Earth-Friendly Renovation

By Sally Mareike

We can be the Change-makers!

- Buildings & Climate Disruption
- Glossary of Terms
- Material comparisons
- What is Earth-Friendly?
- Earth Friendly Strategy
- Low impact renovation
- Top tips & information

Buildings and Climate Disruption!!!

- 2009 - 43% emissions from (use of) buildings
- What % from building materials/processes?
- 75% housing stock built before 1975 (English Heritage)
- 'Difficult to treat' houses

Glossary of terms

Embodied Energy (EE)

The amount of energy used in all aspects of production of a product/service, including raw materials procurement, manufacturing processes, packaging and transportation to the end users.

Embodied Carbon (EC)

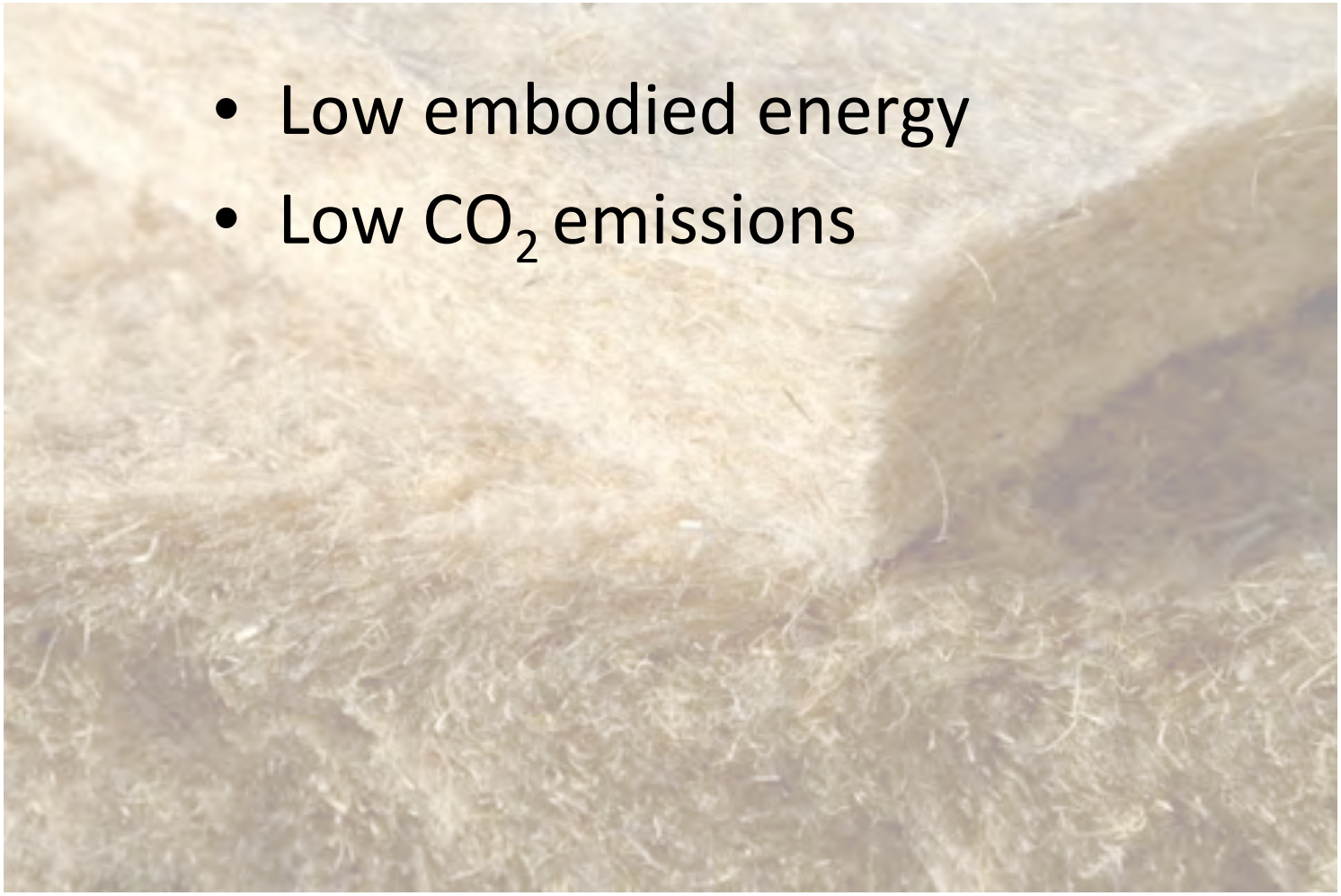
The amount of carbon dioxide and other greenhouse gases that have been produced during all aspects of production of a product/service, including raw materials procurement, manufacturing, packaging and transportation to end users.

