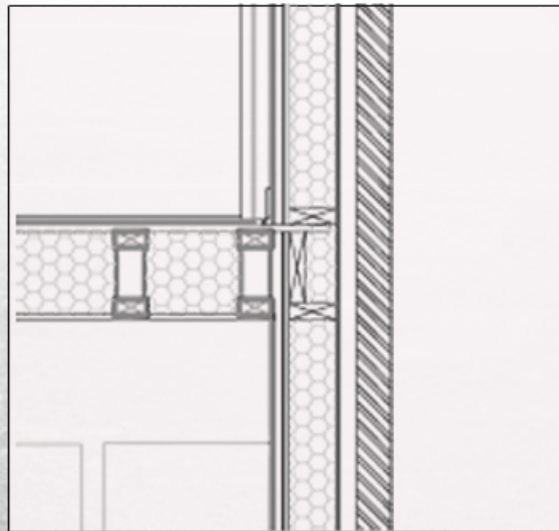
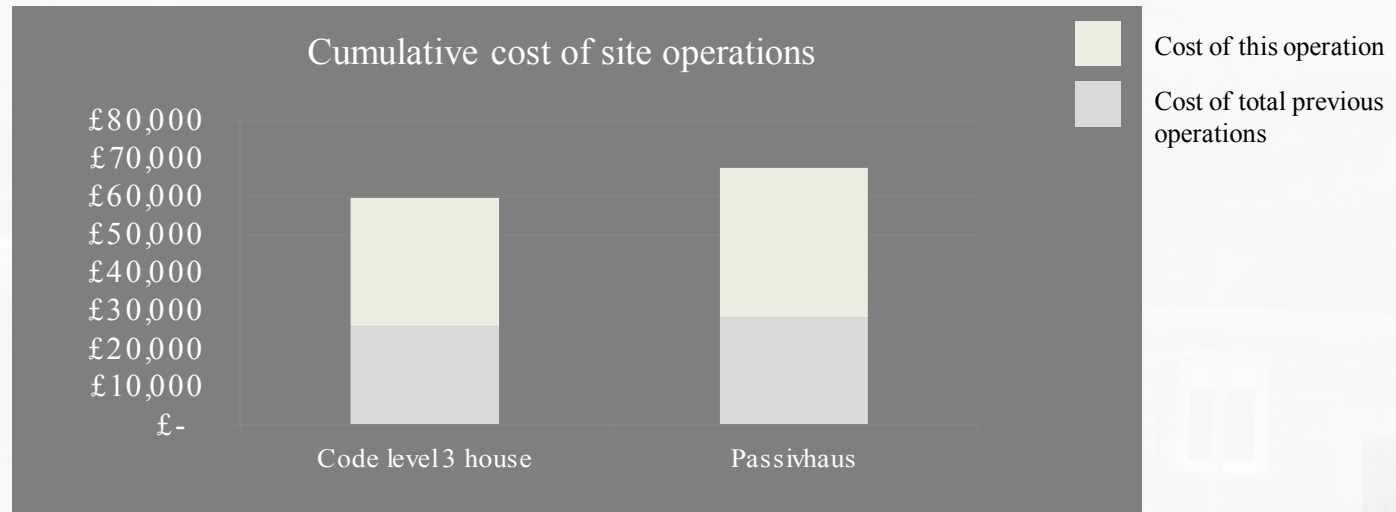
External Walls



External Walls

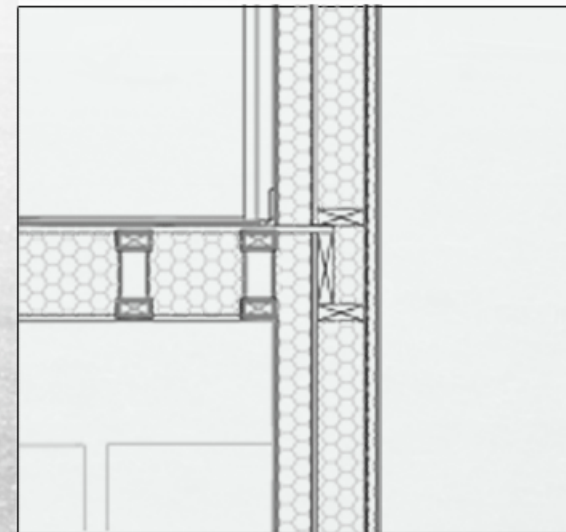


External Walls



Code level 3 house

Cost and Time			
This Operation			
£ 7,785	Cost	£ 11,336	
5 days	Time	7 days	
Total so Far			
£ 33,124	Cost	£ 38,883	
33 days	Time	32 days	

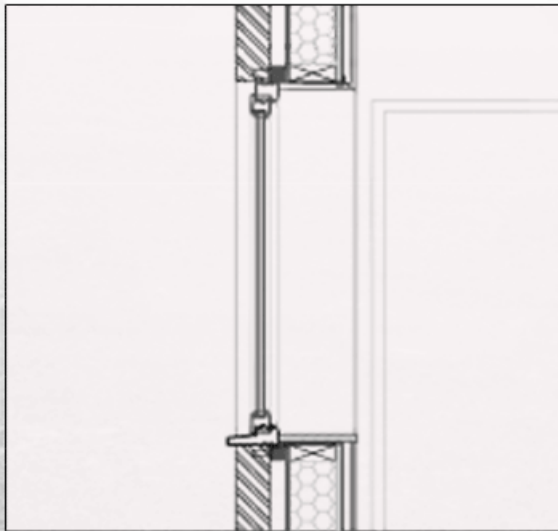


Passivhaus

External Windows and Doors

Specification:-

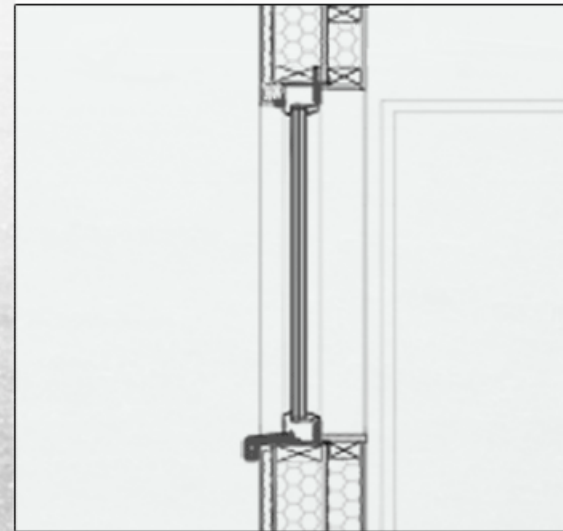
Galvanised steel lintels to brickwork
outer leaf
Standard softwood double glazed
windows and sliding glazed doors
Standard softwood front door and frame
Standard letter plate
Mastic sealant around frames
Painted plywood reveals and heads
Painted plywood window boards
Thermabate cavity closers to jambs,
heads and sills
Softwood curtain battens



Code level 3 house

Specification:-

Triple glazed passivhaus timber windows
and sliding glazed doors sealed with
air-tight tapes to external walls
Passivhaus timber front door and frame
with multi-point locking
Mail box
Mastic sealant around frames
Painted plywood reveals and heads
Painted plywood window boards
Zinc flashing to heads of doors and
windows and dpc to sills
Softwood curtain battens
First air tightness test

