THE SEED CO-HOUSING, nr Dundee, Scotland





THE SEED CO-HOUSING: TECHNICAL SUSTAINABILITY

Experiential design

- Biophilic design – strong visual and physical links to garden
- Warm central shared heart – oak lined
- East living – womb-like dark clay
- West living – airy lime white clay

THE SEED CO-HOUSING: SOCIAL SUSTAINABILIY

Privacy mediation and flow

The occupants have developed a non-verbal language:

- fully open - 'you are invited in',
- half open - 'do come in if you would like to'
- closed - 'time for ourselves'

THE SEED CO-HOUSING: SHARING AND COMMUNITY

Restrictions

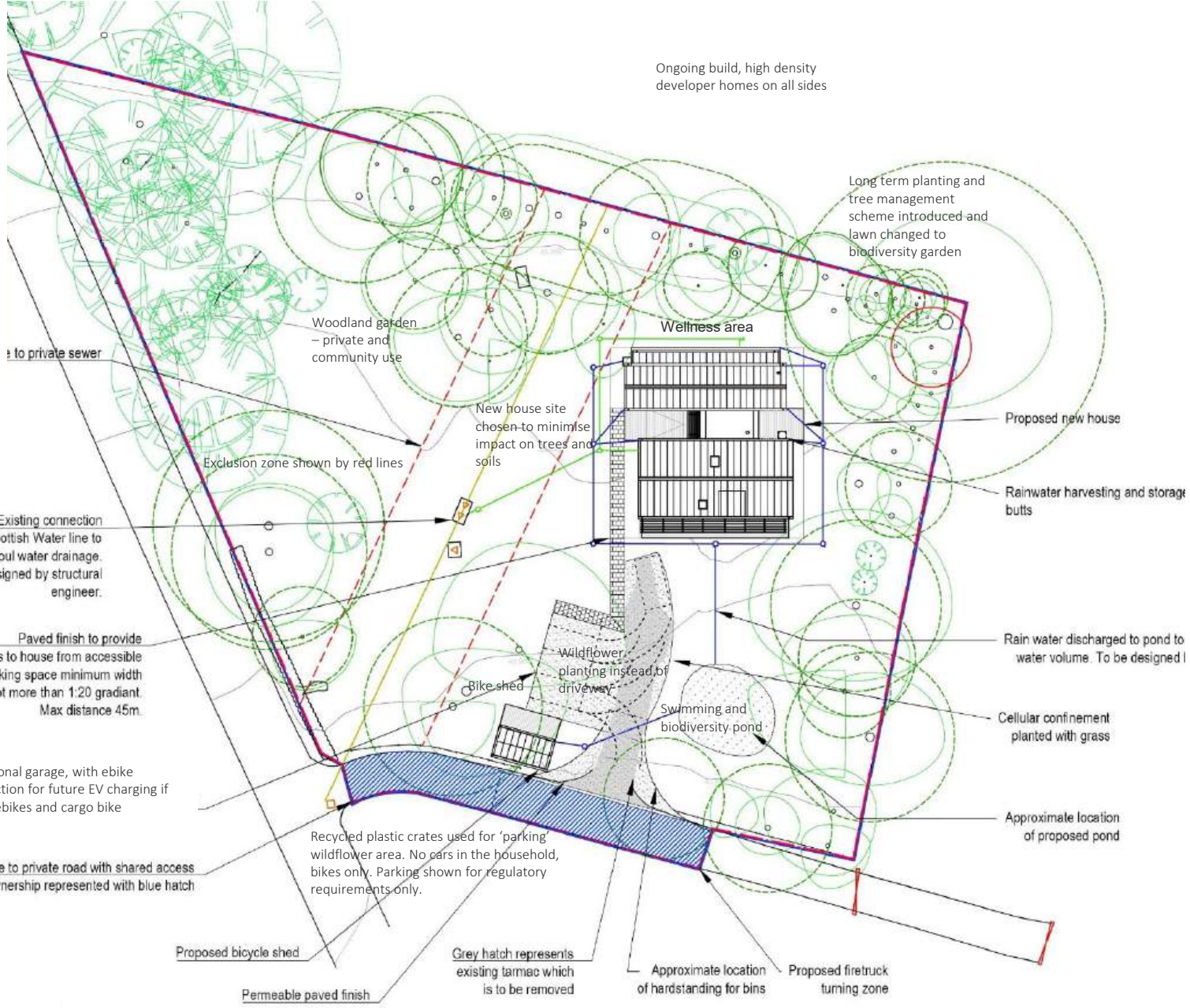
- Trees, pipework

Brief

- Shared living
- Community
- Biophilic design
- Ecology
- Reuse
- Low embodied carbon
- Design for deconstruction
- Learning and training
- Replicable concepts