Material comparisons

Material	Embodied Energy (MJ/kg)	Embodied Carbon (CO_2/kg)	Total Embodied GHG (CO_2e/kg)
Sand/aggregate	0.081	0.0048	0.0051
Commercial clay topcoat plaster *	0.236*	-	0.0106*
Commercial clay basecoat plaster*	0.17*	-	0.0592*
Commercial clay basecoat plaster + straw*	**0.26***	-	**0.0516***
Gypsum plaster	**1.80**	0.12	**0.13**
Lime	5.3	0.76	0.78
Plasterboard (gypsum)	6.75	0.38	0.39
Cement/sand 1:6	0.85	0.127	0.136
Cement/sand 1:5	**0.97**	0.146	**0.156**
Cement/lime/sand 1:1:6	1.11	0.163	0.174

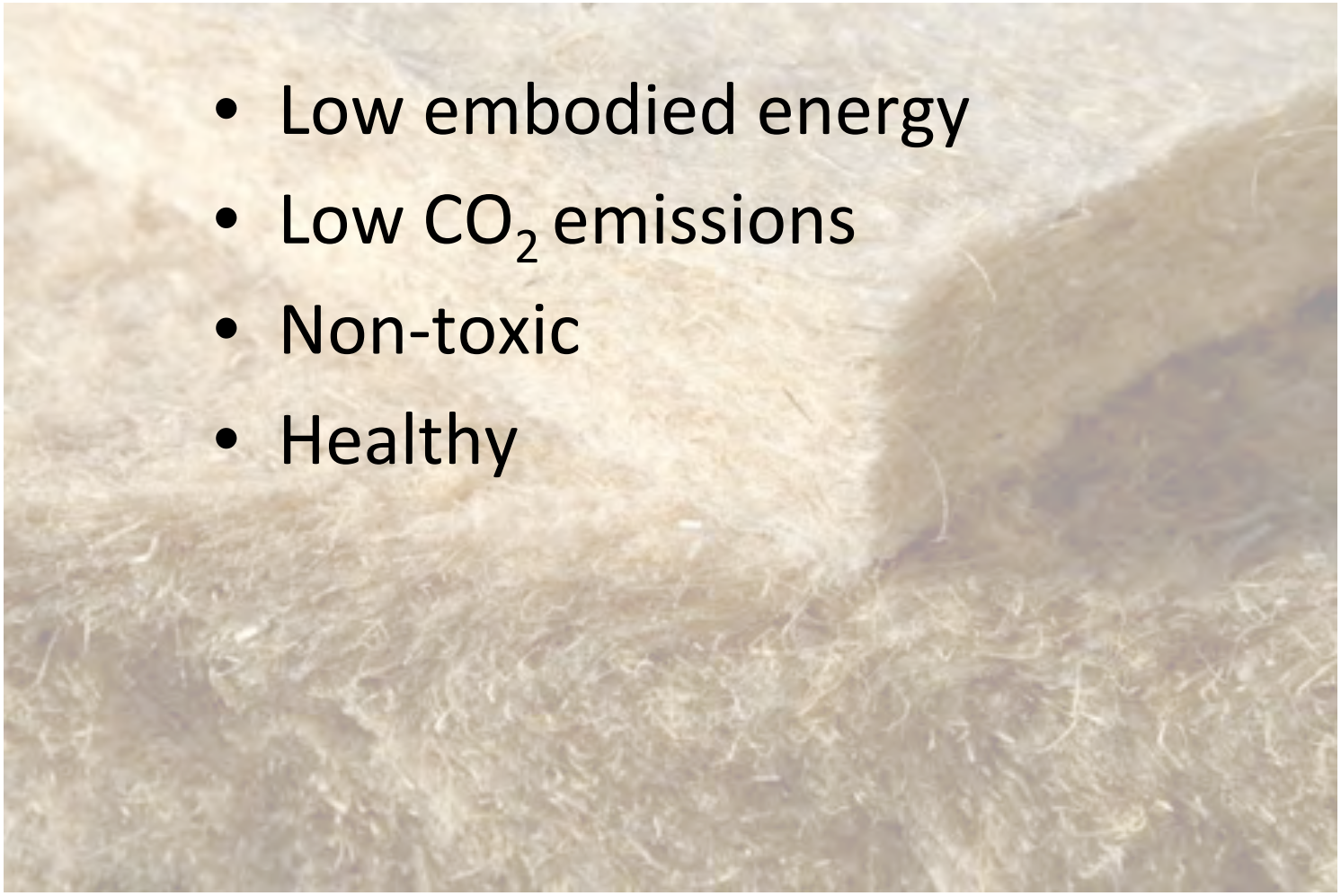
Data extracted from Inventory of Carbon & Energy (Hammond & Jones 2011) * Commercial clay plaster, CAPEM (Weismann 2013 pc)

What is Earth-Friendly?



- Low embodied energy
- Low CO_2 emissions

What is Earth-Friendly?



- Low embodied energy
- Low CO_2 emissions
- Non-toxic
- Healthy

What is Earth-Friendly?

