Green Architecture Day
25th March 2011

RETREAD:
Practical Ways To Deliver Low Impact Buildings

Presented by Duncan Baker-Brown RIBA
of **BBM** sustainable design

www.bbm-architects.co.uk

What Architect's Do

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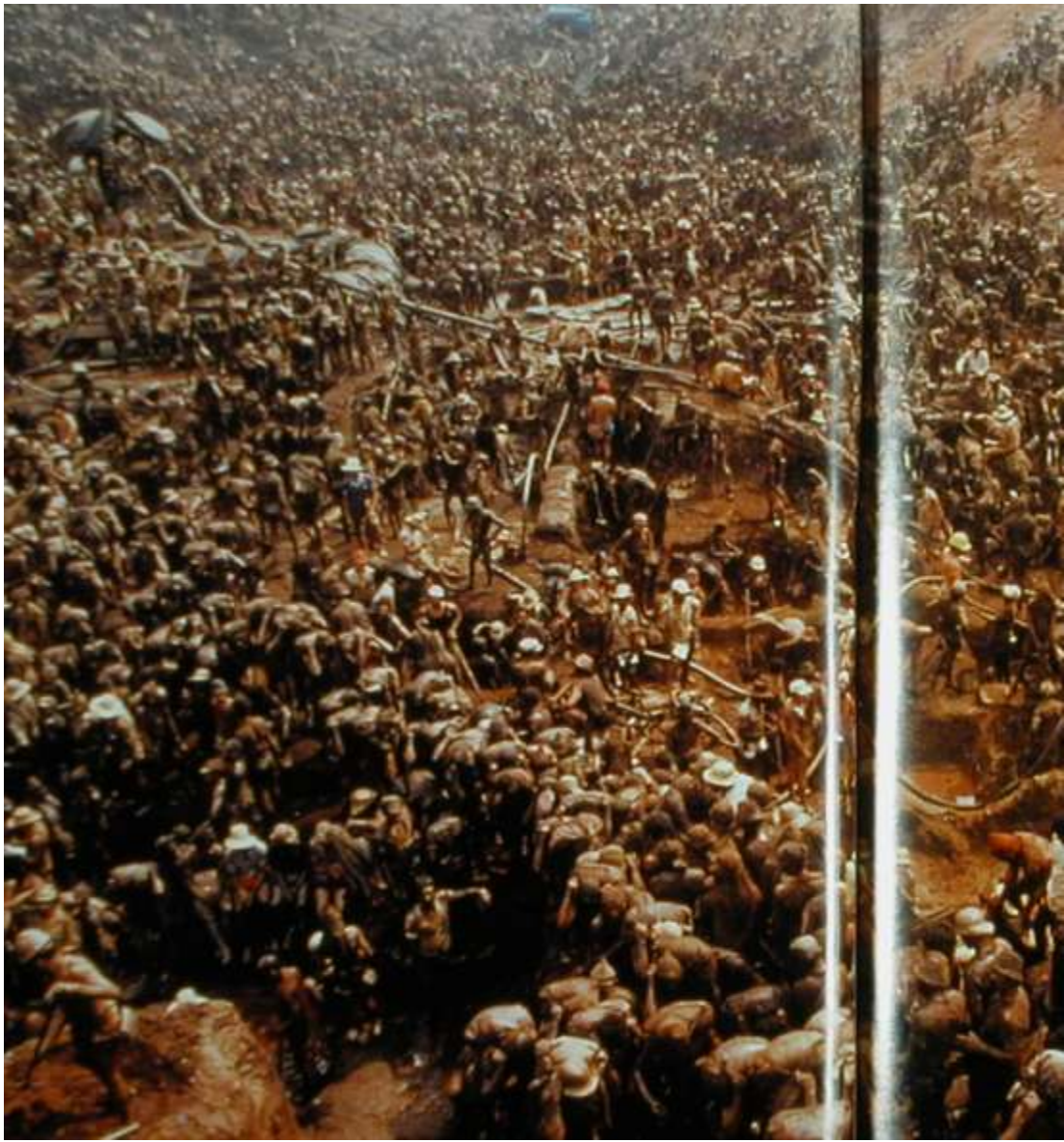
And this is where materials come from…



And this is what we do to redundant buildings…

And this is where materials end up……

One Planet NOT Three!

Earth

Unfortunately this is Sustainable Design…… Hyberabad-sindh

However this is not…

but it is beautiful!

but you learn something everyday…

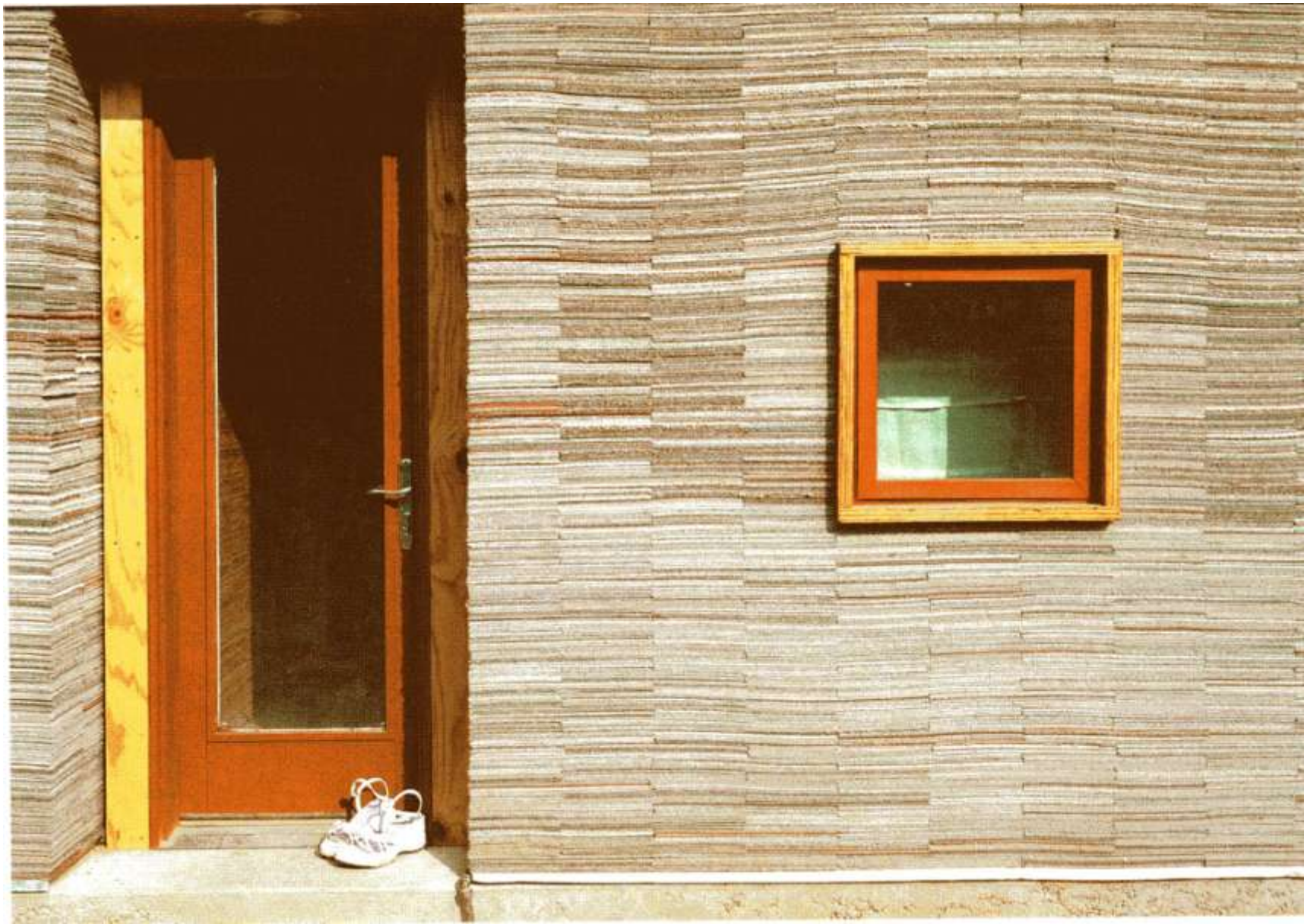
Is this?

Perhaps

Perhaps

I think this is….

but how is it relevant?



Rural Studio….

Carpet tiles

Cottrell & Vermeulen….

Cardboard classroom

Shigeru Ban....

Cardboard roles

Architecture Student Project's

Architecture Student Project's

Architecture Student Project's

Recycling is a big deal…..

But in order of preference….