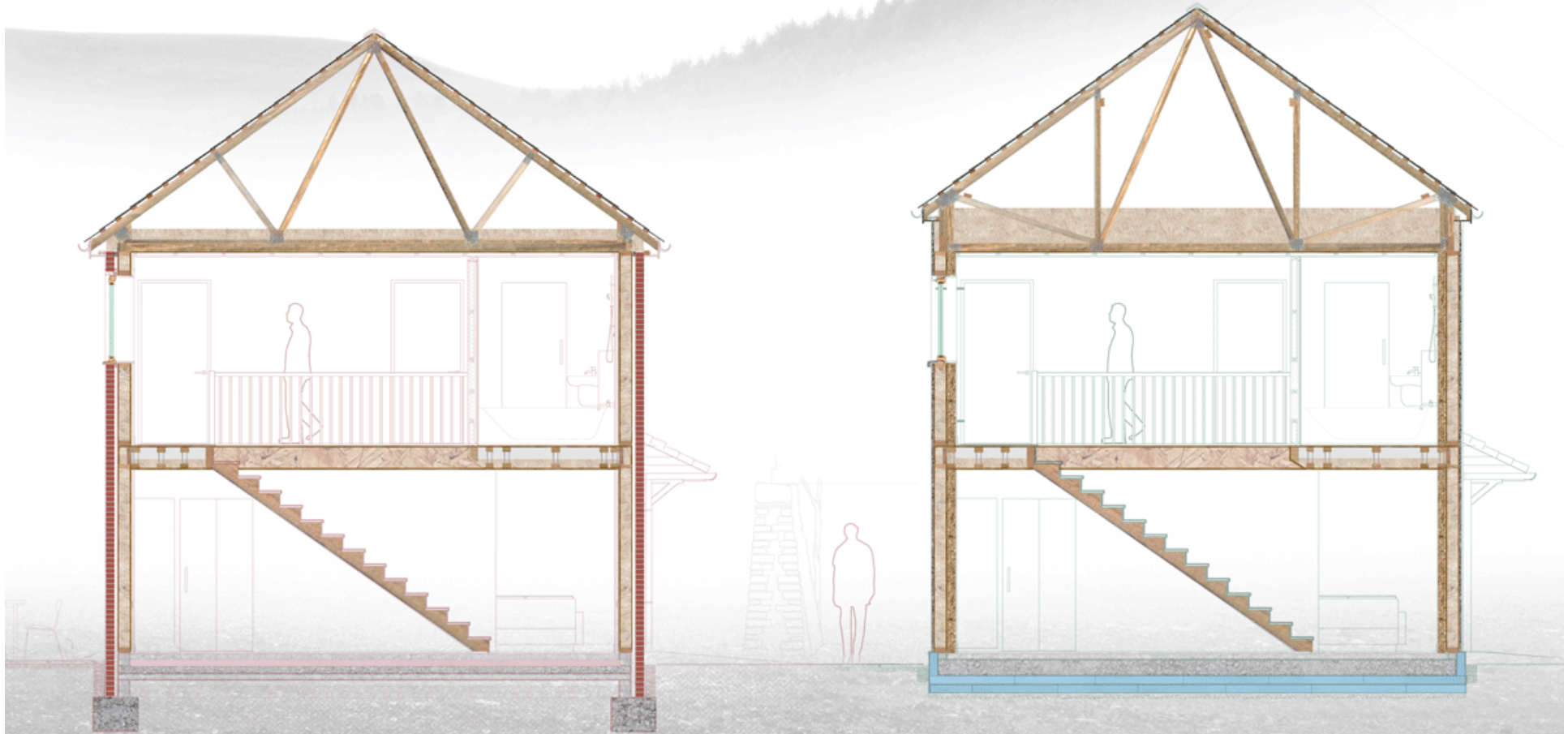


Passivhaus

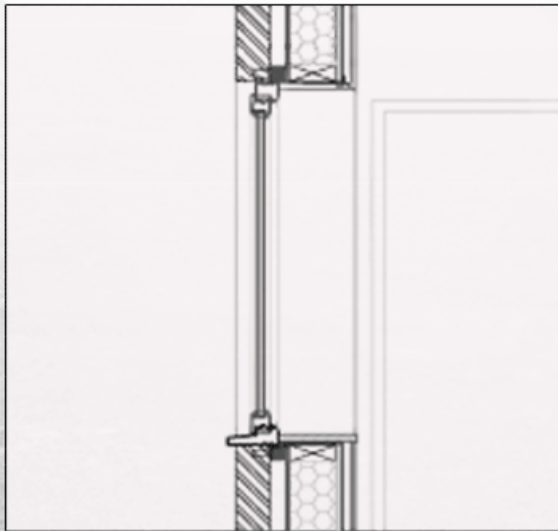
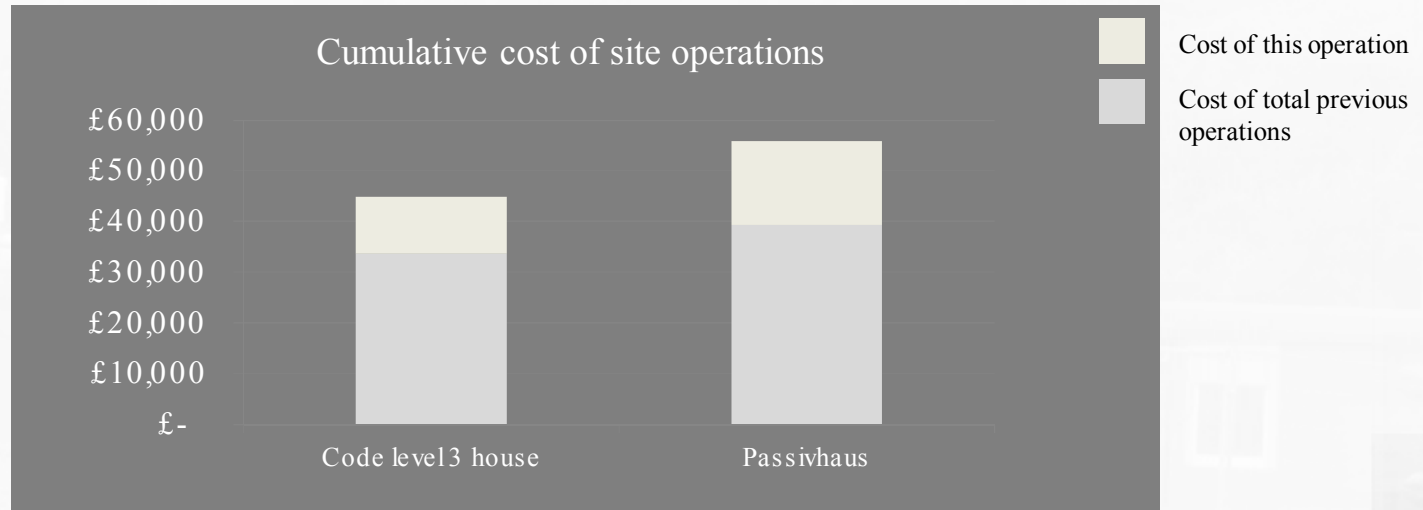
Windows and External Doors



Windows and External Doors

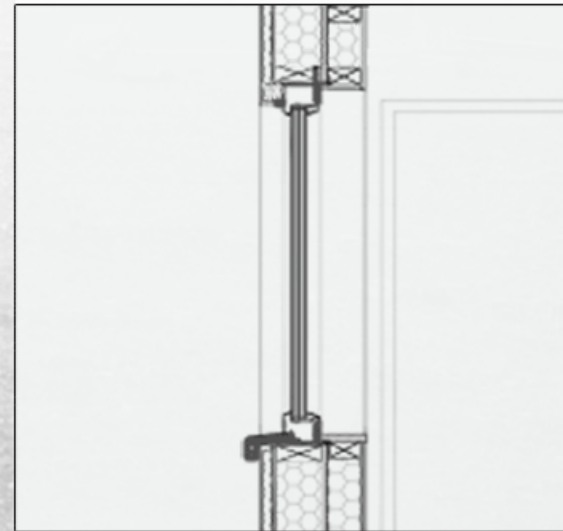


Windows and External Doors



Code level 3 house

Cost and Time			
This Operation			
£ 11,241	Cost	£ 16,451	
4 days	Time	6 days	
Total so Far			
£ 44,366	Cost	£ 55,335	
37 days	Time	38 days	