- Low embodied energy
- Low CO_2 emissions
- Non-toxic
- Healthy
- Natural
- Local
- Biodegradable

Low Impact Strategy

Low Impact Strategy

- -
- -
- -
- -
- -
- Borrow (tools & equip)
- Use what you have

Low Impact Strategy

- -
- -
- -
- Thrift: Reuse & repurpose
- Swap time & materials
- Borrow (tools & equip)
- Use what you have

Low Impact Strategy

- -
- Buy new items
- Make things
- Thrift: Reuse & repurpose
- Swap time & materials
- Borrow (tools & equip)
- Use what you have

Low Impact Strategy

- Reduce waste
- Buy new items
- Make things
- Thrift: Reuse & repurpose
- Swap time & materials
- Borrow (tools & equip)
- Use what you have

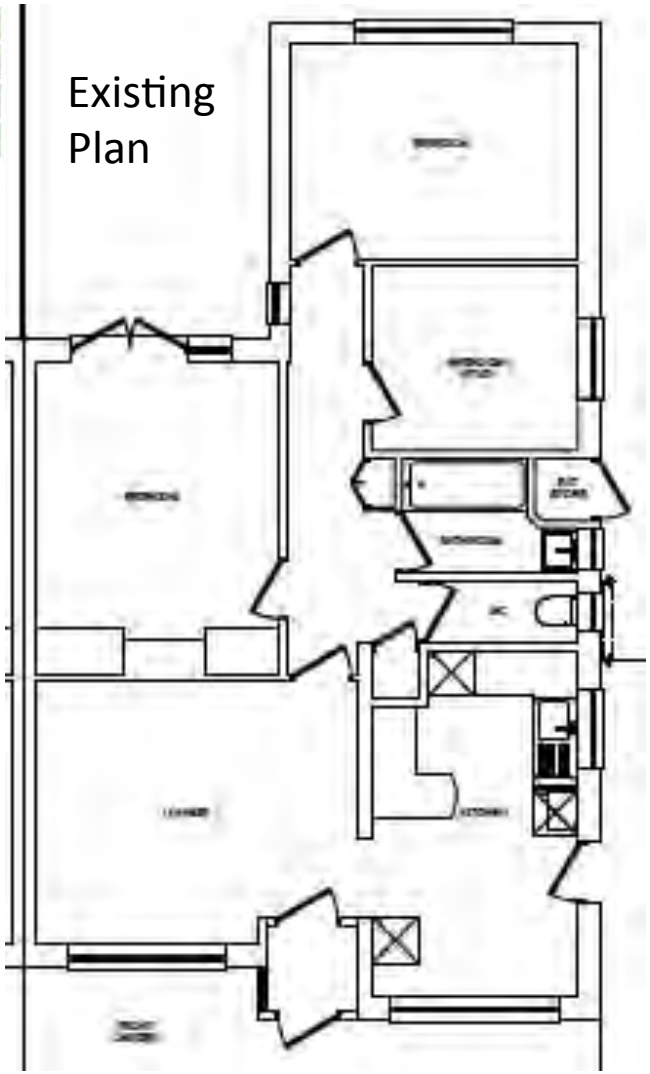
Earth-Friendly Renovation @ No 40

- Original bungalow
- New Design plans
- Lounge & 1st bedroom
- Bathroom
- Old kitchen
- Finances
- Garage studio
- Top tips
- 2nd hand material sources
- Upgrade your skills
- Helpful information