Outcomes:

- Unique design – replicable concepts
- Minimise risk



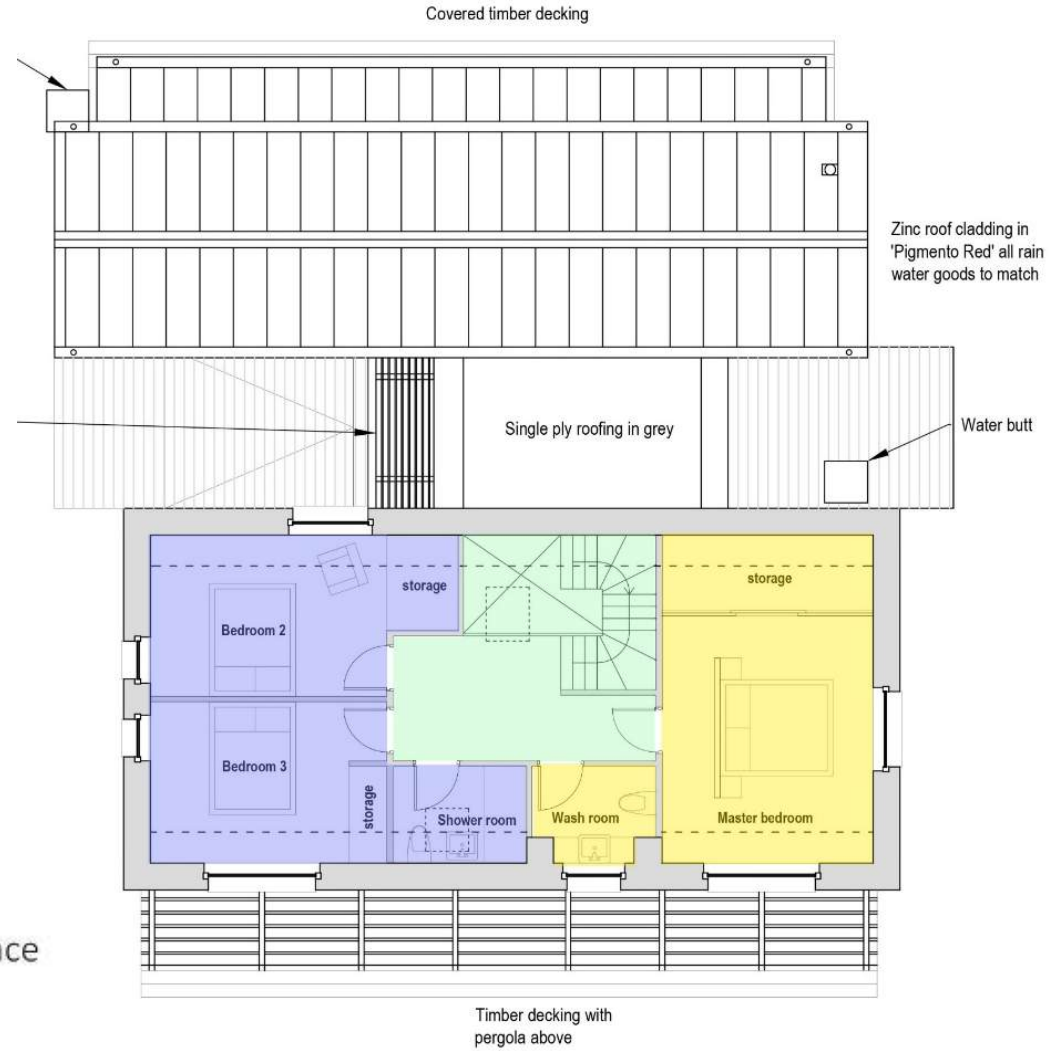
Home schooling – designing treehouses

The Seed occupant enjoying the house

Sharing learning

THE SEED CO-HOUSING: BRIEF AND CONSTRAINTS

Ground Floor Plan



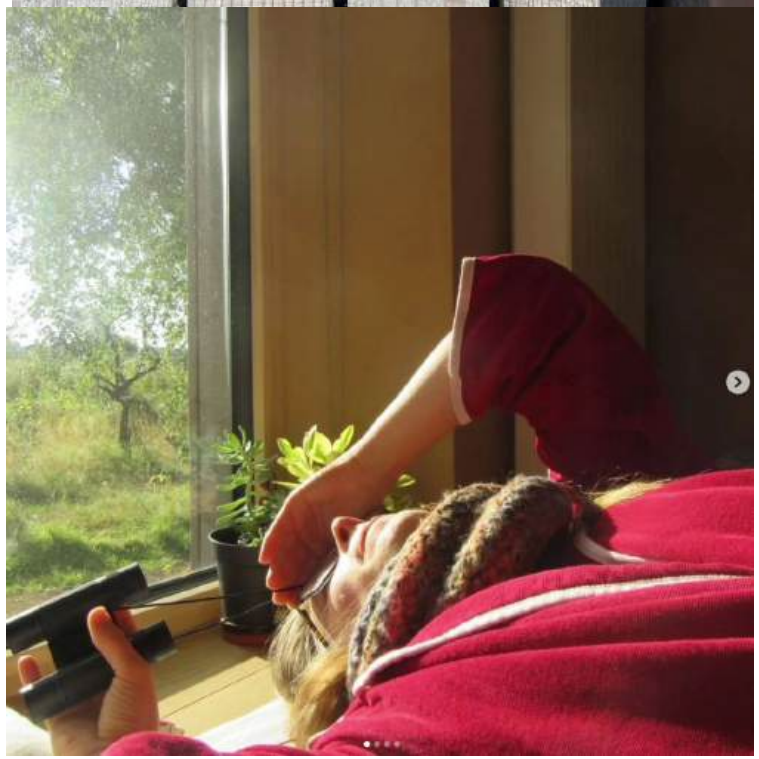
First Floor Plan

Shared space

Family 1

Family 2

THE SEED CO-HOUSING: LAYOUTS AND ZONING



Enjoying the sun whilst birdwatching

TFA:

- 177 m^2 total (89 m^2 /household)

Heat demand:

- 20kW/m^2.a (modelled)

Heat load:

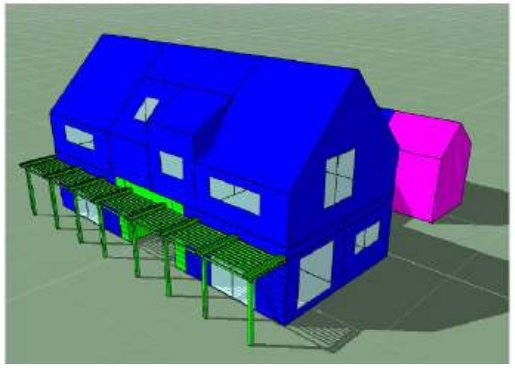
- 10W/m^2 (modelled)

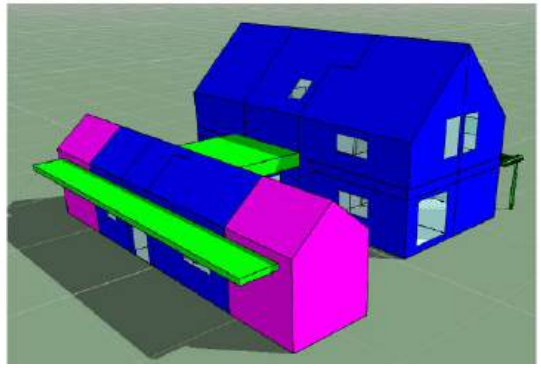
Measured energy use for all energy:

- 23kW/m^2.a TFA
- 17kW/m^2.a GIFA

Overheating risk: 0%

Airtightness: 0.18 ACHC@50pa





Overheating risk: PHPP then TM59

Running cost comparisons

Actual running costs:

- £5.75 m^2/ yr TFA
- £4.67 m^2/ yr GIA

for all energy use including sauna.