Passivhaus

Heat Source

Specification:-
Gas boiler and controls



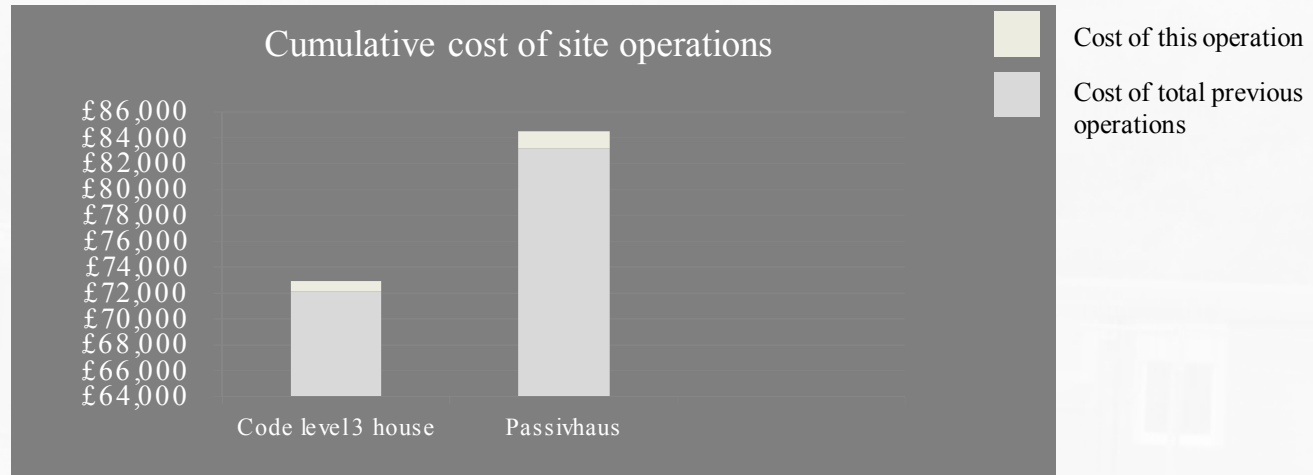
Code level 3 house

Specification:-
Gas boiler and controls
Post heater battery on MHVR supply air



Passivhaus

Heat Source



Code level 3 house

Cost and Time			
This Operation			
£ 773	Cost	£ 1,375	
2 days	Time	2 days	
Total so Far			
£ 72,391	Cost	£ 83,963	
58 days	Time	59 days	



Passivhaus

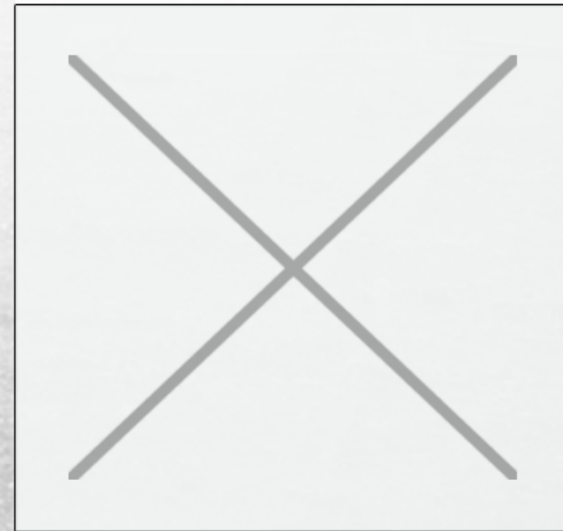
Space Heating

Specification:-
Wet radiator system



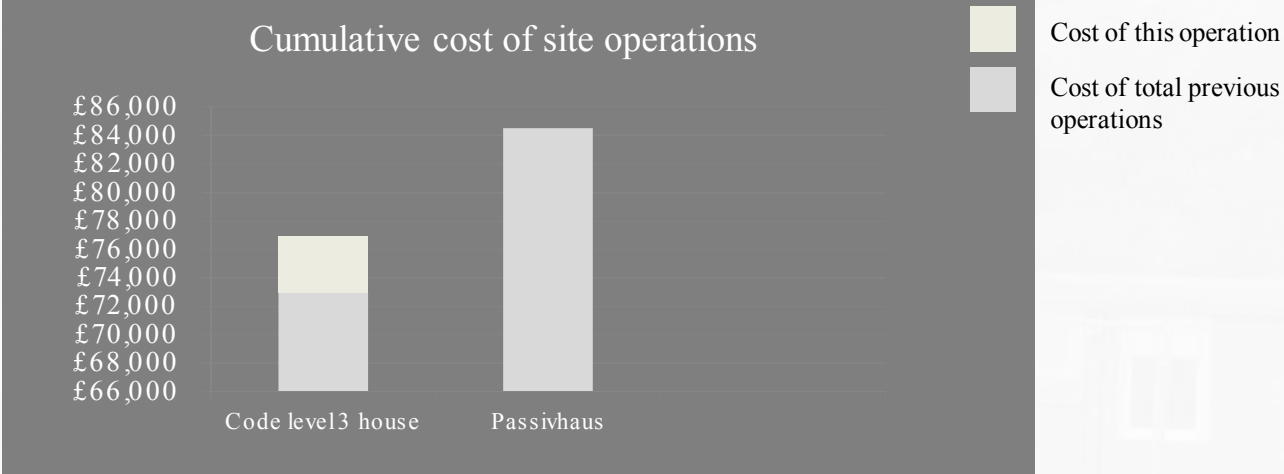
Code level 3 house

Specification:-
Not required



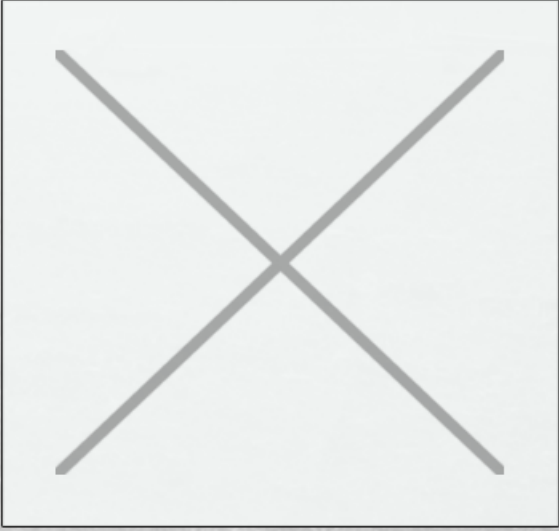
Passivhaus

Space Heating Circuit



Code level 3 house

Cost and Time		
This Operation		
£ 4,017	Cost	£ -
5 days	Time	0 days
Total so Far		
£ 76,408	Cost	£ 83,963
63 days	Time	59 days