- **REDUCE**
- **REUSE**
- **RECYCLE**
- **Design for Demolition!**

THE GOOD NEWS

- **Everybody is talking about**
  - **saving energy & reducing CO_2**
  - **reducing waste & water consumption**
  - **buying good local food**
  - **cycling to work**

- **It saves lots money, adds value to property -** *UK Green Building Council stated that low carbon new built office buildings cost as little as 5-10% extra over 'normal' versions*

- **Green building can be at the heart of a low-carbon economic recovery,** *boosting growth and creating green collar jobs. This is particularly true in our leaky existing homes and buildings, where we need a massive programme of refurbishment to cut carbon, reduce energy bills and produce more comfortable places to live and work…..Green Building Council*

- **There are lots of new networks helping the construction industry to reduce waste**

THE CURRENT REALITY

Lights go out across Britain as recession hits home

Electricity demand falls as economy slows at fastest rate since 1980

Ashley Seager and Mark Milner

Britain's days as the fastest growing economy in Europe were officially declared over yesterday as the deepest recession in a generation saw consumers turning off the lights and Poles returning home.

While official figures showed the economy contracting at its fastest since 1980, National Grid said demand for electricity had fallen over Christmas at homes and factories across the land, and Poland confirmed that thousands of its citizens were coming home from Britain and Ireland.

National Grid said it was cutting its forecast for electricity consumption this year because of the recession. The thousands of people being laid off each week and the hundreds of firms cutting production are reducing demand.

Industry has suffered most in this recession and made the biggest contribution to the slump in national output, which fell by a worse-than-expected 1.5% in the fourth quarter of last year compared to the third – or around 6% on an annualised basis.

As the economy had contracted by 0.6% in the July to September period, Britain now meets the most common definition of a recession – two consecutive quarters of shrinkage. But some analysts say the country fell into recession last April.

Financial markets took fright at the sheer speed of the economy's contraction, which outpaced anything seen in the recession of the early 1990s.

The pound slumped to a fresh, 23-year low against the dollar of just $1.35 – a fall of 13% from the peak of $2.11 seen last summer – and to an all-time low against the yen. The FTSE 100 share index fell below the key 4,000 level after the news, although it later recovered to end little changed.

"These figures are the final nail in the coffin for Gordon Brown's claim to have 'ended boom and bust'. The UK economy is most definitely bust at the moment," said Charles Davis at the Centre for Economics and Business Research.

"It is not just that the UK has entered recession; it is the size of the contraction ... The economy is set for the steepest contraction in the post-war era in 2009."

Brown admitted the government had not seen what was coming: "What we did not see, nobody saw, was the possibility of markets' failure.

"We are fighting this global recession with every weapon at our disposal. We need other countries to work with us and we are asking them to agree with us a common set of measures."

He criticised David Cameron for having suggested Britain might need to go to the IMF for help in financing its bail-out of the creaking banking system. But Cameron insisted he was right to warn that the country faced the prospect of an IMF loan for the first time since 1976. "I think it's right to warn about that, I think it's a responsible thing to do," Cameron said.

He and the shadow chancellor, George Osborne, mocked Brown's claims last summer that the economy was better placed than in the past to withstand recession and would grow in spite of the credit crunch.

But TUC chief Brendan Barber blamed bankers and previous Tory governments for the economic mess: "This recession is not bad luck or an inevitable swing of the pendulum. Its cause is irresponsible behaviour by banks and financial institutions taking advantage of the deregulation started by Mrs Thatcher and president Reagan, and continued to a greater or lesser extent ever since."

Unemployment was this week reported to have jumped to nearly two million, and analysts say it would be much higher were it not for workers from countries such as Poland returning home.

Poland's treasury minister Aleksander Grad told the Guardian that the economy there, unlike Britain's, would avoid recession. Poland's banks had been regulated tightly and had not got into the toxic derivative products that have brought down banks around the world, said Grad.

National Grid said weekly peak electricity demand would fall by 600-1,000 megawatts, the equivalent of a large power plant, over the next year. The drop will ease the strain on power stations, some of which are facing closure because of age or environmental rules. It will also reduce CO_2 emissions.

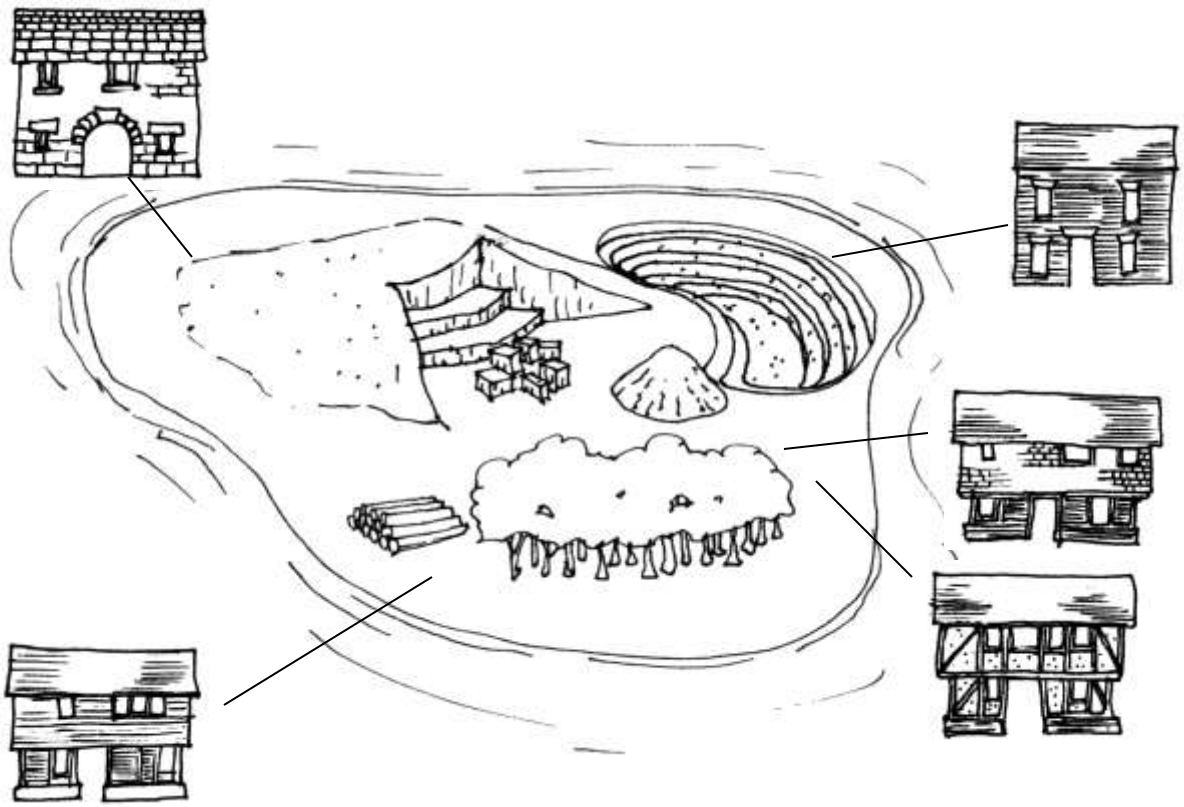
4–5 »

So How Did Pre-Industrial Society Cope?

"...man has from age to age translated the manuscript of the earth into the terms of his own thought and use...To realize the differences between place and place; to observe the varieties in expression of the genius locci by noting the correspondences between the raw material below and the finished structure above the ground"