SAP predicted running costs: £

- 8.18/m^2/ yr

Total cost/yr all energy

- £500/yr per household

'As I am German, fresh air is really important. It seemed hard to believe at design stage that enough would be provided just by the MVHR. But, it turns out that it is and we love this'

THE SEED CO-HOUSING: PASSIVHAUS

Roof, walls and floor – OSM timber kit

- Clay plaster on fermacell, oak lining or glass for wet spaces
- Services cavity
- Smartply
- I-joists with cellulose insulation
- Wood fibre board sarking
- Scottish cladding on walls, zinc on roof
- Triple glazed timber windows

Foundations

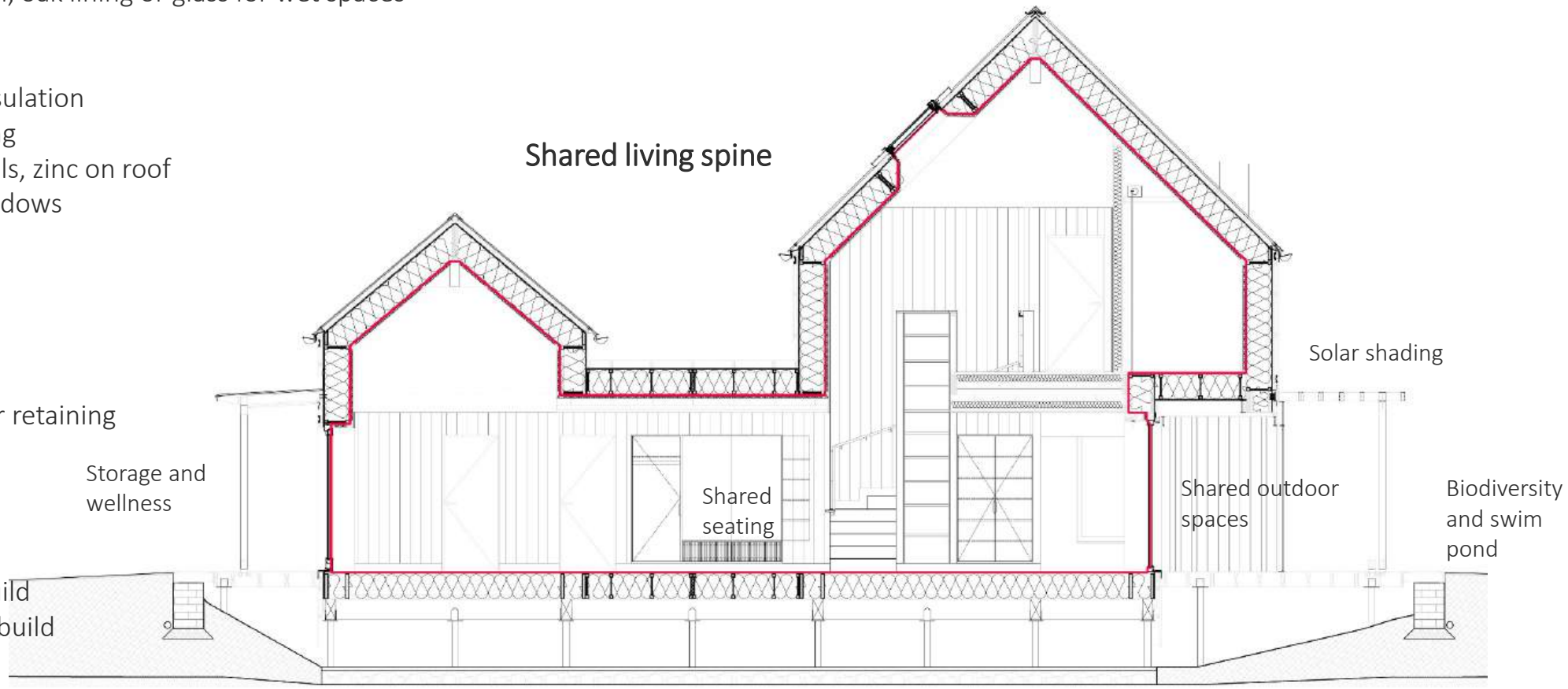
- Steel screw piles
- Timber ground beams
- Reused brick solum cap
- Reused brick gabions for retaining

Landscaping

- Reclaimed bricks
- Caithness stone
- Soil protected during build
- Roots protected during build

