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How to create your dream home

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Magazine

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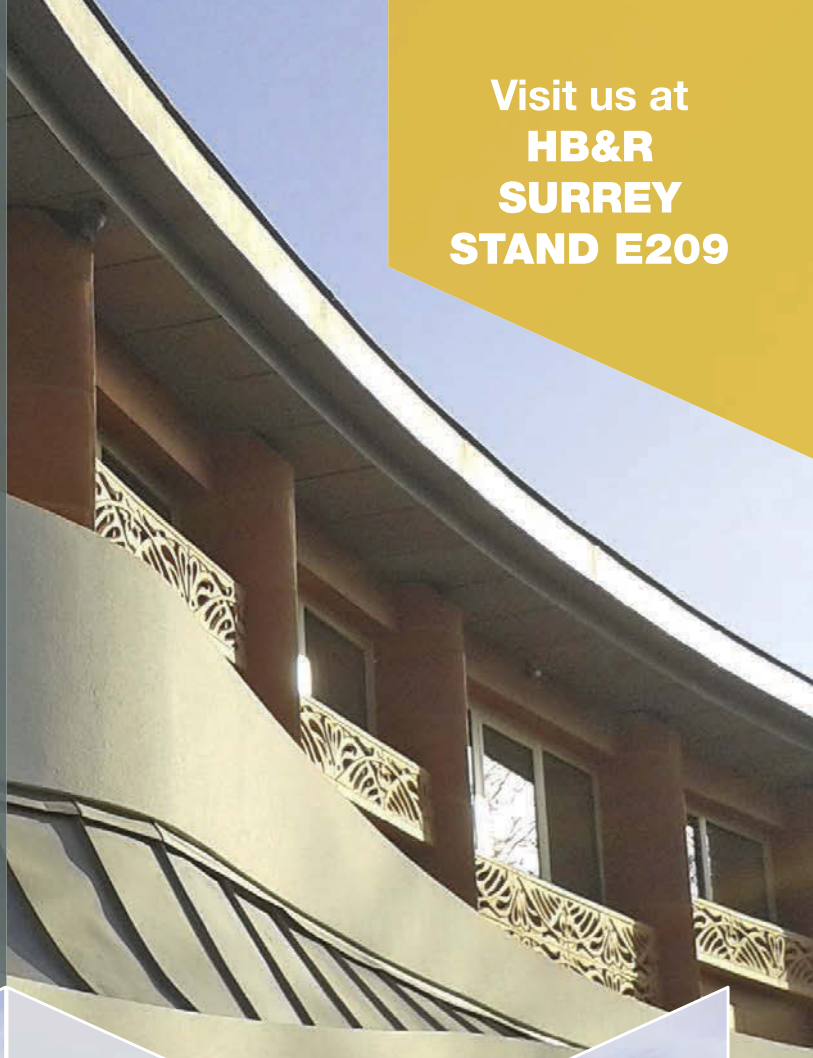
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Editor's Letter

This issue marks the launch of The Daily Telegraph Homebuilding & Renovating Awards for 2017. Our annual awards scheme, which has been running for over two decades, represents a broad range of residential projects — from contemporary self-builds, barn conversions, custom build schemes and sympathetic renovation projects to small extensions and dramatic makeovers. Importantly, our awards do not simply celebrate the house created — the clever architecture or high level of build finish — but the homeowners behind the project. After all, the journey to creating an individual home (whether you're building new or renovating) is not always the easiest of paths to tread.

If you've finished your home or are due to complete in early summer, we'd love to hear from you. (If you're in the midst of a building project, we look forward to seeing your entry in 2018.) What's more, our Overall Winner this year will win £1,000 of

John Lewis vouchers. Find out how to enter on page 28.

Elsewhere, we delve into the world of renewables. The renewables industry has a lot to thank self-builders for — way before heat pumps, solar panels and the like became (relatively) commonplace, self-builders' willingness to invest spurred on the market. However, the decision-making process remains a challenge. So we asked sustainability experts Tim Pullen and David Hilton to deliver their no-nonsense guides to what to pay, the pros and cons, and deciding whether and what type of renewable technology is right for your home (p.135 and p.155). **H**

“We'd love to see your home entered into our Awards”

DON'T FORGET TO CHECK OUT OUR LATEST SUBSCRIPTION OFFER ON PAGE 108



Claire Lloyd

has been a member of the *Homebuilding & Renovating* team for almost a decade. She's currently in the midst of renovating an old stone cottage with her partner Ed, a builder, aided by their two dogs, Bruce (shown) and George (who wouldn't stand still for the photo).

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Meet the EXPERTS



Bob Branscombe

Bob is a chartered surveyor with 30 years' experience running residential and commercial projects. He has particular expertise in cost estimation and project scheduling.