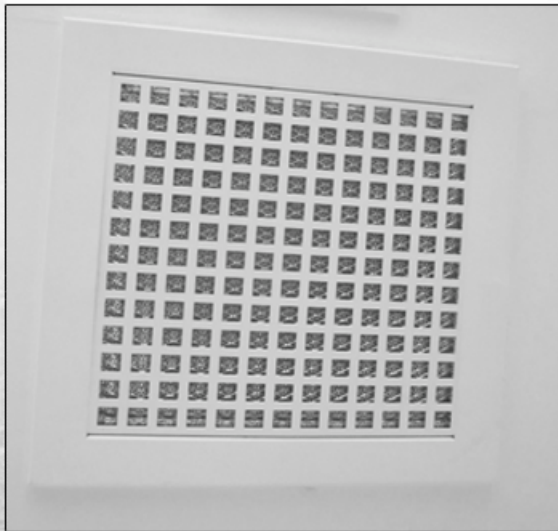


Passivhaus

Ventilation

Specification:-

Extract fans to WC and Bathroom
Extract hood to kitchen



Code level 3 house

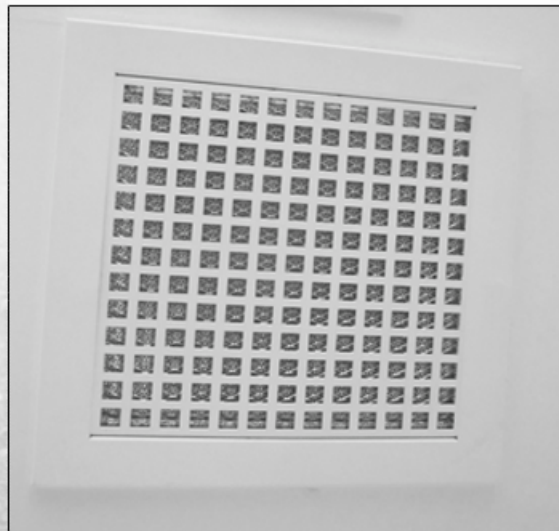
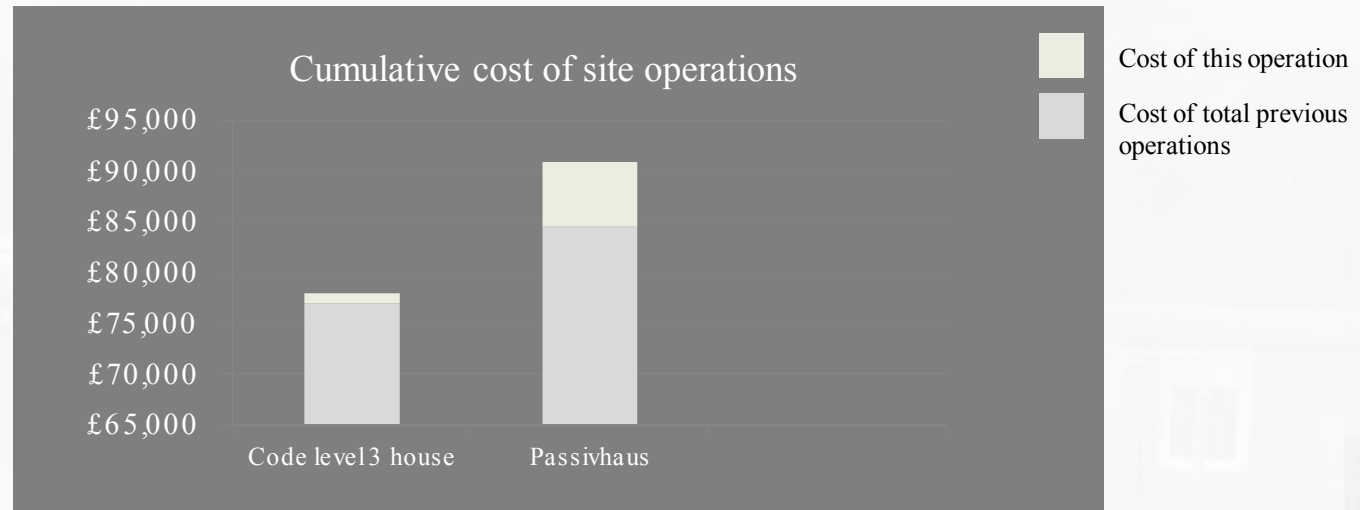
Specification:-

Whole house heat recovery
PAUL MVHR system



Passivhaus

Ventilation



Code level 3 house

Cost and Time			
This Operation			
£ 1,082	Cost	£ 6,397	
2 days	Time	4 days	
Total so Far			
£ 77,489	Cost	£ 90,360	
65 days	Time	63 days	



Passivhaus

Adding Main Electrical Consumer &
Builders work in Connection

Cost and Time		
This Operation		
£ 6,162	Cost	£ 6,318
5 days	Time	5 days
Total		
£ 83,651	Cost	£ 96,677
70 days	Time	68 days