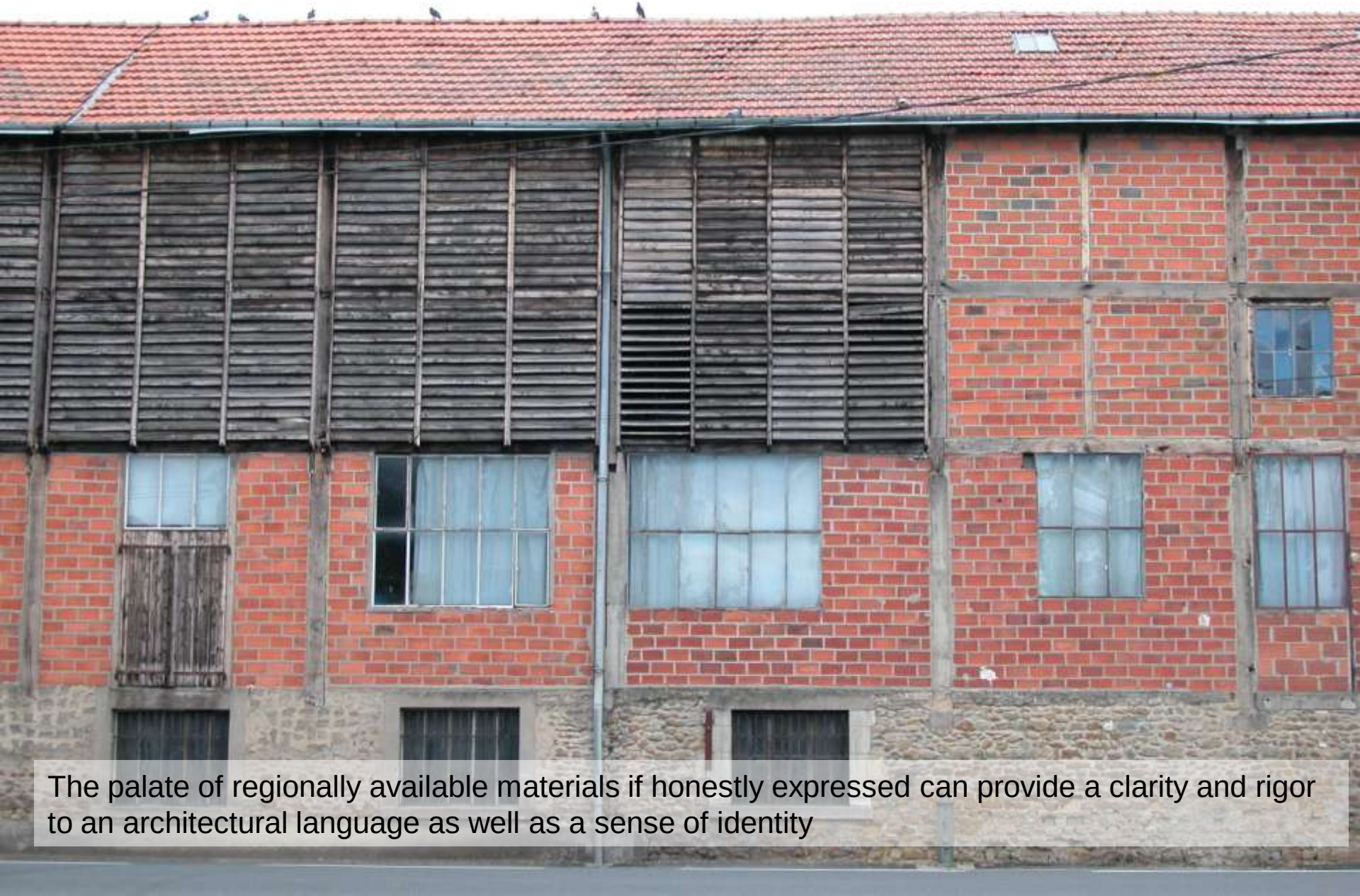
H.J. Massingham, Cotswold Country, Batsford Press, London, 1937, P.3

Pertaining to Place



Vernacular styles of architecture were derived from the materials found close to the site - regional differences of geology and vegetation resulted in logical variations in constructional language

Pertaining to Place



The palate of regionally available materials if honestly expressed can provide a clarity and rigor to an architectural language as well as a sense of identity

Pertaining to Place

Understanding through learned experience produces a ‘Genius Locci’ where the sense of place is heightened by the logical translation of the land into domain


Locking Carbon - not burning it

Sweet Chestnut:

The Process

Sweet Chestnut:

The Process

Sweet Chestnut:

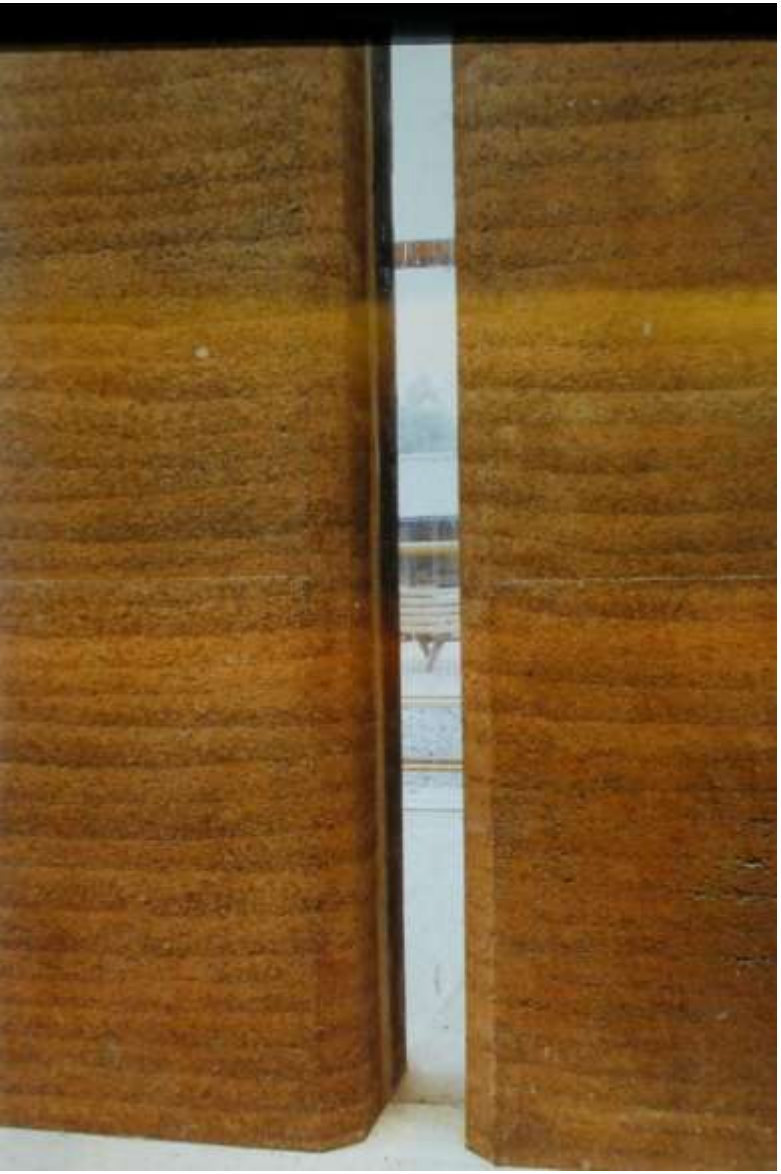
The Process

Sweet Chestnut:

Glue Laminated Column

Understanding Materials

RAMMED EARTH & CHALK

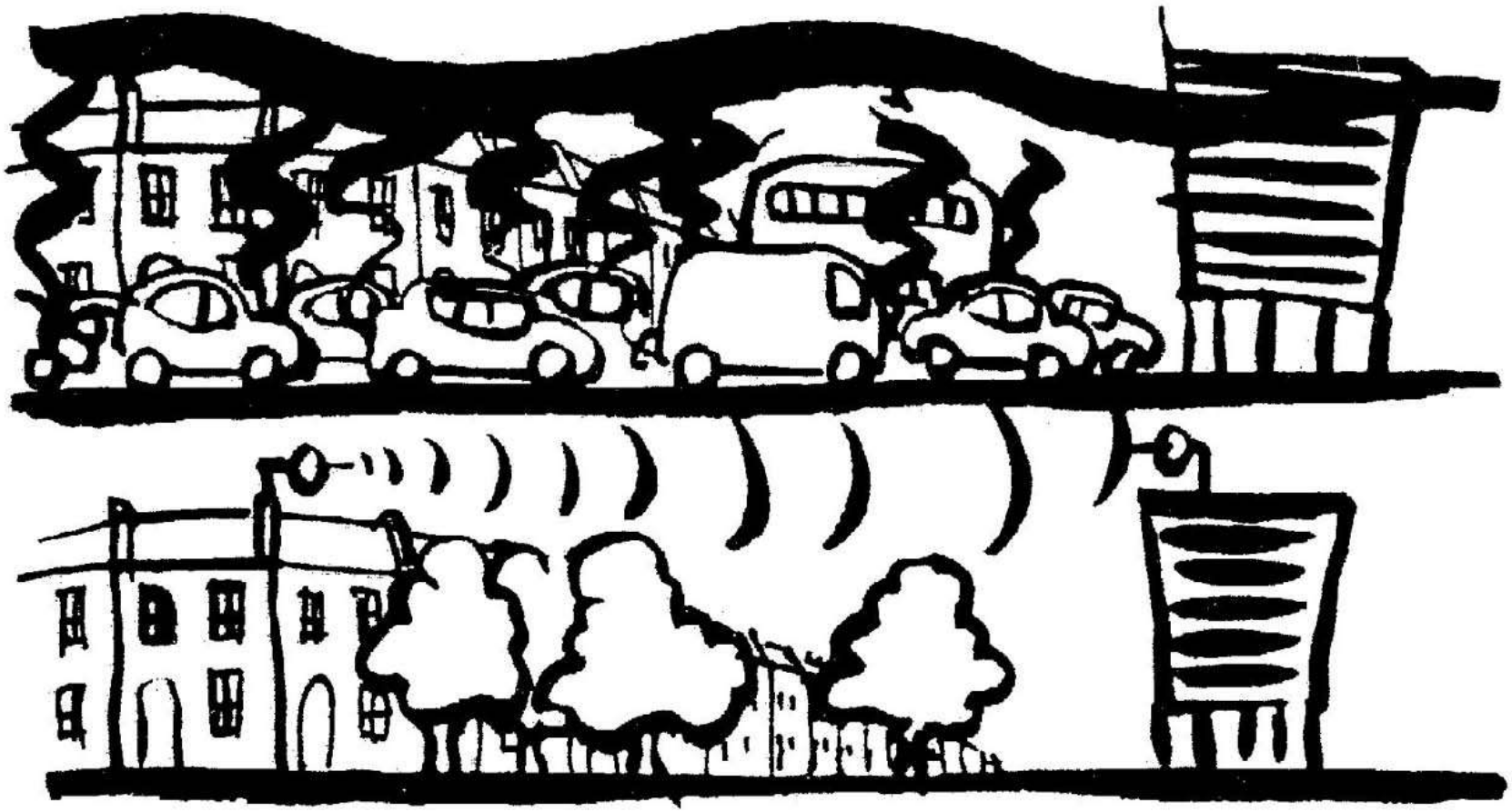


RAMMED EARTH

But despite all the green features

It’s a change in lifestyle that really counts….

CityVision



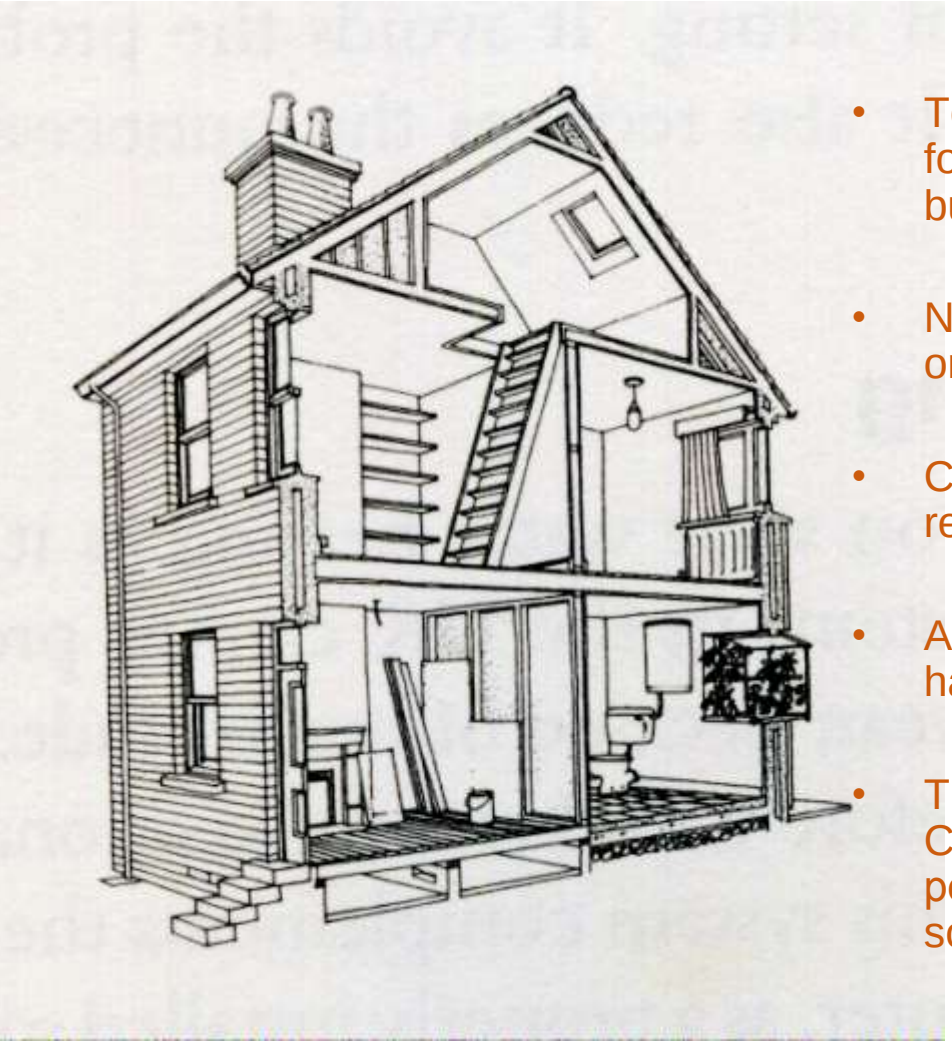
We need good ideas…
the Swiss Sound Box

We need good ideas…

warm tarmac + solar juice

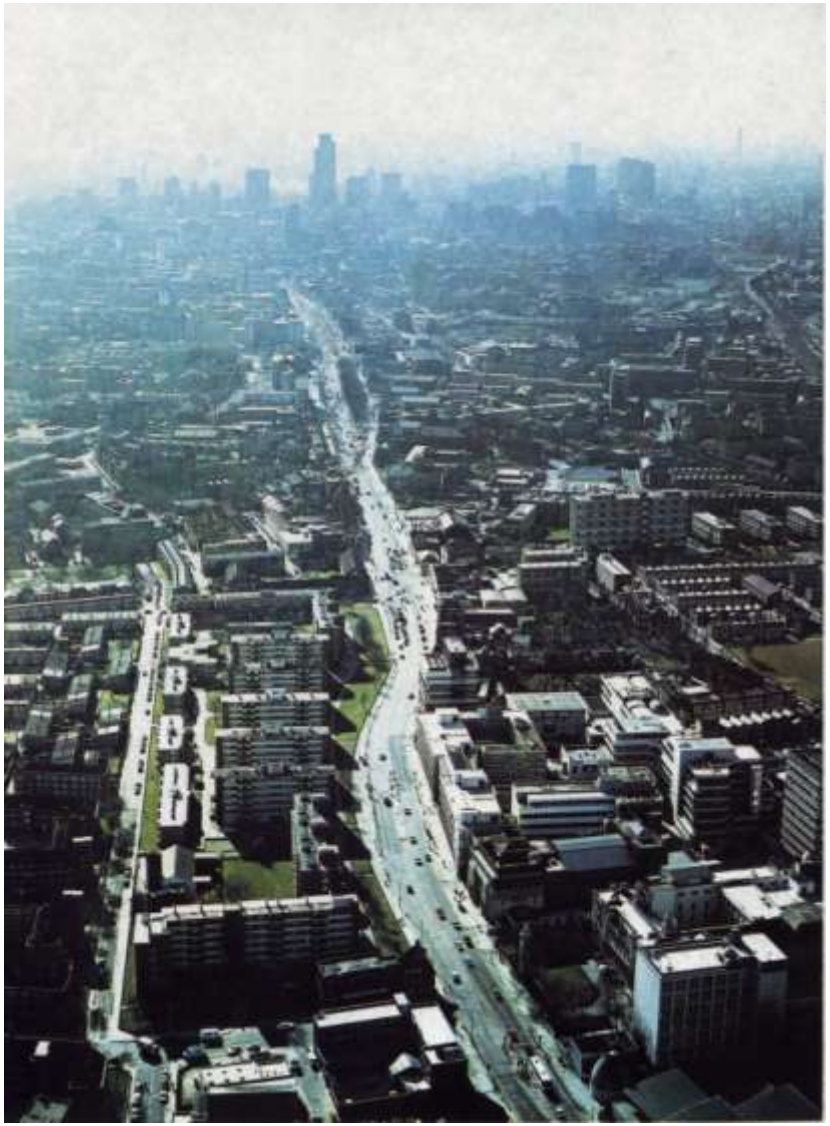
But watch out for *greenwash*

THE CHALLENGE



- To make a real impact on CO2 emissions we must focus on improving energy efficiency of existing building stock
- New buildings are well insulated but account for only 0.01% of building stock (each year)
- Central government requires CO2 emissions to be reduced by 80% by 2050.
- At current demolition rates we should expect to have 80% of our current building stock in 2050
- Therefore we need to retrofit existing homes to a Code Level 4 standard at least at a rate of 500,000 per year for 40 years!!….. And that doesn't allow for schools, offices etc..