Bike and potting shed

- Timber to match
- On screw piles – root protection



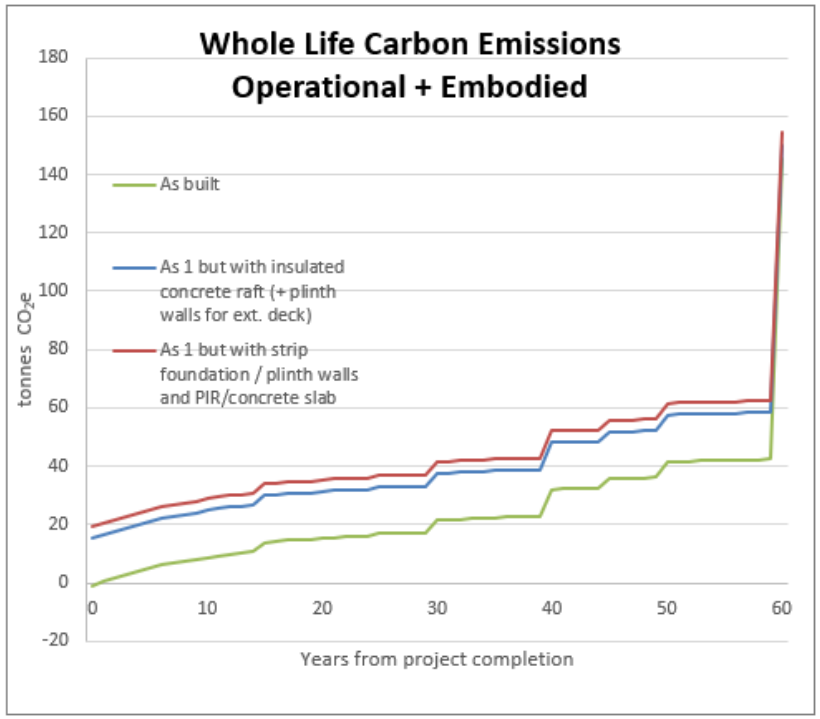
‘Today I learnt that no part of the old house - except the asbestos and timber - has left the site. Brick walls, concrete floors and roofs are all still here.

…gardens using rubble: creating a nutrient-poor environment for meadow plants mimicking dry chalk downland. 600 species of invertebrates have been found to use (their) garden! What’s more, three times more species use the rubble habitat than other habitats within the garden.

My mind is so excited at the transformation of what I had once seen as “waste” into a valuable resource.’
Karoline