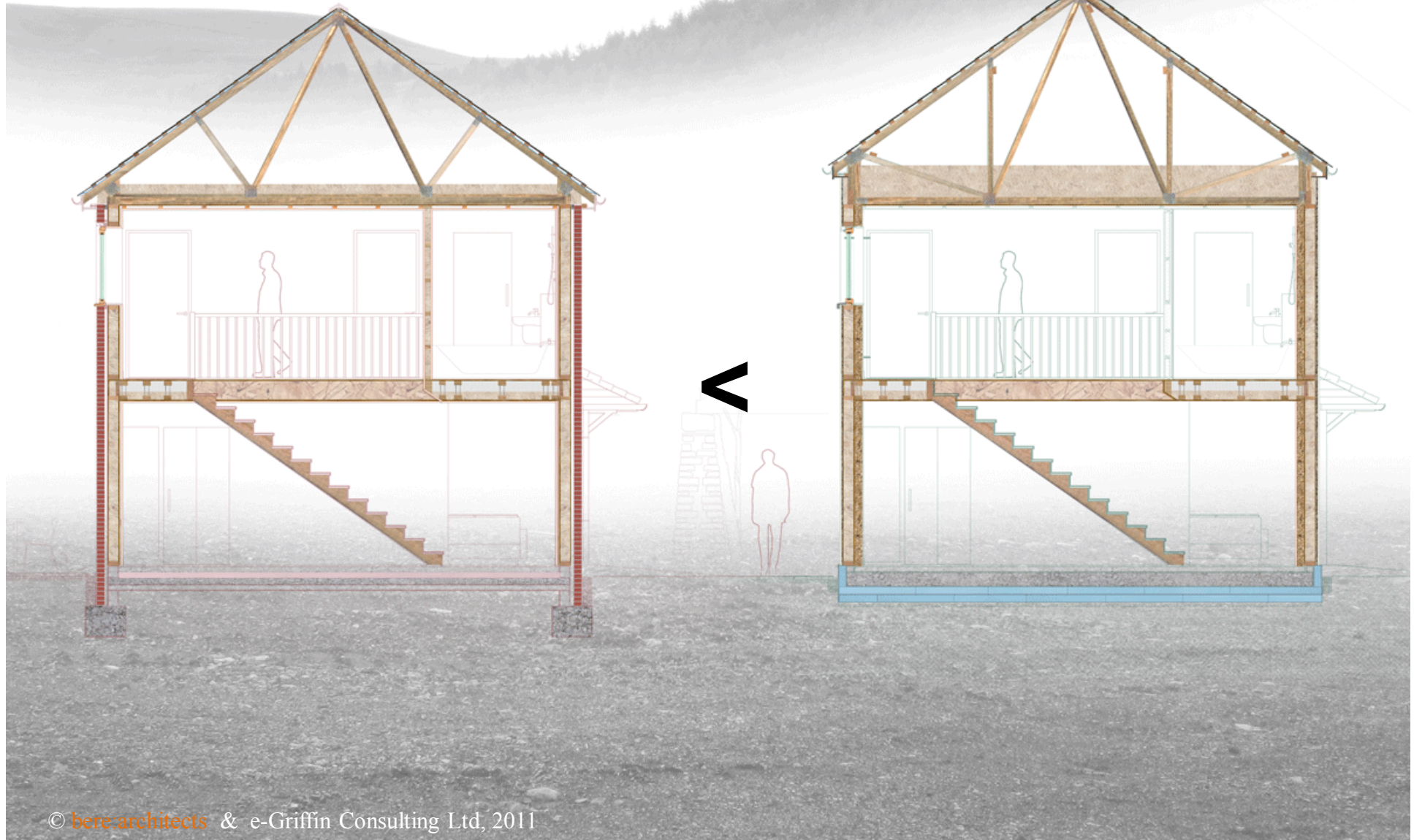
Code level 3 house

Passivhaus



Code level 3 house

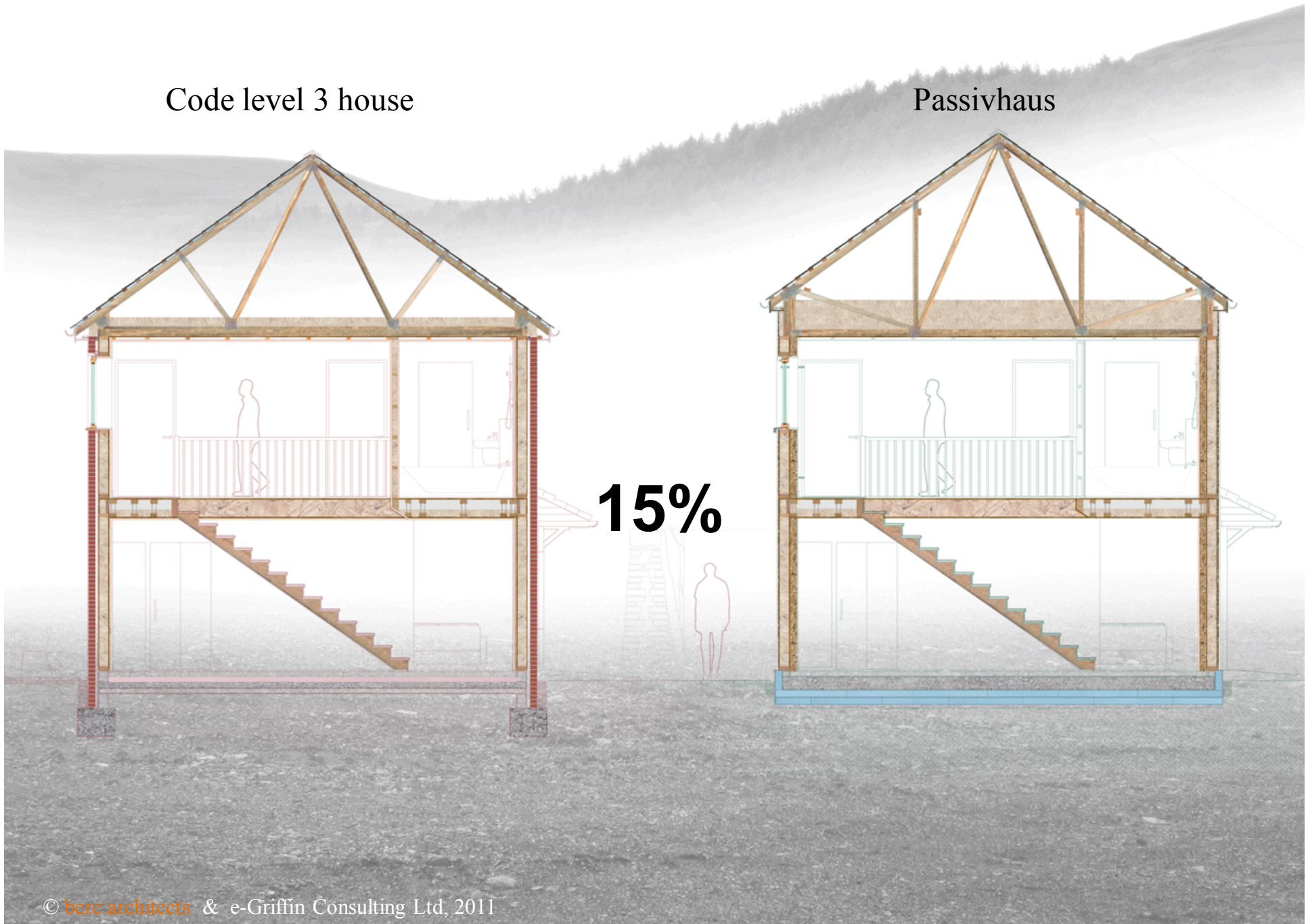
Passivhaus



Code level 3 house

Passivhaus

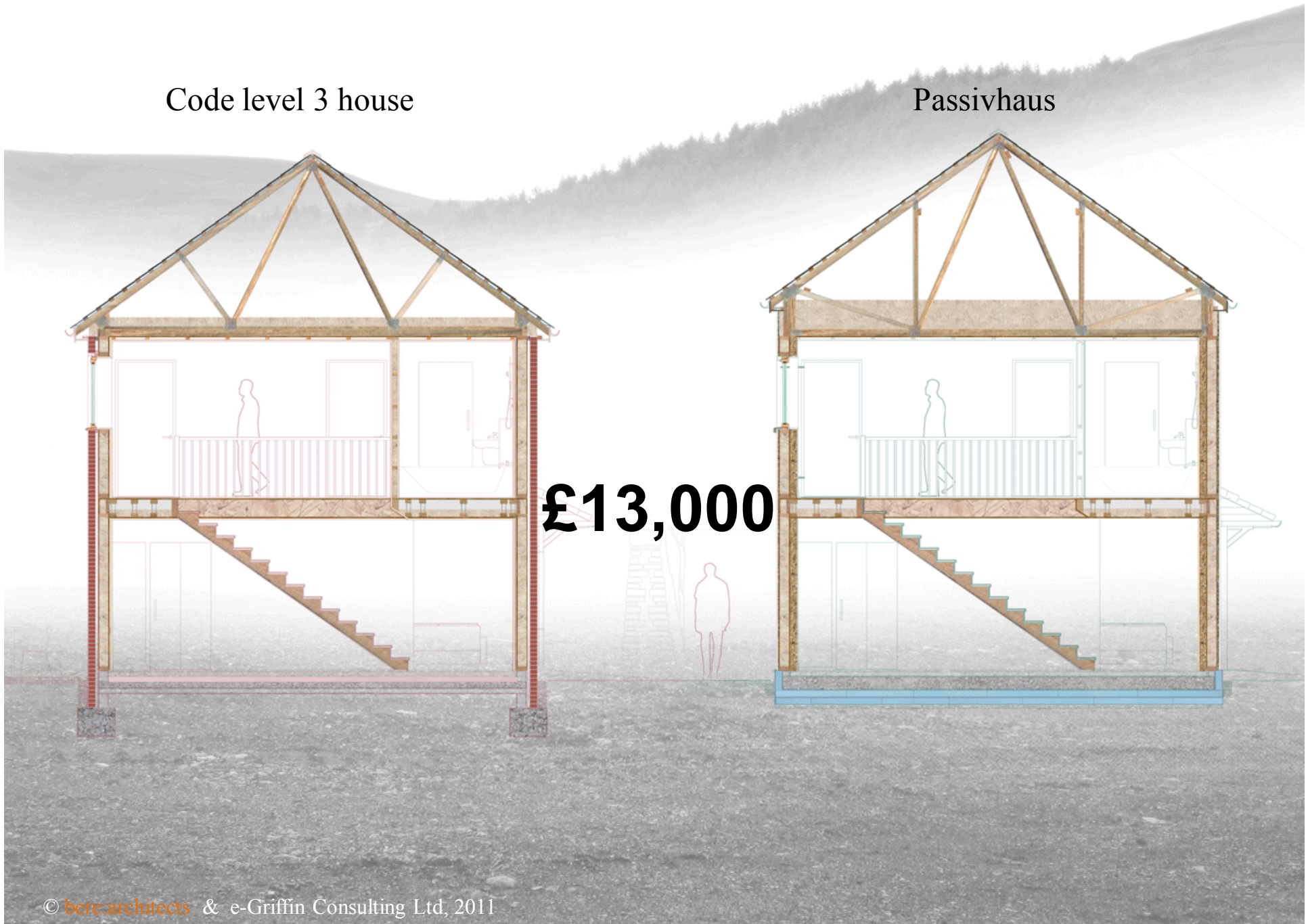
15%



Code level 3 house

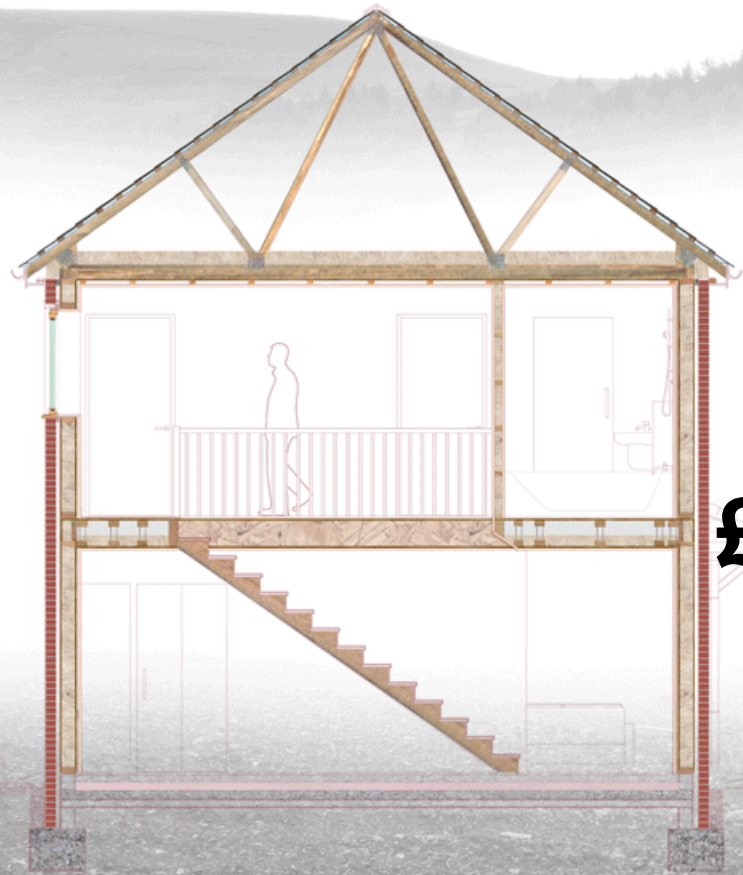
Passivhaus

£13,000



Code level 3 house