THESE ARE OUR FUTURE ECO TOWNS

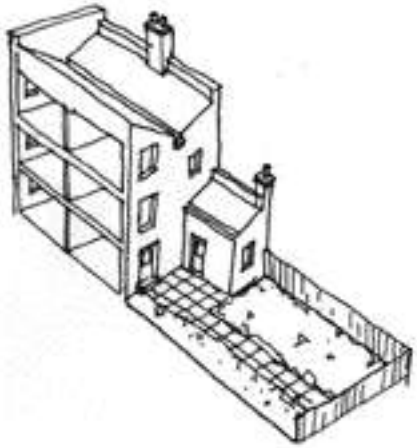


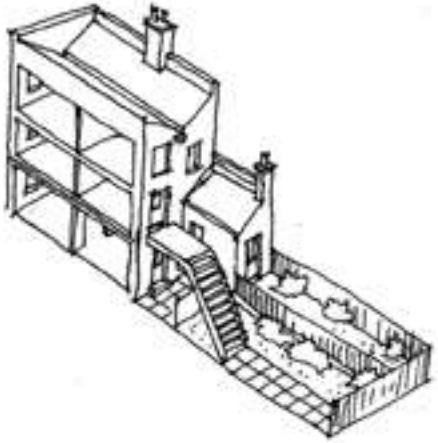
Working with Existing Buildings

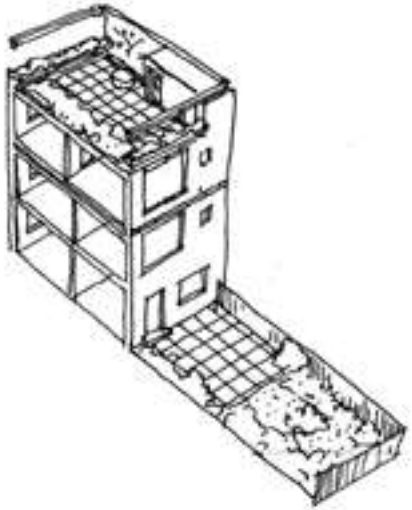
Working with Existing Buildings

Working with Existing Buildings

The evolution of a terrace house







Case Study

SALFORD QUAYS

Urban Splash

Working with Existing Buildings

Jakob & Macfarlene's *Cite de la mode et du design* in Paris

GREEN RETROFIT

House + Studio Hove

GREEN RETROFIT

House + Studio Hove

Case Study

The Bridge

G.I.A : 750m²

Type of Project: Rebuild on existing concrete footprint

Final Account: £1,500,000+vat

Cost/m² inc. renewables £2,000/m²

Contact Period: 11 Months

On budget and 7 weeks ahead of time

Renewables: 6kW Photovoltaic Panels + 4m² evacuated tube panel

Utility Bills: “1/3 of that expected”

Case Study

The Bridge

Case Study

The Bridge

Case Study

The Bridge

Case Study

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Case Study

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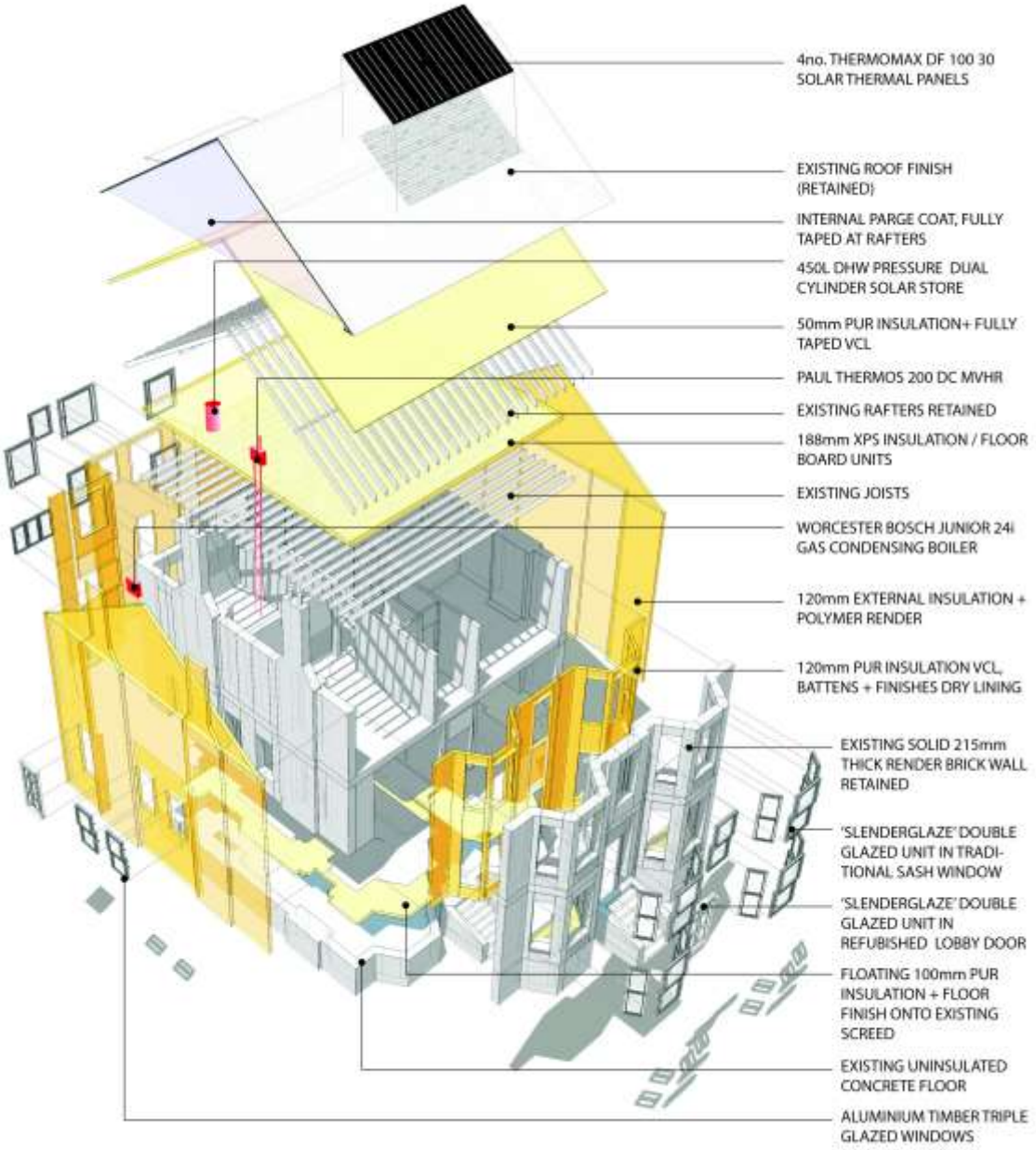
REBUILD: Case Study

The Bridge + Allotments

T.S.B. RETROFIT THE FUTURE

The Nook Brighton



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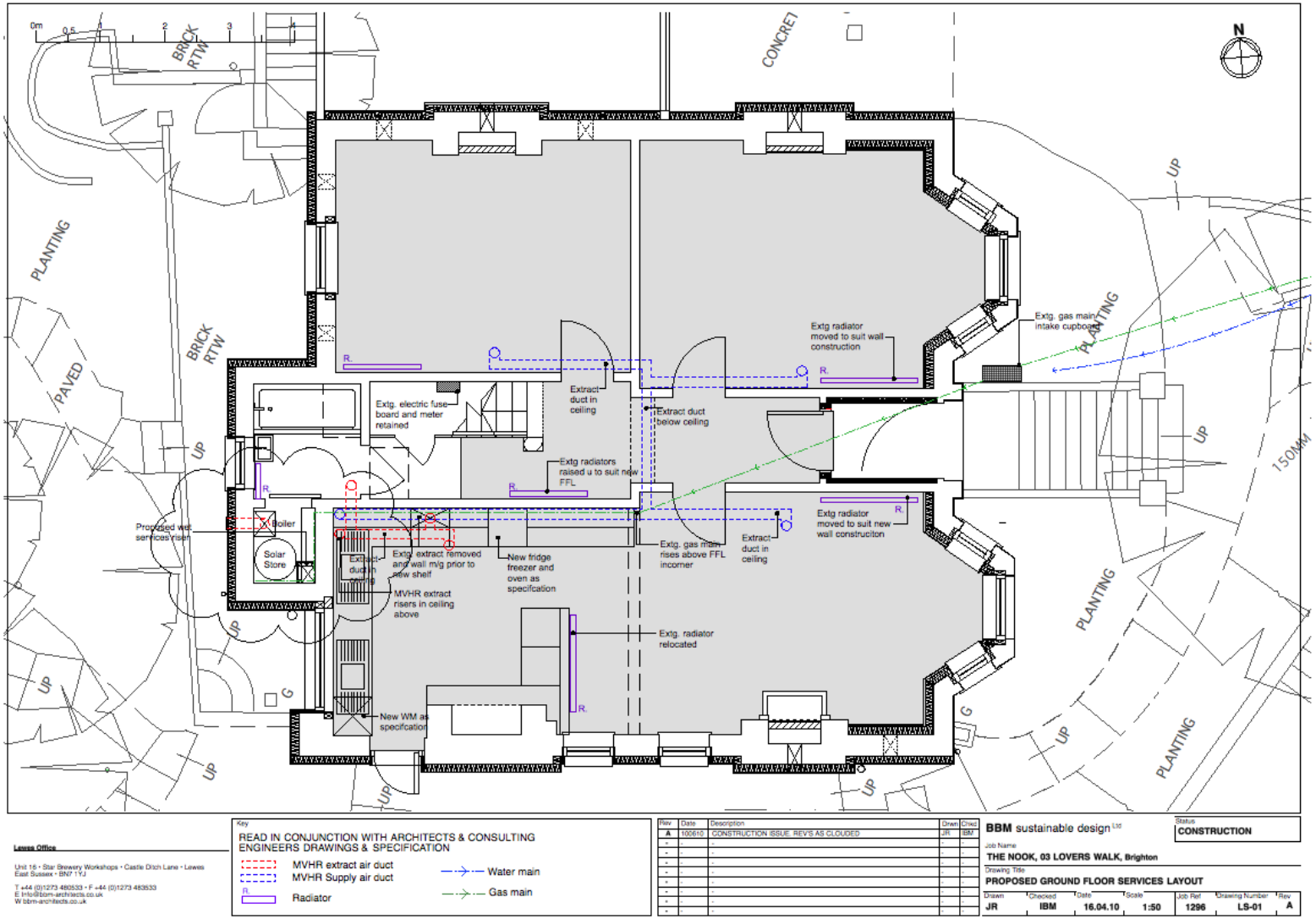