THE SEED CO-HOUSING: BIODIVERSITY AND LANDSCAPE

Embodied carbon modelling: Design stage, KMA/Completion by John Butler



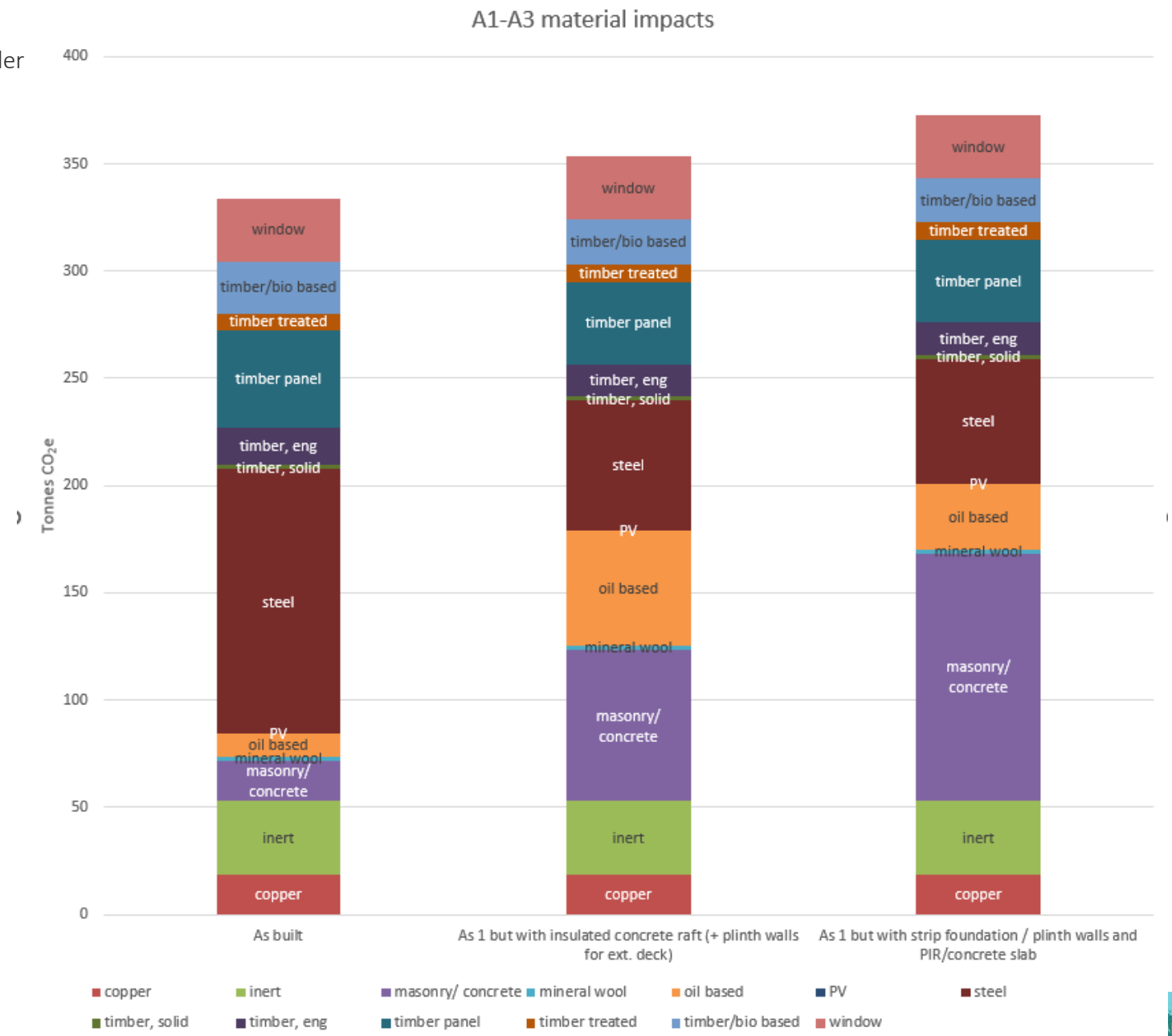
Embodied carbon:

As built: 582 $kgCO_2e/m^2$

including landscaping and external works

RIBA 2030 benchmark: 625 $kgCO_2e/m^2$

excluding landscaping and external works



Training in Eco/Passivhaus

- Practical training
  - 6 senior contractor staff – Coaction/BEST
  - 15+ college students – site visits and airtightness
  - Full workforce at contractor level from work experience and apprentices to senior staff – toolbox
  - Airtightness on site training done during 1st air test too
- Articles, podcasts, awards, conferences
- Research in practice