Passivhaus

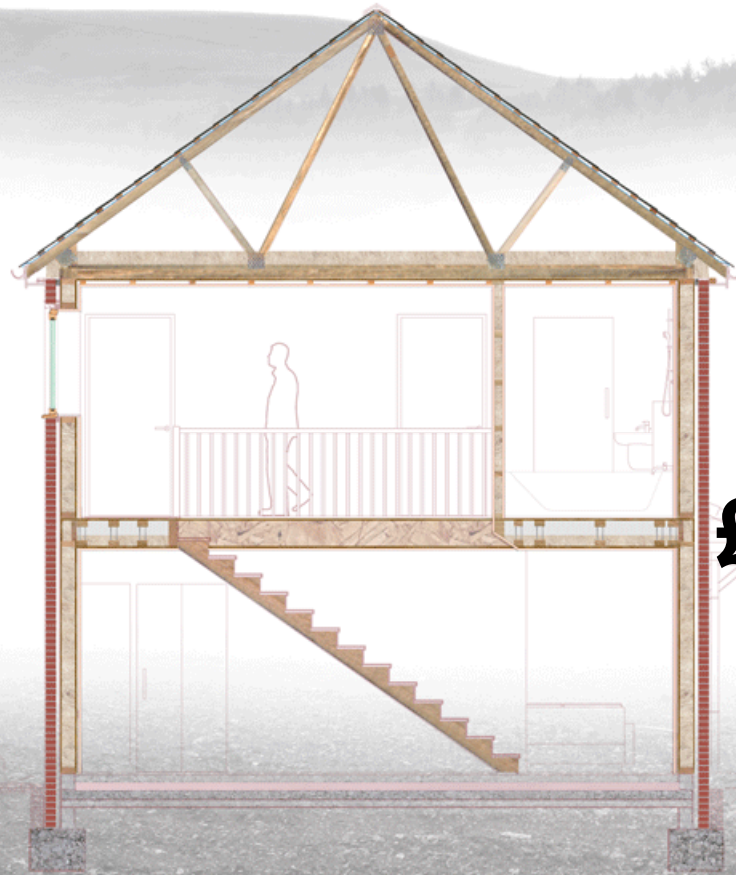


£13,000

• **Eight times less energy use**

Code level 3 house

Passivhaus

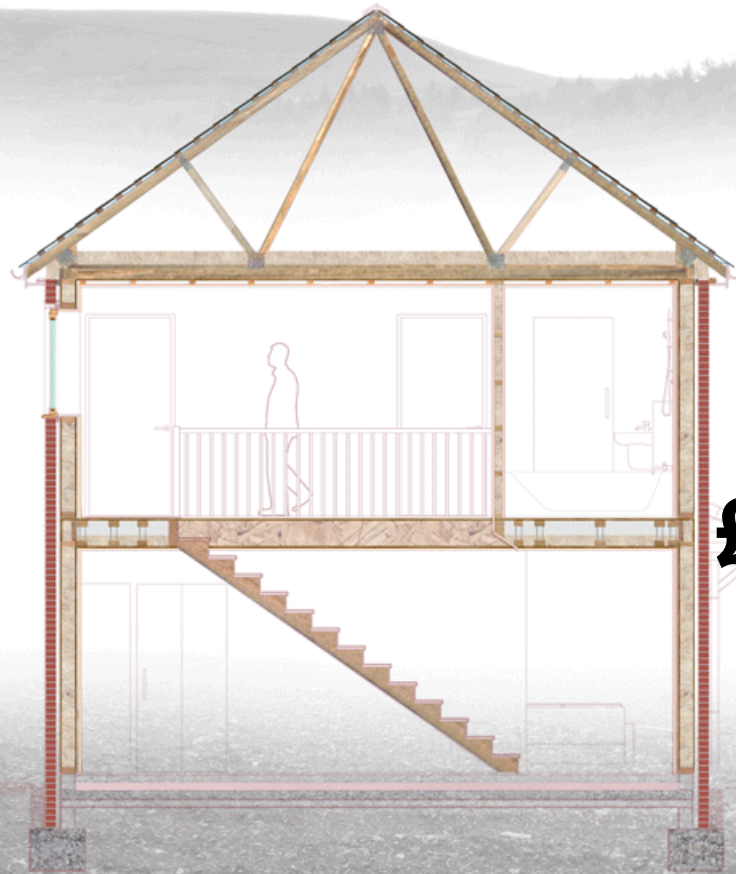


£13,000

- Eight times less energy use
- Optimum comfort levels

Code level 3 house

Passivhaus

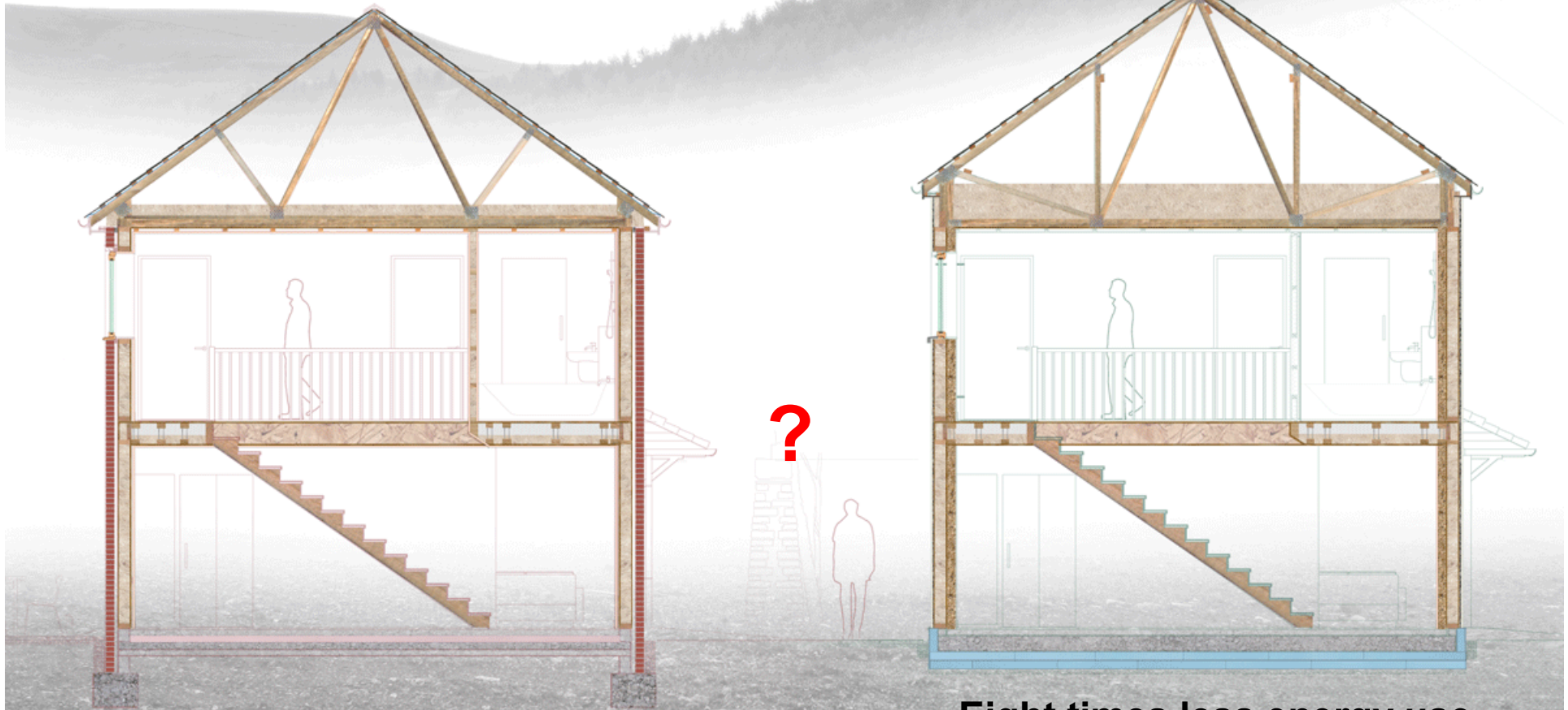


£13,000