Original design @ No 40

Ben Rogers Architectural Design

Existing Plan



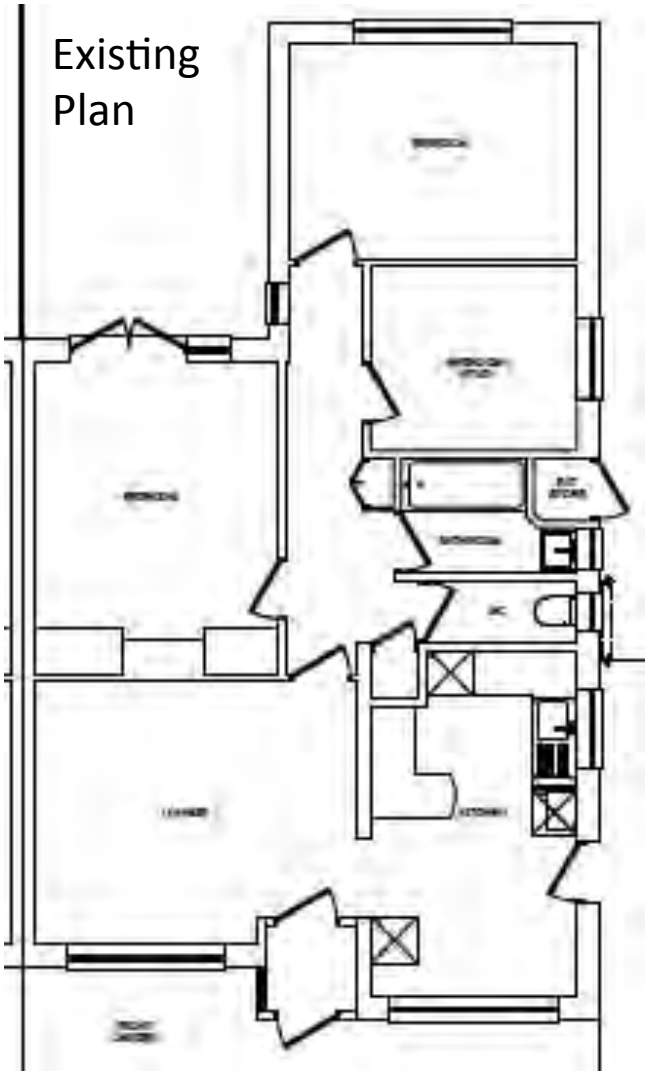
Original lounge & 1st bedroom

Original kitchen & dining area

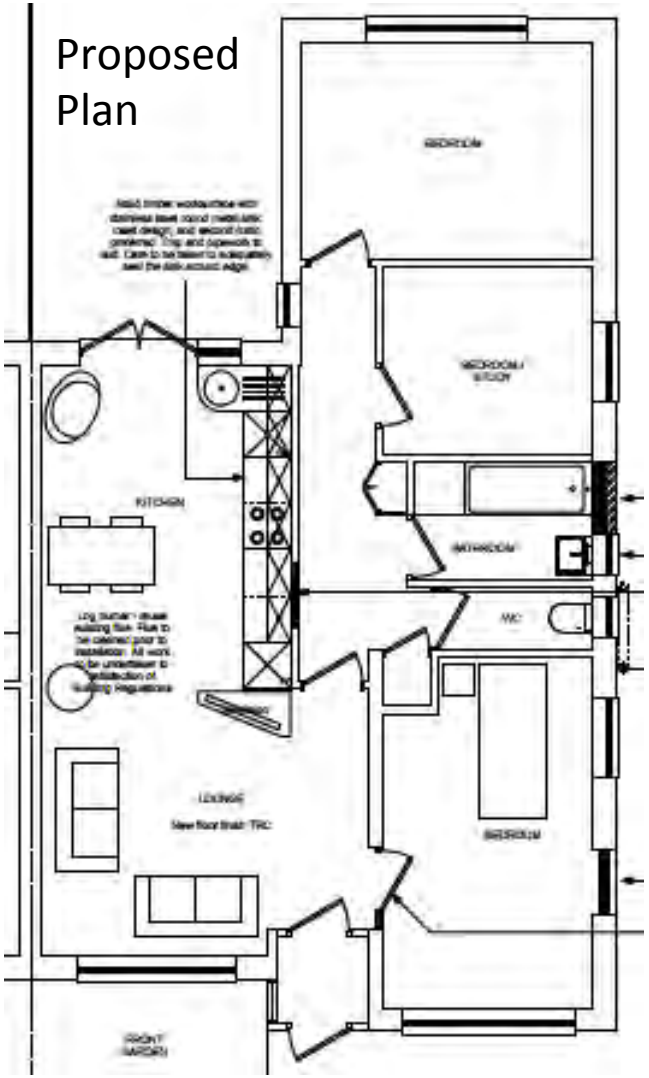
Earth-friendly design @ No 40

Ben Rogers Architectural Design

Existing Plan

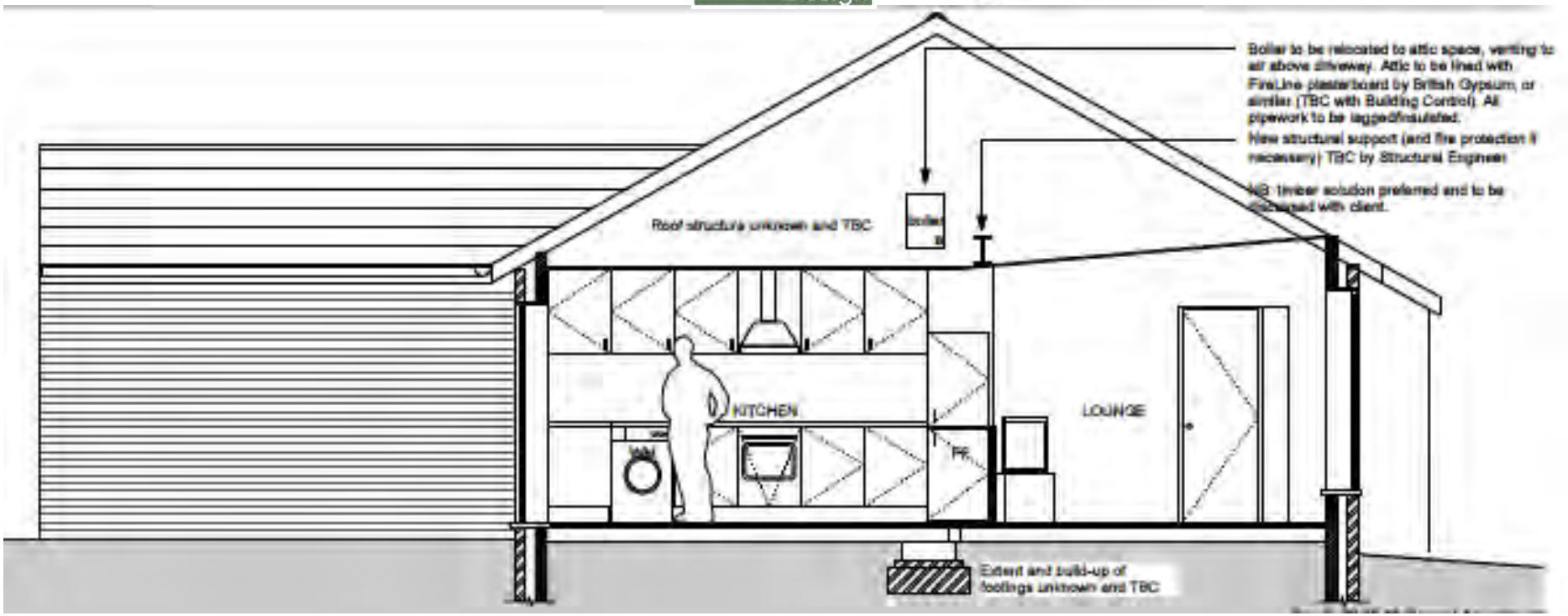


Proposed Plan



Earth-friendly design @ No 40

Ben
Rogers
Architectural
Design



WORKS: The lounge & 1st bedroom

Chimney wall removal – careful deconstruction
Builder: Chris Kennett