Chris Reeves

Former builder Chris Reeves is now a construction solicitor and chartered building consultant. He also acts as a specialist mediator in construction disputes.



Jason Orme

The former Editor of *Homebuilding & Renovating* magazine, Jason is an experienced self-builder and is currently renovating a 1960s home.



Sally Tagg

Planning consultant Sally Tagg is MD of Foxley Tagg Ltd. She specialises in self-build issues and advises the Department for Communities and Local Government on policy.



David Snell

The author of *Building Your Own Home*, David is a serial self-builder and has been building homes for 50 years. He's currently building his fourteenth home.



Tim Pullen

Tim is *Homebuilding & Renovating's* expert in sustainable building and energy efficiency. He runs the green home consultancy Weather Works.



Ian Rock

Chartered surveyor Ian Rock MRICS is the author of eight popular Haynes House Manuals, and is a director of Rightsurvey.co.uk.



Mark Brinkley

Mark is the author of the ever-popular *Housebuilder's Bible* and an experienced builder. He's just started another self-build.



Michael Holmes

Michael is HB&R's Head of Content and Product Development. He also chairs NaCSBA (National Custom and Self Build Association).



Paul Hymers

Paul Hymers is a building control officer and has written eight books on home improvements and developing, including the best-selling *Home Extensions*.



Pete Tonks

Pete Tonks is an architectural designer and MD of PJT Design Ltd. His masterclass on downsizing is on page 120.



Steve Whitby

Steve is MD of Estimators Ltd, the UK's leading building estimating service. Turn to page 179 to find out how to calculate the additional costs of foundations.

Homebuilding & RENOVATING SHOW

Meet the Experts in Person

Want a free 15-minute consultation with one of our experts? They will be taking appointments in The Advice Centre at the Scottish Homebuilding & Renovating Show at the SEC, Glasgow, from 20-21 May 2017.* homebuildingshow.co.uk

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Government Moves to Unlock Brownfield Sites

Abandoned and derelict sites could be freed up more readily for new homes, under a new government initiative to boost homebuilding

Local authorities will now have to produce and maintain up-to-date, publicly available registers of brownfield sites available for housing locally, the government has announced.

“We need to build more homes in this country, so making sure that we reuse brownfield land is crucial,” says Housing and Planning Minister Gavin Barwell. “We want to bring life back to abandoned sites, create thousands more homes and help protect our valued countryside. These new registers will give local authorities

and developers the tools to do this.”

Brownfield registers were piloted in 2016, when 73 local planning authorities across the country pioneered the measures. The government has also introduced a new way of obtaining planning permission through the brownfield registers. ‘Permission in principle’ will simplify the planning process and give more certainty over whether a site is suitable for development, ahead of working up proposals for full planning permission. More legislation is expected to follow this year to roll out ‘permission in principle’ more widely through the planning system.



DID YOU KNOW?

The self-build market is expected to grow by around 7-10% per year from 2017-2020*

GO FOR BOLD

We’re a nation wedded to our white and cream walls, but secretly many of us would like to be much bolder with colour, according to new research from Homebase. The retailer found that 85% of us paint our walls white or cream, even though nearly half of us (44%) would like to use more colour, but are held back by a fear of choosing a colour that’s too dark. To help, Homebase has teamed up with design expert Julia Kendell to launch its *Colour Confidence* guides, which can be found on homebase.co.uk.



A HI-TECH SOLUTION TO HOUSEHOLD LEAKS

GROHE has launched two app-controlled water sensors to prevent domestic water damage. The GROHE Sense smart water sensor monitors humidity, detects leaks and alerts homeowners instantly in case of a problem, while GROHE Sense Guard (above) is installed on the main water pipe and can switch off the water supply in case of a burst pipe. Both can be monitored and controlled using the new GROHE ONDUS App. The Grohe Sense costs £51.99, while the Grohe Sense Guard costs £439.



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LET'S MOVE TO...

DIDCOT IN OXFORDSHIRE

WHY? Recently named as the 'most normal' town in England, according to ASI Data Science. The findings are based on a range of factors including age, marital status, home ownership, income, house prices and the 2015 election vote, with data drawn from the Office for National Statistics and the 2011 Census.

ALSO Other 'normal' towns named in the top five in the study include (in order): Droitwich Spa in Worcestershire, Bath Road area in Worcester, Southwick in West Sussex and East Leake in Nottinghamshire.

SELF-BUILD AND RENOVATION PROJECTS NEAR UK'S 'MOST NORMAL TOWNS', FROM PLOTFINDER.NET*



ABINGDON

A detached studio with consent to convert to a separate dwelling, along with a detached family home that needs updating (eight miles from Didcot).

PRICE: £695,000



KINGSTON BAGPUIZE

Detailed planning consent for a two-storey dwelling of approximately 230m² plus garage (11 miles from Didcot).