- Eight times less energy use
- Optimum comfort levels
- Fully breathable construction

Code level 4 house

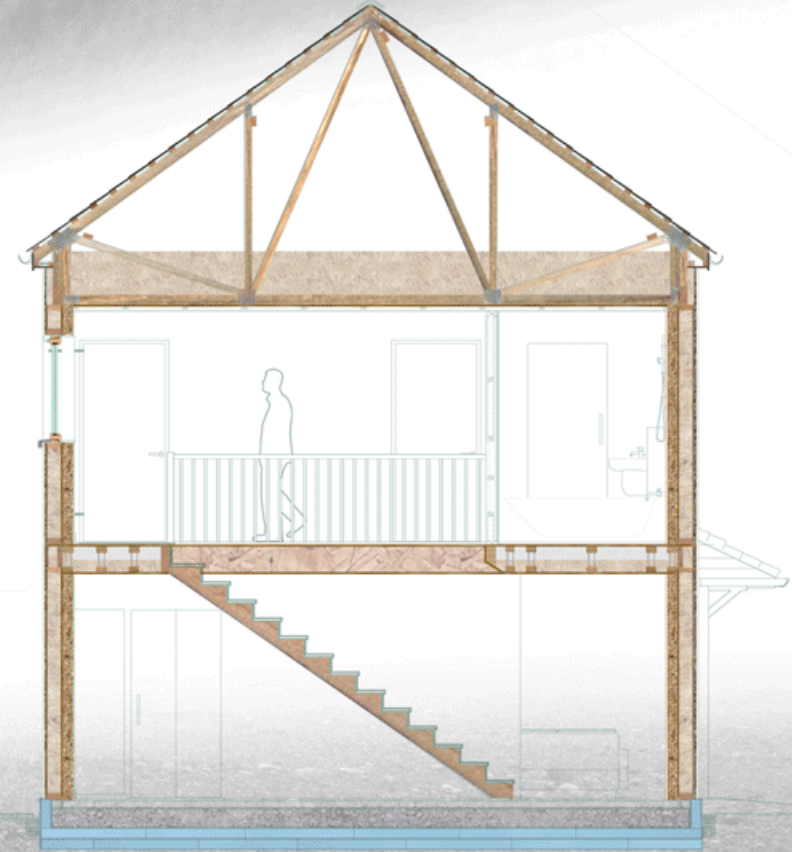
Passivhaus



- Eight times less energy use
- Optimum comfort levels
- Fully breathable construction

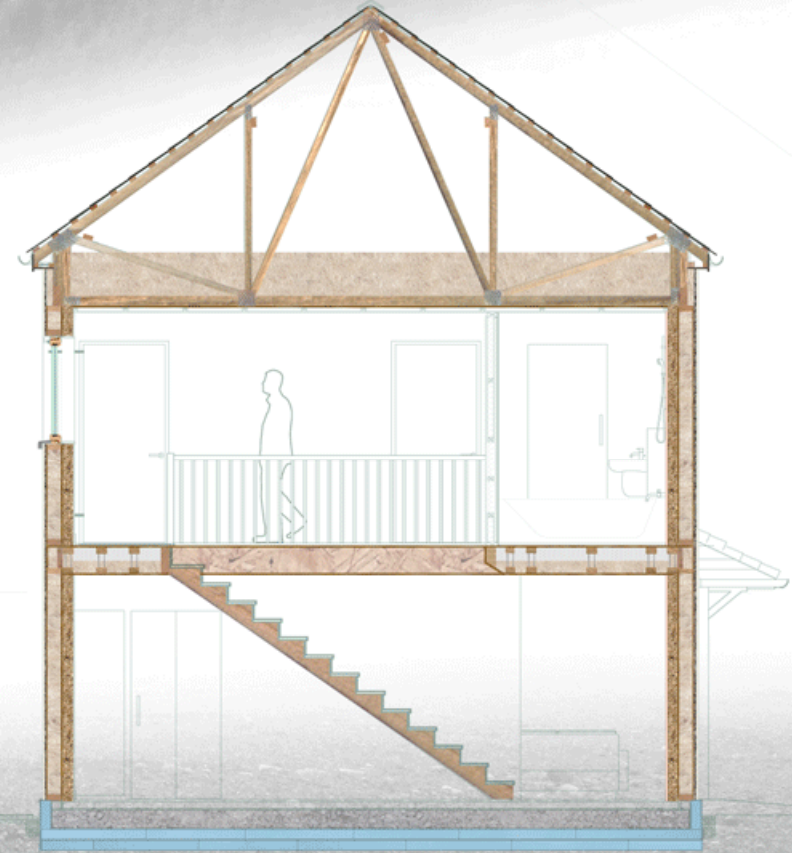
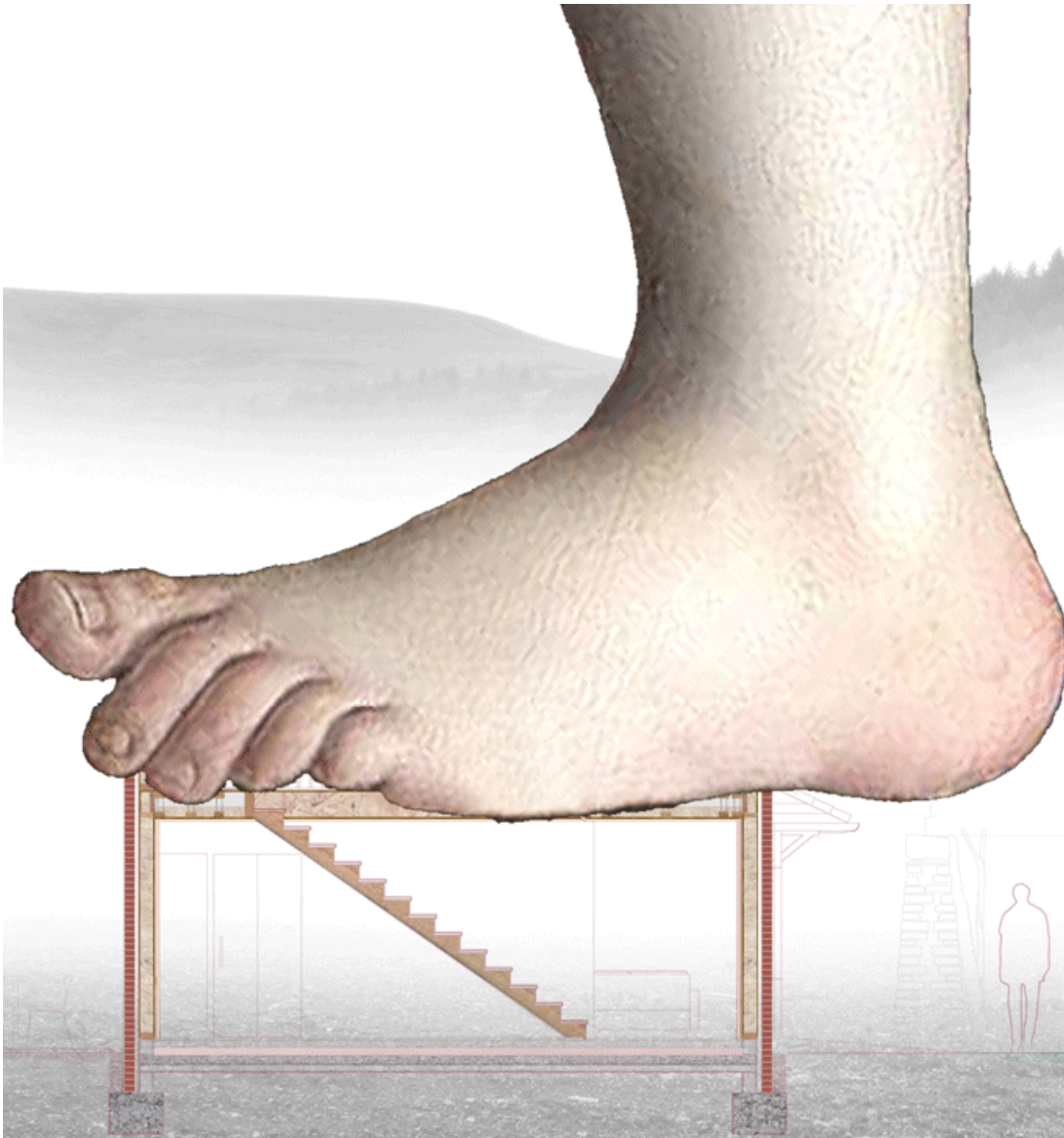