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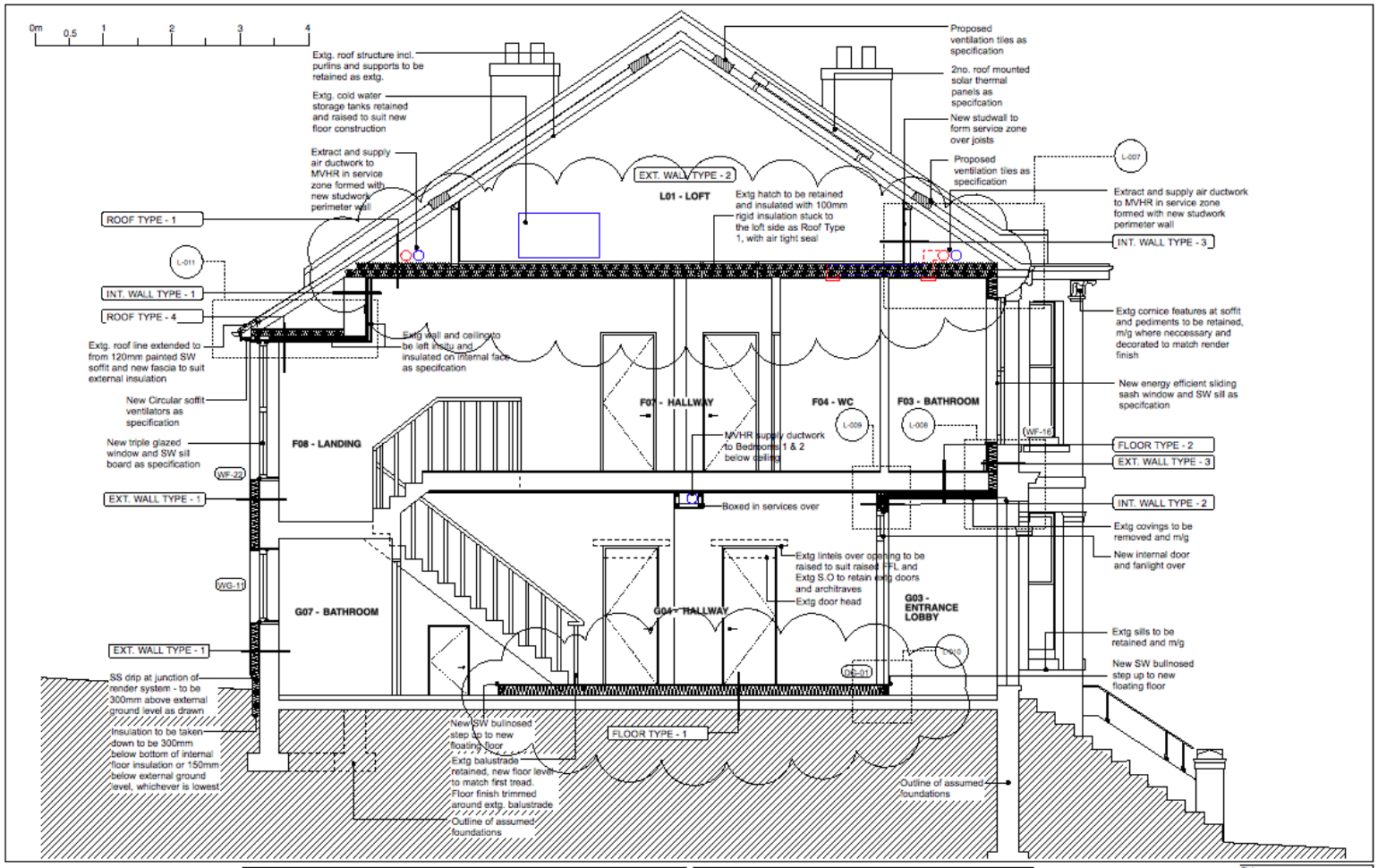

Key

READ IN CONJUNCTION WITH ARCHITECTS & CONSULTING ENGINEERS DRAWINGS & SPECIFICATION

Rev	Date	Description	Drwn	Chkd
A	10.06.10	CONSTRUCTION ISSUE. DETAIL REF'S ADDED. REV'S CLOUNDED	JR	IBM

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Status: **CONSTRUCTION**

Job Name: **THE NOOK, 03 LOVERS WALK, Brighton**

Drawing Title: **PROPOSED SECTION A:A**

Drawn	Checked	Date	Scale	Job Ref	Drawing Number	Rev
JR	IBM	16.04.10	1:50	1296	L-13	A

T.S.B. RETROFIT THE FUTURE

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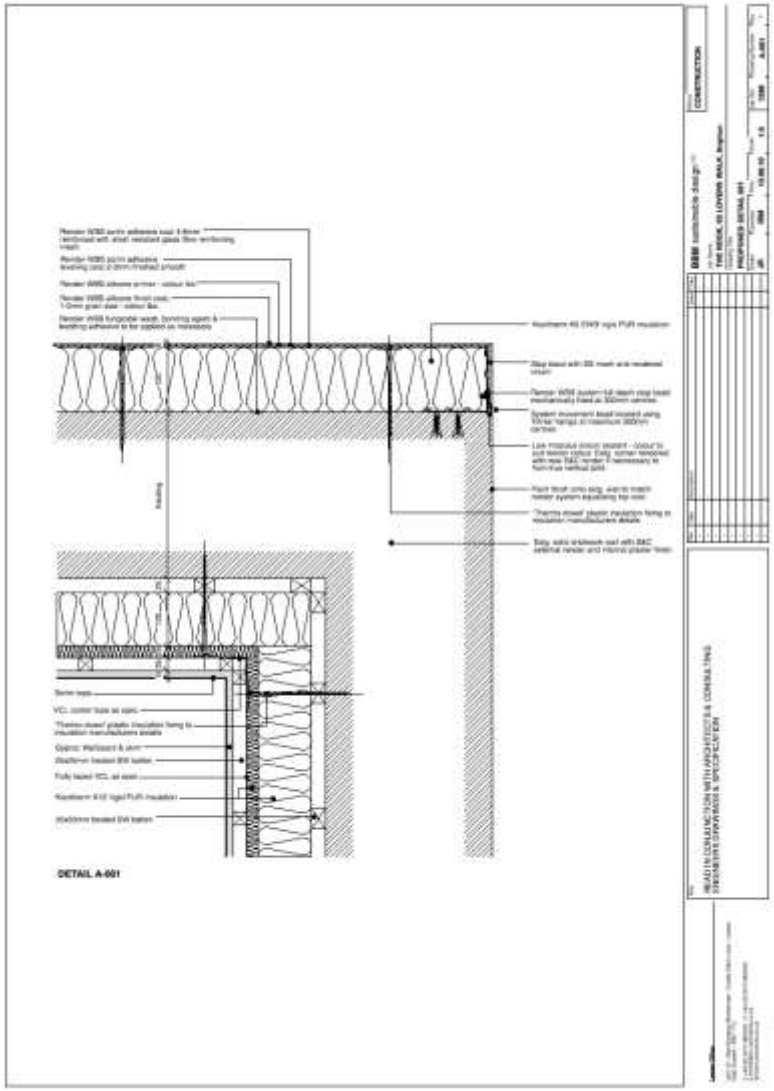