PRICE: £375,000



BRIGHTON

Currently arranged as a house with a later side extension, planning permission has been approved to remove the side extension and erect another near-identical property on the side plot (five miles from Southwick).

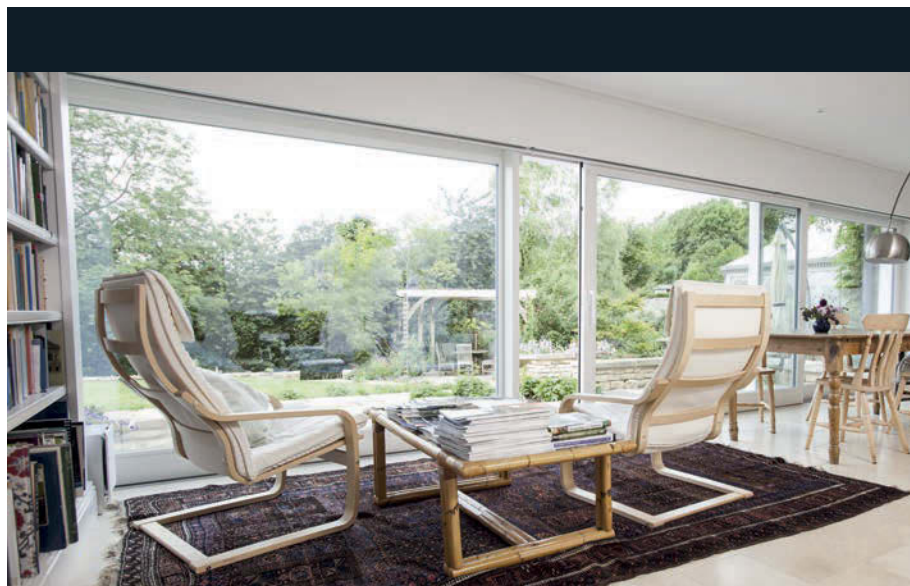
PRICE: £1,250,000

'LIGHT TOUCH' MENTORING SCHEME FOR SELF-BUILDERS

Self-build enabler Ecomotive (ecomotive.org) has launched a pilot mentoring scheme for self-builders, designed as a 'light touch' service for anyone looking for extra support and guidance as their project progresses. The new service offers two one-hour check-in calls a month with a dedicated mentor, who can also refer onto other spe-

cialists if needed. The check-in calls will allow the self-builder to talk through where they are now, their goals, next steps, help needed and action points for the next meeting with their mentor.

Between sessions, the mentor will send support emails, undertake research and provide technical advice. Email info@ecomotive.org for more details.



Lift & Slide Doors Meet Eco Targets

Doors reach stringent security and airtightness standards, says supplier

Green Building Store has launched a triple-glazed timber lift and slide door for low-energy self-builds and retrofits, available in FSC redwood or oak. "Lift and slide doors frequently present a challenge in terms of achieving airtightness and high security levels," says Chris Herring, director of Green Building Store. "We're delighted to have overcome these issues and to have developed a lift and slide door that meets exacting security and airtightness standards." The door combines Secured by Design and Part Q security compliance with the highest Class 4 level airtightness standards, and the whole door U values are as low as 0.84W/m²K. Green Building Store has also said that it will be launching a Passivhaus version of the door later in the year. ➤

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FLAT-PACK HOMES LAUNCHED

Prefabrication specialist Bauhu has launched a range of 'plug and play' houses built entirely off site, ranging from a compact studio home and guest annexe, to a three bedroom house. Smaller models can be equipped for use as offices, garden rooms, home gyms or soundproofed home cinema rooms. The mobile buildings, which do not require foundations, easily surpass Building Regulations' standards and have "impressive insulation and energy saving credentials", according to the experts at Bauhu.

Women are twice as likely as men to have the final say on a building project's scope and style*

FREE ECO HOME OPEN DAYS

Self-builders can learn more about Passivhaus and low-energy construction and retrofit at two free open days being hosted by the Green Building Store on 3 June and 22 July at its site near Huddersfield. Talks will cover mechanical ventilation with heat recovery, Passivhaus, radical retrofit case studies and high-performance windows. Visit greenbuildingstore.co.uk/summer-open-days to book your place.

*ACCORDING TO THE FEDERATION OF MASTER BUILDERS

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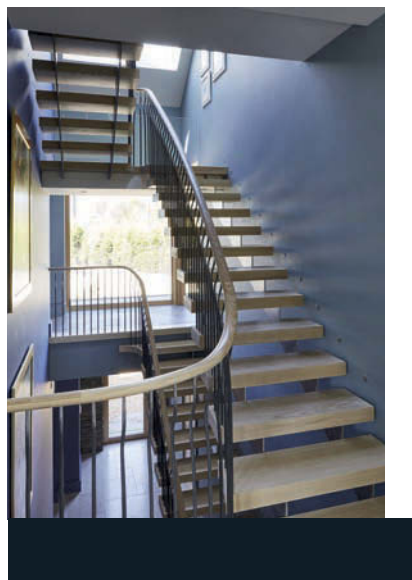


Want an open tread staircase in a house with young children? Bisca's design director Richard McLane advises

ARE OPEN TREAD STAIRCASES SAFE FOR FAMILIES WITH SMALL CHILDREN?