Passivhaus



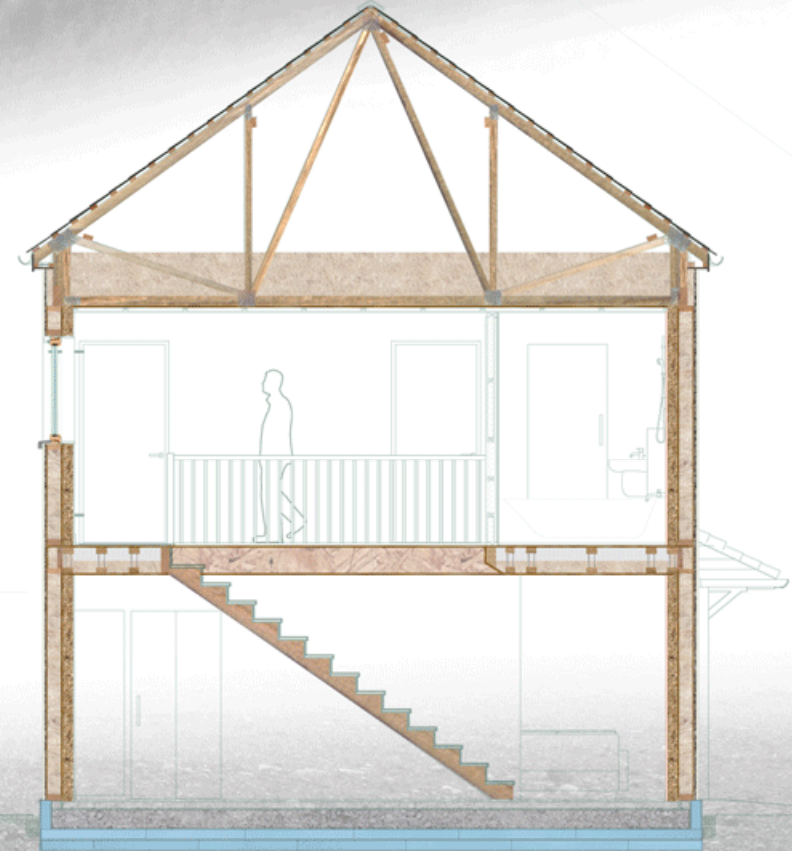
- **Eight times less energy use**
- **Optimum comfort levels**
- **Fully breathable construction**

Passivhaus



- **Eight times less energy use**
- **Optimum comfort levels**
- **Fully breathable construction**

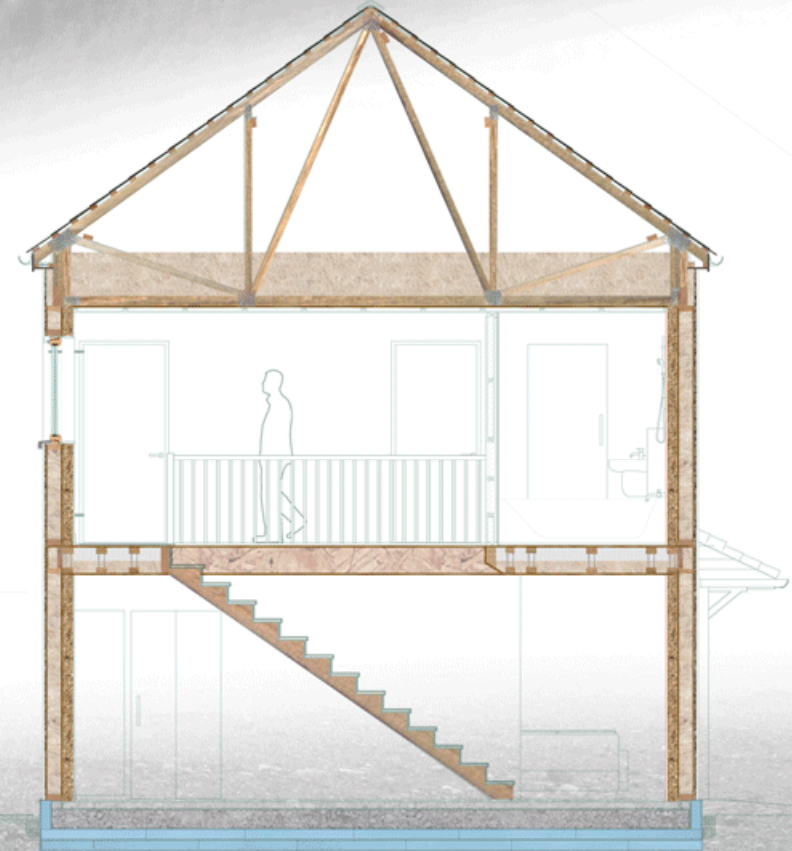
Passivhaus



- **Eight times less energy use**
- **Optimum comfort levels**
- **Fully breathable construction**

Thank you

Passivhaus



- **Eight times less energy use**
- **Optimum comfort levels**
- **Fully breathable construction**

Passivhaus Cost Project
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