Coaction/BE-ST contractor training

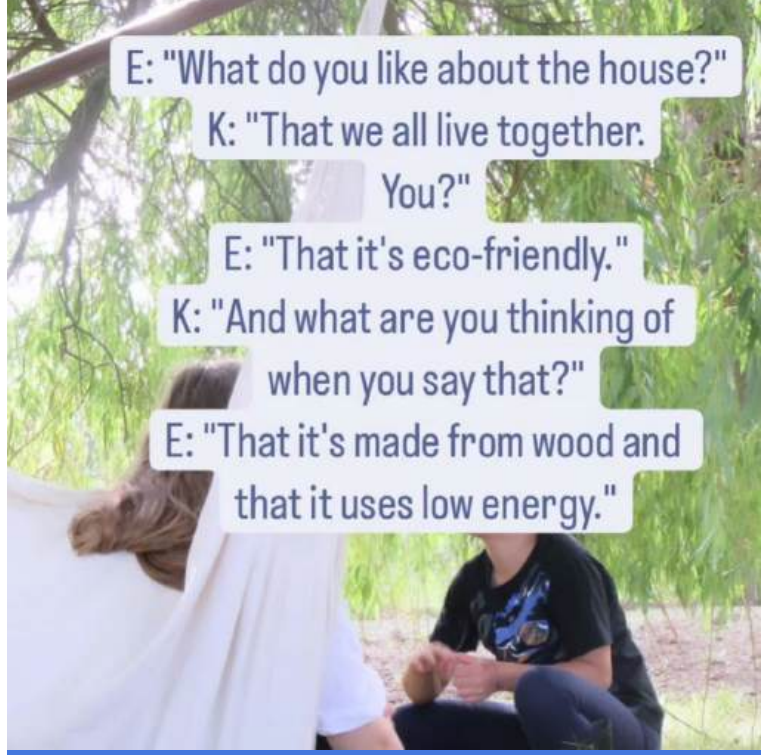
Apprentice airtightness rig intro

Training with immediate results - airtest

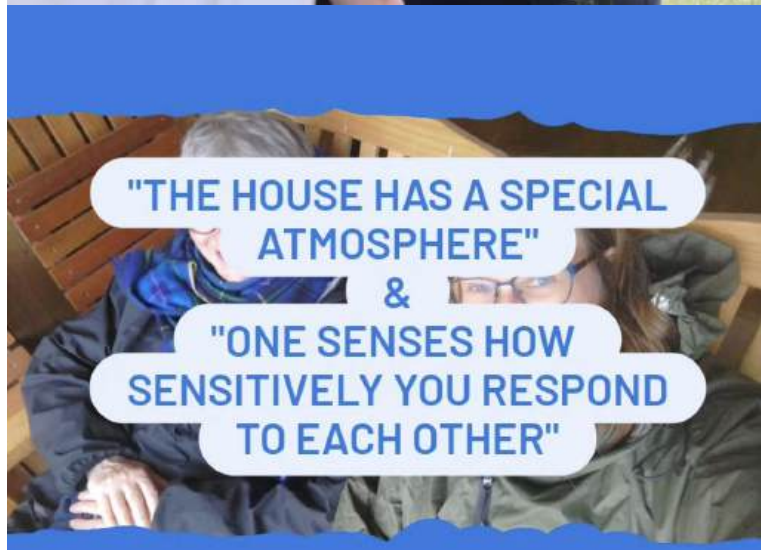
Post Occupancy Evaluation

‘We can find each other to share exciting news or gnawing worries the moment they occur, and almost never have to use our keys to open the front doors, because there is always someone around.

Our two families can also close a door to each other when we need to be by ourselves. We can then enjoy the blossoms of re-connection when we came out the other side.’ Karoline

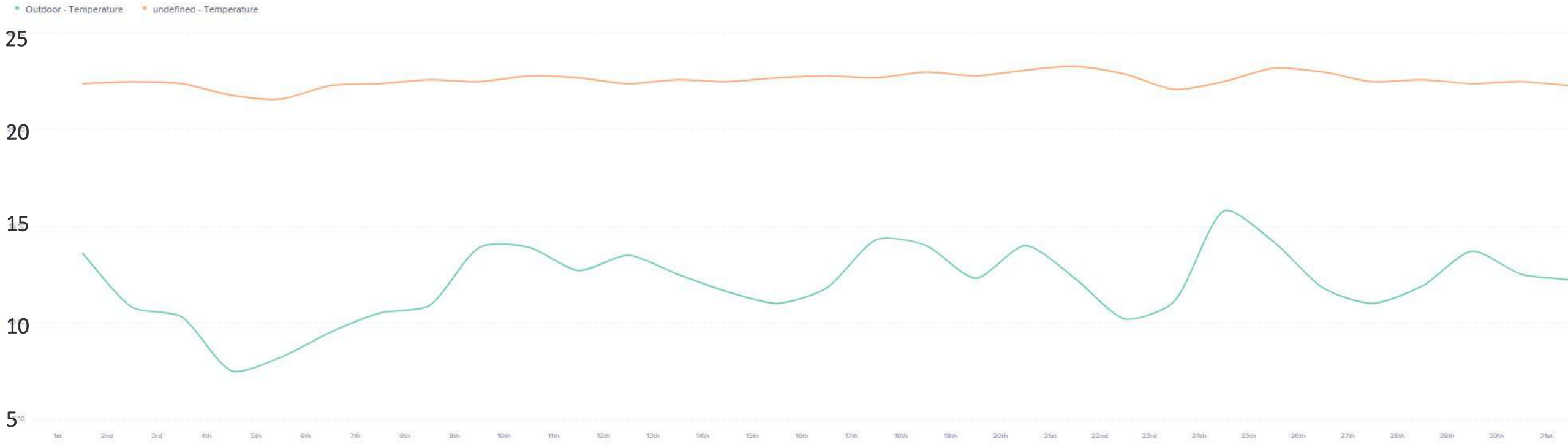


9 year old ‘E’ explains her experiences to ‘K’