Oak Structural beam
Supplier: English Woodland Timber (from Normandy)

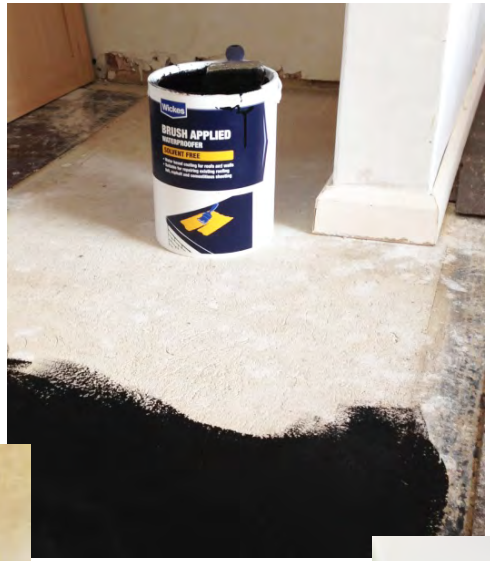
WORKS: The lounge & 1st bedroom

Blocking a doorway.

Natural insulation samples – hemp fibre, recycled denim, sheep wool, wood fibre

WORKS: The lounge & 1st bedroom

Limecrete screed



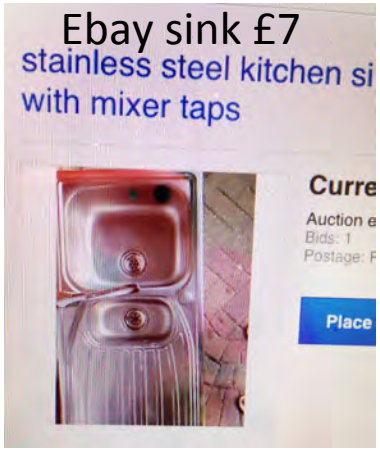
Water-based bitumen waterproof paint membrane

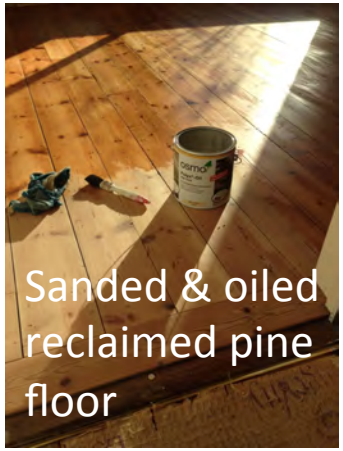
Lime plaster

Reusing vinyl floor tiles

1st bedroom becomes a kitchen

Reclaimed kitchen. Reclaimed pine floor.