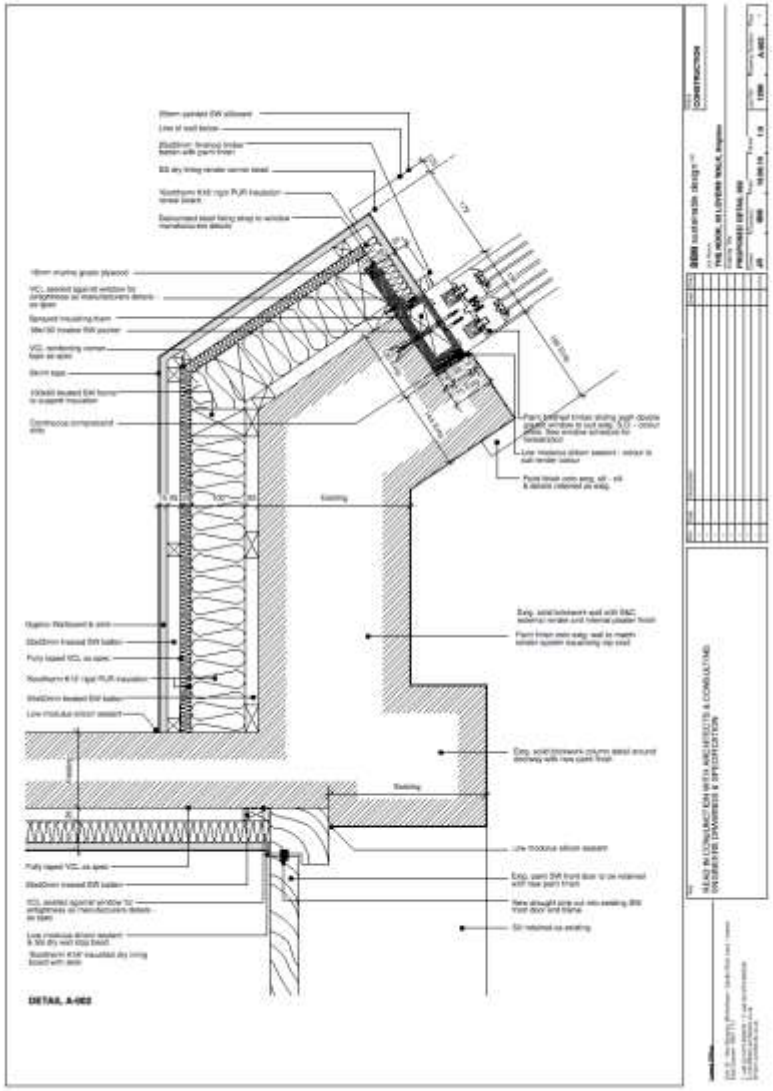

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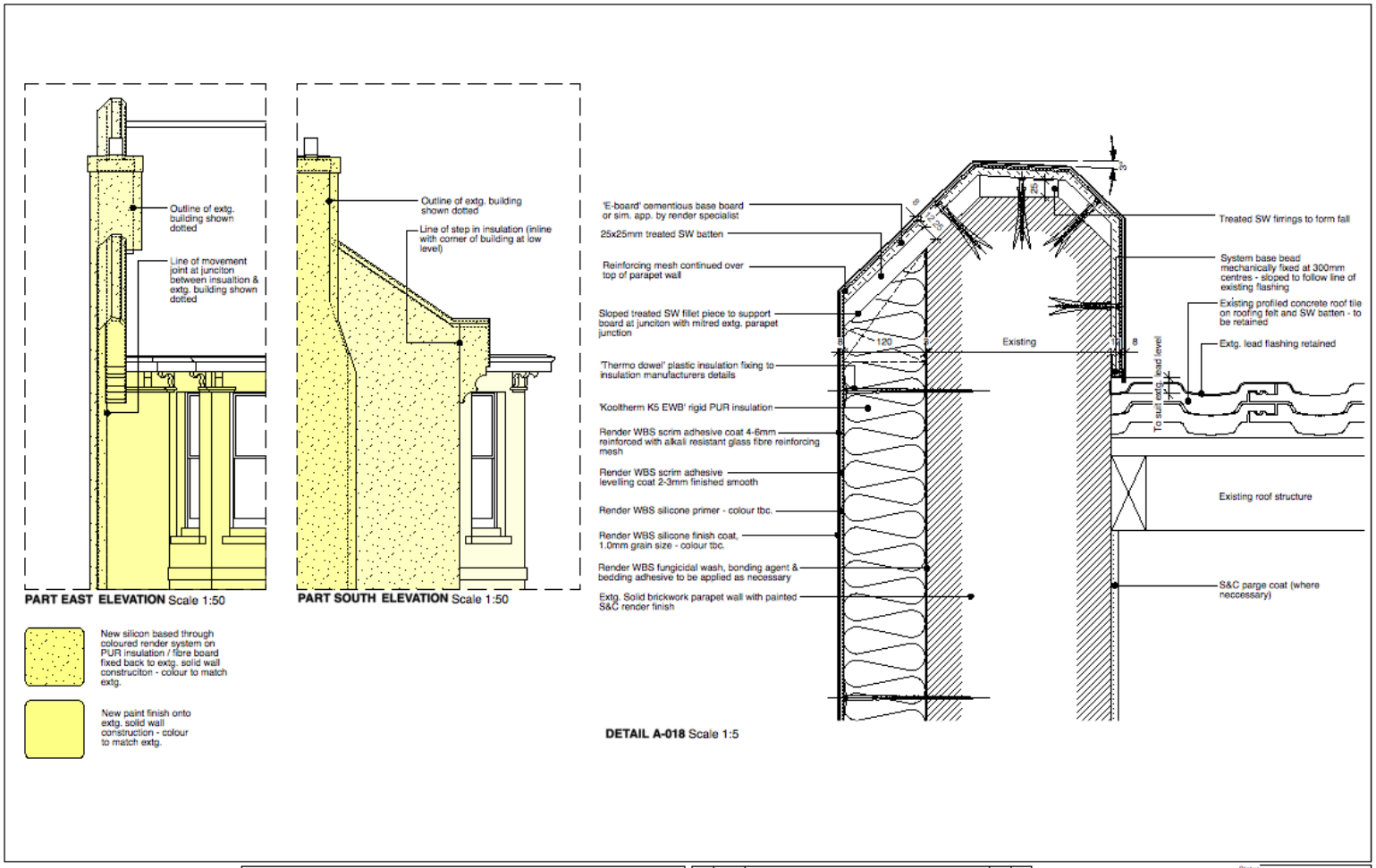

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Rev	Date	Description	Drwn	Chkd
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BBM sustainable design Ltd

Status: CONSTRUCTION

Job Name: THE NOOK, 03 LOVERS WALK, Brighton

Drawing Title: PROPOSED DETAIL 018, Part East & South Elevation Details

Drawn	Checked	Date	Scale	Job Ref	Drawing Number	Rev
JR	IBM	10.06.10	Var.	1296	A-018	-

T.S.B. RETROFIT THE FUTURE

The Nook Brighton

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T.S.B. RETROFIT THE FUTURE

The Nook Brighton

Construction Cost = £100,000 + vat

Of that £70,000+vat on building fabric
&
£30,000+vat on services

Cost per flat = £21,666.67 + vat + Design Fees

Air permeability result was 3.00m3/m2.hr@50Pa

Air changes were down 2.5 per hour

GREEN RETROFIT

Hamsey Village Hall

GREEN RETROFIT

Hamsey Village Hall

GREEN RETROFIT

Hamsey Village Hall

G.I.A : 146m^2

Mayor refurbishment of existing building & 37m^2 extension

Final Account: £207,000+vat

Cost/m^2 inc. renewables £1,417/m^2

Grants for construction from DEFRA/ VIRADOR/ BIFFA

100% Grants for renewables worth £38.5k 50% from EDF + 50% Clear Skies

GREEN RETROFIT

Hamsey Village Hall

RENEWABLES:

• after year one the wind turbine generated:

6,700 Kwh of electricity with the wind turbine. The charity have signed up with Good Energy and their payback scheme pays 9p/Kwh hour. This gave an income of £603. The electricity bill for the first year was £413!

BBM's first Carbon Negative Building!