A family member after a few day’s stay in the house

May 2025
(hot,dry weather – no rain)



Temperature: internal and external

Extract of Netatmo monitoring

May 2025
(hot,dry weather – no rain)

Humidity: internal and external

Extract of Netatmo monitoring

May 2025
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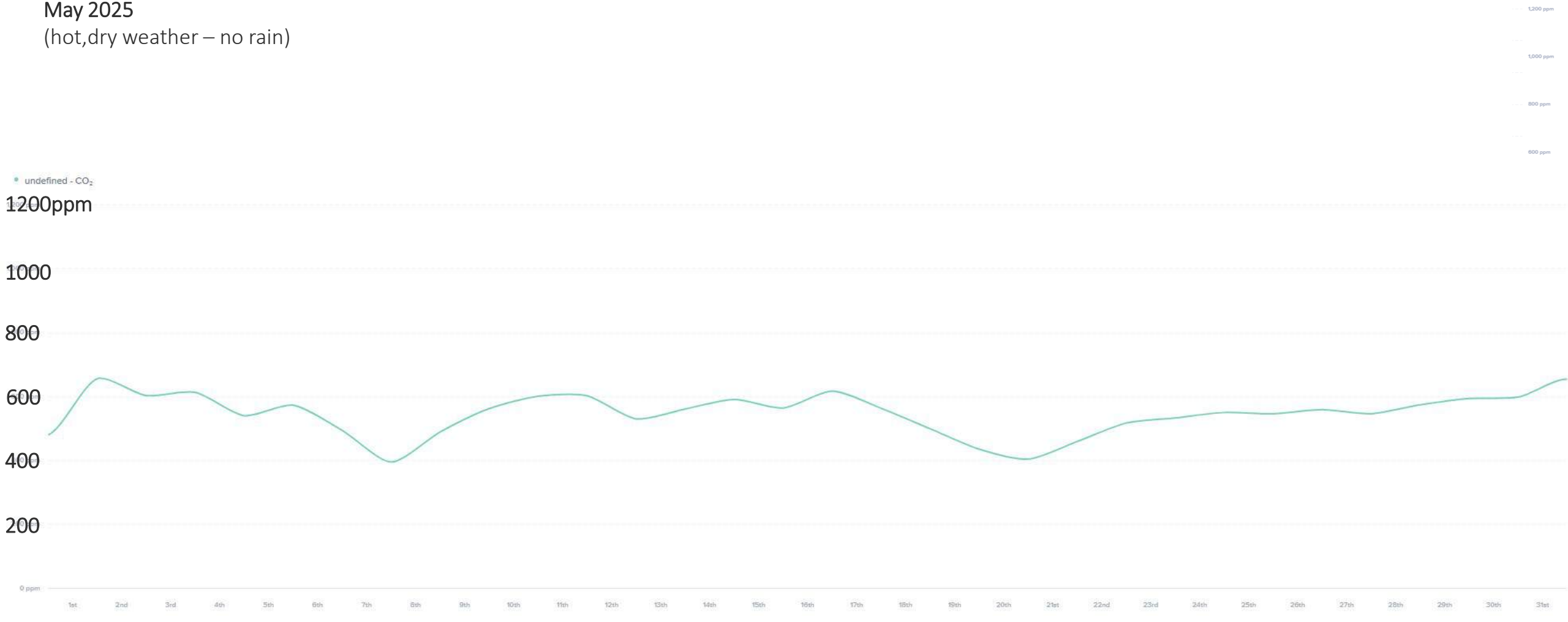

CO_2: internal

Extract of Netatmo monitoring

Winter gloaming with a frozen pond – cosy inside

TEAM CREDITS:

Client:	Karoline Hardt
Architect & PH Consultant:	Kirsty Maguire Architect Ltd
Structural Engineer:	Narros
Services Engineer:	Max Fordham
Arboriculture:	Fife Landscaping
Ecology:	Tay Ecology
MVHR designer:	Paul Heat Recovery Scotland
Contractor:	Alpha Projects
OSM supplier:	Eden Insulation
Certifier:	Ingo Theobalt