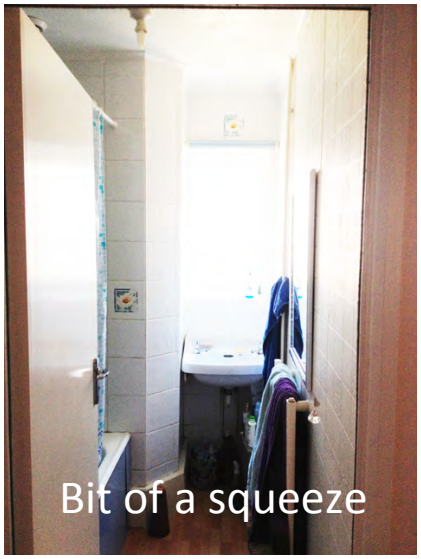
New lounge, kitchen & dining area

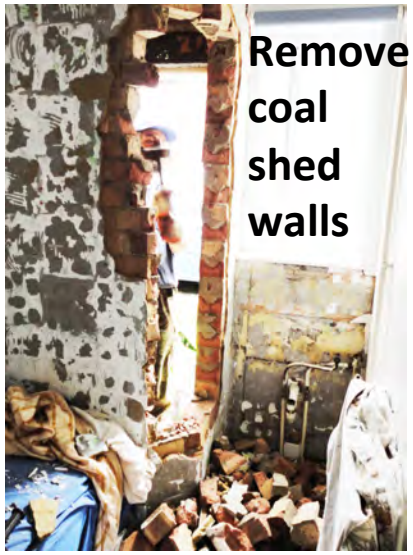
Dining area to lounge

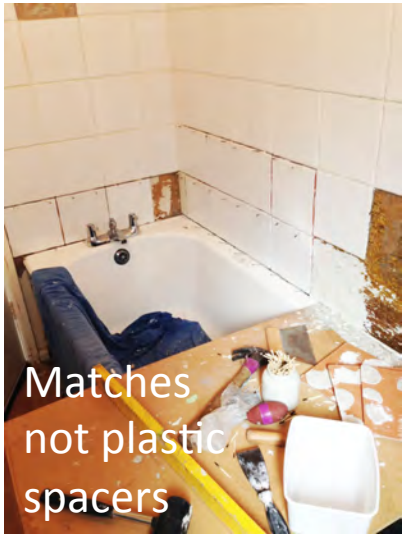
Kitchen

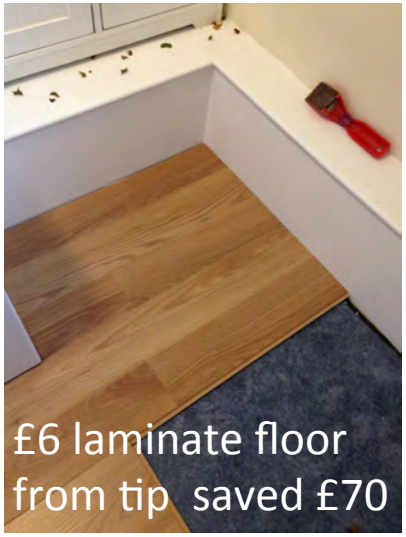
Lounge to dining area

The bathroom





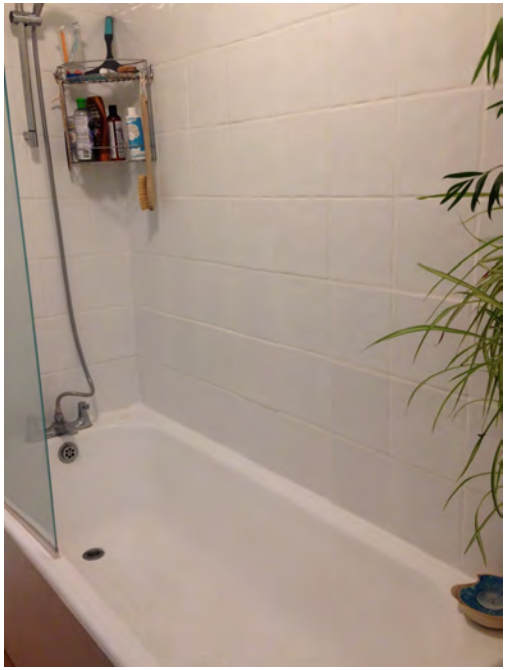




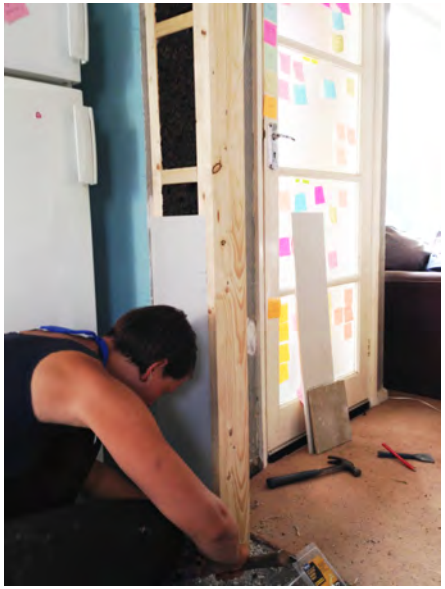
The bathroom

Before

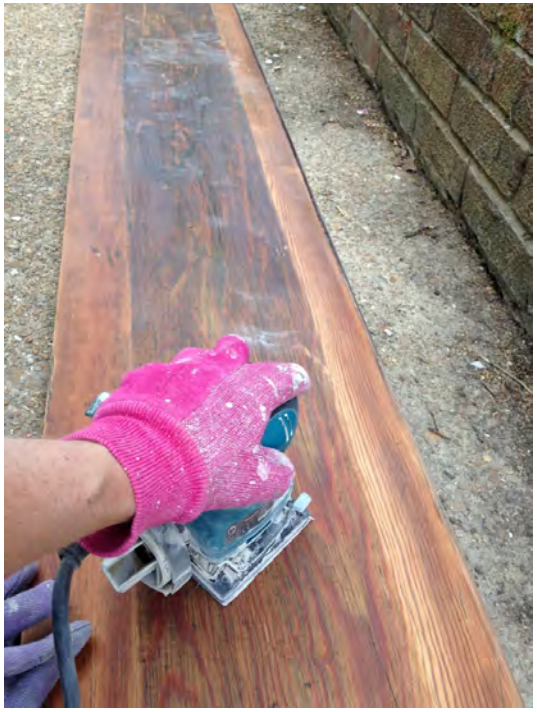
After



The old kitchen – new bedroom



Cork insulation &
old plasterboard in
mini stud



Sanded, oiled and
reused church pew seat
for wide window sill £70

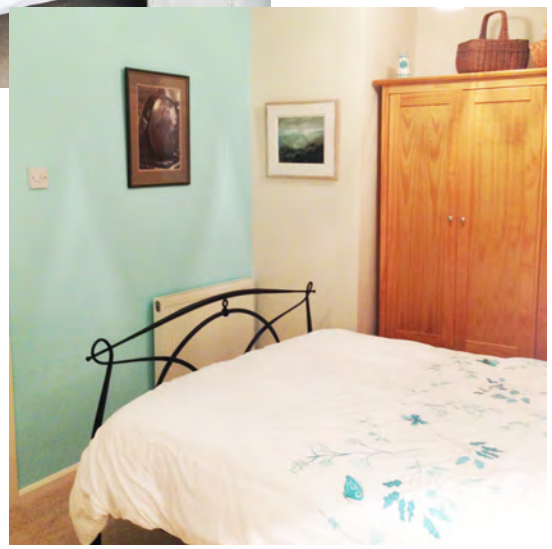
High impact gypsum plaster

Reusing old skirting

The old kitchen – new bedroom

Before

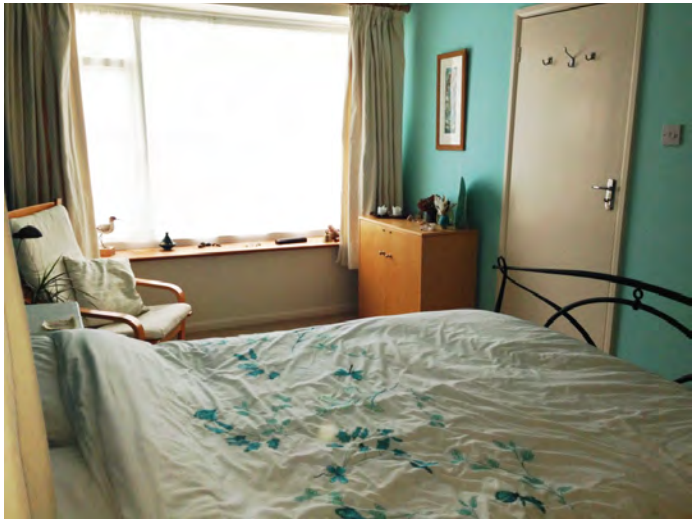
After



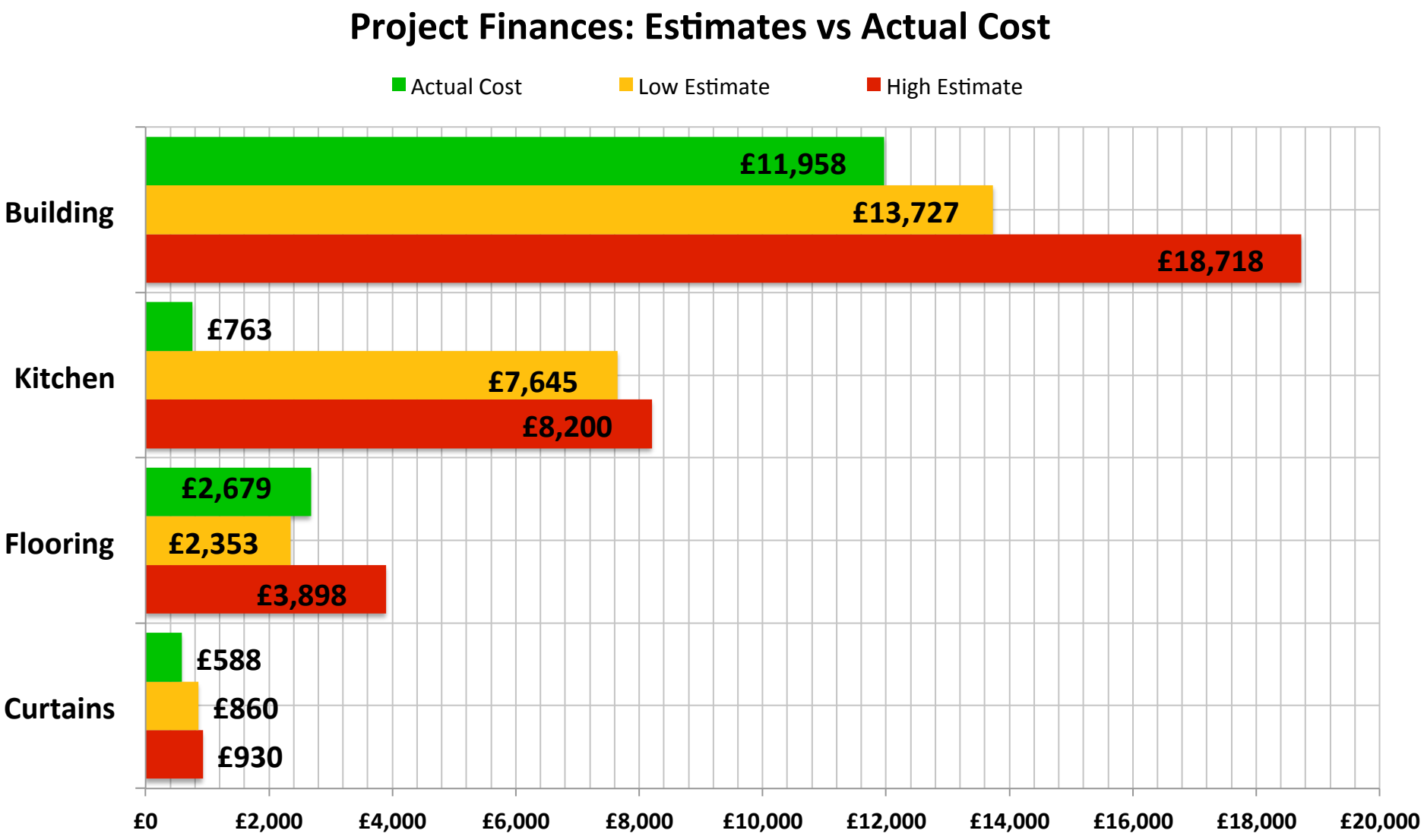
The dining area – new bedroom

Before

After



After


Project Finances: Estimates vs Actual Cost
Actual Cost
Low Estimate
High Estimate
Building
£11,958
£13,727
£18,718
Kitchen
£763
£7,645
£8,200
Flooring
£2,679