GREEN RETROFIT

Little England Farm

GREEN RETROFIT

Little England Farm

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GREEN RETROFIT

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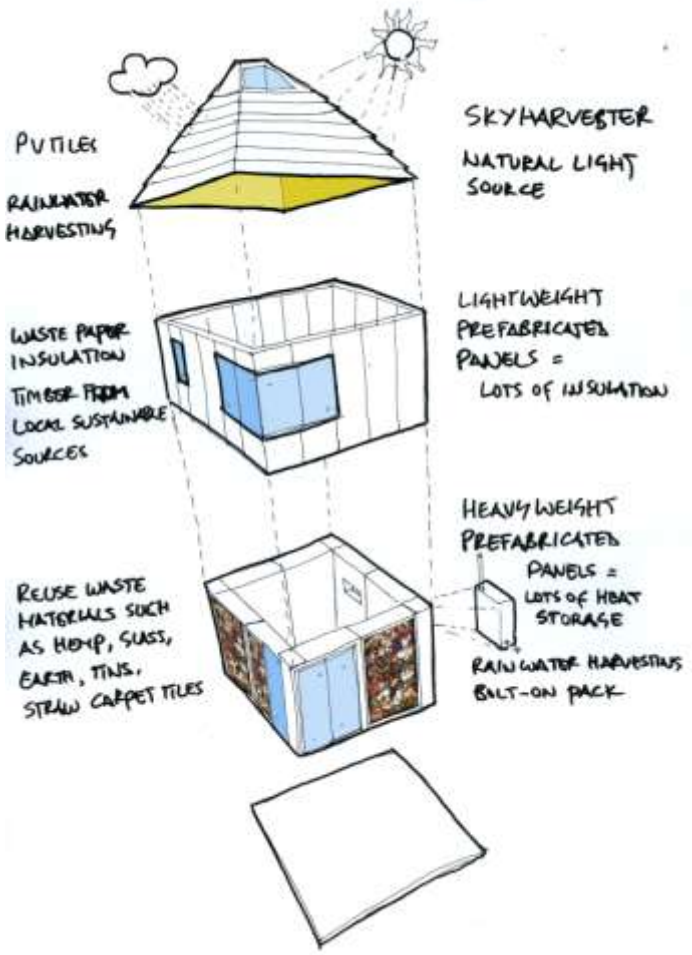
GREEN RETROFIT

Little England Farm

THTKB: THE CHALLENGE



- To create Europe's first truly environmentally-friendly 'Prefab' house
- Using predominately non-toxic, organic, locally-sourced, replenishable and/or secondhand/ waste materials
- To use fully integrated rooftop 'renewables'
- And do it live on TV in 6 days!

THTKB: THE IDEA

- To combine two brand new innovative green prefab systems
- MODCELL - Heavyweight, highly insulated, locally sourced, affordable replenishable/ waste materials -combining a minimal amount of expensive engineered timber plus cheaper straw/ lime/ hemp

  Creating cellular, self-cooling/ warming ground floor bedrooms & bathroom
- FACIT - Lightweight, highly insulated, replenishable/ waste materials, all cut out with a computer controlled router

  Creating double height open plan living room/ kitchen/ dining room 'balloon'
- Both designed by UK Architects pushing the boundaries

THTKB: THE AMBITION

- To prove that fluffy, crumbly, organic low carbon materials can compete with their more established high energy high carbon counterparts
- To focus on prefabrication because it reduces wastage on site to a minimum (up pf 20% of building material ends up in landfill using traditional ‘wet’ trades
- To use high tech construction methods to reduce time on site, material waste and accuracy on site
- To prove that an understanding of lightweight material to insulate and heavyweight materials to store energy will mean that you don’t have to rely too much on expensive high tech gear to create a low carbon house

MODCELL's off-site Flying Factory

MODCELL's off-site Flying Factory

DAY 1: MODCELL ON SITE

DAY 2: THATCH

DAY 2: UPSTAIRS WITH FACIT

DAY 2: UPSTAIRS WITH FACIT

DAY 2: UPSTAIRS WITH FACIT

DAY 2: THTKB

DAY 3

DAY 3: RAMMED EARTH

DAY 3: TOPPING OUT

DAY 4: ACCOYA WINDOWS

RUBBER ROOF/ PAPER LINING

DAY 4: GLASS SOLAR TILES

SOLAR THERMAL & PHOTOVOLTAIC

RECYCLED PAPER & PLY CLADDING

DAY 5: COMPLETE

DAY 5: COMPLETE

DAY 5: ENTRANCE HALL

DAY 5: BATHROOM

DAY 5: THE LIVING ROOM

DAY 5: THE DINING ROOM

The House that Kevin Built

G.I.A : 85m²

Type of Project: Prefab New build

Final Account: £170,000+vat

Estimated Cost/m² inc. renewables £2,000/m²

Contact Period: 5 days

Energy Rating: A+

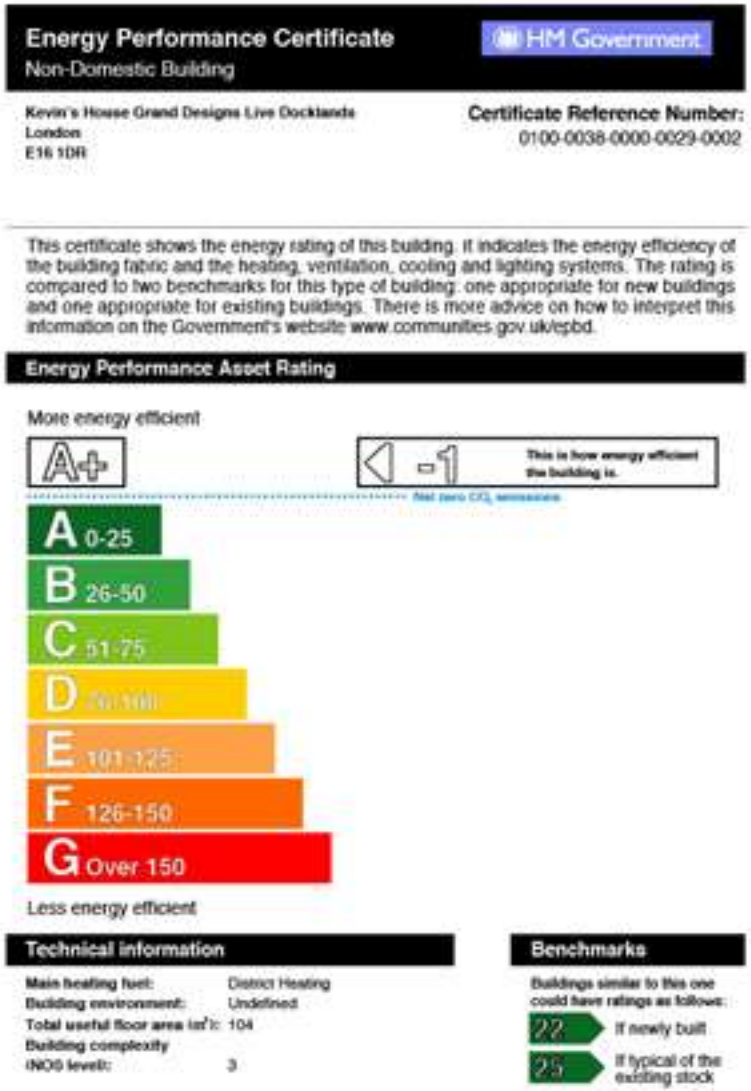
Code For Sustainable Homes Rating: Level 5

Renewables:
Solar Thermal Glass Tiles
1.5kW Photovoltaic Tiles

4000 PEOPLE IN TWO DAYS

PRECISION CUTTING & FABRICATION

UK'S FIRST A+ RATED HOUSE!



Energy Performance Certificate
Non-Domestic Building

HM Government

Kevin's House Grand Designs Live Docklands
London
E16 1DR

Certificate Reference Number:
0100-0038-0000-0029-0002

This certificate shows the energy rating of this building. It indicates the energy efficiency of the building fabric and the heating, ventilation, cooling and lighting systems. The rating is compared to two benchmarks for this type of building: one appropriate for new buildings and one appropriate for existing buildings. There is more advice on how to interpret this information on the Government's website www.communities.gov.uk/epbd.

Energy Performance Asset Rating

More energy efficient

A+

This is how energy efficient the building is.

Net zero CO_2 emissions

A 0-25
B 26-50
C 51-75
D 76-100
E 101-125
F 126-150
G Over 150

Less energy efficient

Technical information

Main heating fuel:	District Heating
Building environment:	Undefined
Total useful floor area (m^2):	104
Building complexity (NOS level):	3

Benchmarks

Buildings similar to this one could have ratings as follows:

22 If newly built
25 If typical of the existing stock

THTKB: REBUILT @ GRAND PARADE

THTKB: REBUILT @ GRAND PARADE

http://arts.brighton.ac.uk/thtkb