£2,353
£3,898
Curtains
£588
£860
£930
£0
£2,000
£4,000
£6,000
£8,000
£10,000
£12,000
£14,000
£16,000
£18,000
£20,000

Number 40 – Finances before

- £220k purchase price
- £270k forecast sale price after renovation (2 beds)
- Estimates £17k to £31k
- 8 months no income
- Renovation budget <£15k
- Contingency £3k
- Flexible completion date

Number 40 – Finances after

Number 40 – Spring 2018

- Renovation Budget >£15k
- Expenditure £14k
- Saved £10,000 by reusing
- Re-valued £320k
- Profit £86k
- £? Prevented landfill
- £? Preserved resources
- £? Reduced CO2 emissions

Garage to Pottery Studio

Top Tips

Plan well ahead – list your needs early on

Speak to EVERYONE about what you need

Allow time to research freebies & bargains

Budget but add a contingency

Flexible completion date

Stick to your principles

Persevere and have faith

Congratulate yourself regularly

Second-hand material sources

- Friends & family
- Colleagues
- Community fb pages & noticeboards
- Local press Wanted ads
- Building companies
- Checkatrade companies
- Freecycle.co.uk
- Ilovefreegle.org
- Preloved.co.uk
- Gumtree.co.uk
- Ebay.co.uk
- Amazon.co.uk
- Council Household recycling centres (tip)
- Waste Transfer Stations
- Wood recycling projects
- Architectural salvage

Helpful information

- **The Environmental Design Pocketbook**
  Sofie Pelsmakers (2012) RIBA
- **The Whole House Book**
  Cindy Harris & Pat Borer (2005) CAT.
- **The New Natural House Book**
  David Pearson (1998) Conran
- **The Eco Home Design Guide** Christopher Day (2015) Green Books
- **Zero Carbon Britain – Rethinking the Future**
  P Allen et al (2013) CAT
- **Traditional Construction for a Sustainable Future**
  Carole Ryan (2011) Spon Press
- **Using Natural Finishes**
  Adam Weismann & Katy Price – (2011) Green books
- **Old House Handbook**
  Roger Hunt & Marianne Suhr (2013) SPAB
- **Natural Building – A guide to Materials and Techniques**
  Tom Woolley (2008) Crowood Press

An Earth-Friendly Renovation of a 1950's bungalow

by Sally Mareike