The simple answer is yes — a staircase designed and built to UK regulations is deemed to be safe.

UK regulations state that no part of a staircase or a balustrade must have gaps of more than 100mm, and a sphere of 100mm diameter must not be able to pass through any gap. This includes spacing of balustrade uprights and gaps between treads. In addition, treads must have an overhang no less than 16mm, as this makes it harder for objects to pass through. Bisca recommends increasing this overhang for an added feeling of security and comfort; in fact, most of our staircase designs have an increased overhang.



ALL STAIRCASES SHOWN ARE BY BISCA. FOR MORE VISIT THEIR WEBSITE AT BISCA.CO.UK

Do be aware however that the majority of imported modular or kit staircases may need some modification to get signed off by a building inspector.

ASSUMING THE OPEN STAIRCASE CONFORMS TO BUILDING REGULATIONS, WHAT OTHER DESIGN OPTIONS COULD YOU CONSIDER FOR FAMILIES WITH SMALL CHILDREN OR DOGS?

You could consider installing a baby gate or dog gate as part of the staircase design that can be removed without trace when it's no longer needed. You could also consider fitting riser bars to treads. As part of the design, Bisca can design temporary riser bars to fix to the treads. These can be timber, steel or Perspex, and can be removed completely when young children become teenagers. ➤



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*£1.50 transaction fee applies. **Calls to book the Glasgow show cost 7p per minute plus network extras. Calls to book the Surrey show cost 13p per minute plus network extras. Offer ends 3pm on 19 May 2017 for Glasgow show and 3pm on 30 June 2017 for Surrey show. Children 16 and under go free.

WEB WATCH

HOUSE OF THE MONTH

Ollie and Jessica Allen have converted this former Methodist church, turning it into a stunning family home brimming with original features. Find out more at homebuilding.co.uk/completed-projects.



JEREMY PHILLIPS X2

PILED FOUNDATIONS ON THE RISE

More self-build projects are requiring piled foundations, as self-builders are purchasing more difficult sites for their projects, says specialist self-build insurer ProActive SelfBuild.

Previously, piled foundation work was limited mainly to the south of England, where clay soil is common, but this is now happening country-wide as more challenging sites are being purchased, according to the insurer. Piling work could also affect self-build insurance, adds ProActive SelfBuild, as there are bigger risks that need to be insured against, including a greater likelihood of damage to neighbouring properties and underground services.



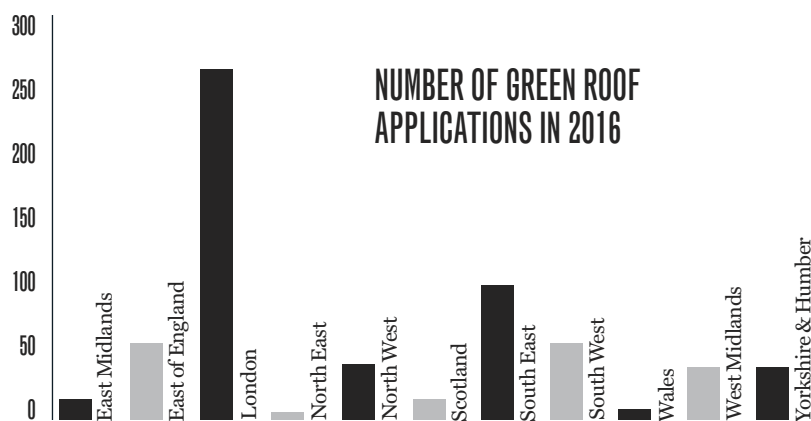
HOMEBUILDING & RENOVATING SHOW COMES TO GLASGOW IN MAY

With the number of planning permissions for custom and self-build homes growing 28% between 2015 and 2016 in Scotland, interest is set to be strong for this year's Homebuilding & Renovating Show at the SEC, Glasgow. The show, which runs from 20-21 May, includes free seminars and workshops, exhibitor stands and one-to-one sessions with self-build and planning experts, architects and builders. Visit homebuildingshow.co.uk/ed to get your two-for-one tickets (offer expires at 3pm on 19 May).

London's the Green Roof Capital of the UK

Last year saw a surge of interest in green roofs, particularly in London, according to new data published by Barbour Product Search. The number of planning applications for green roofs rose by 34% in 2016, compared to the figures registered in 2015. The southern regions of England accounted for 65% of the

total number of green roof applications in 2016 and London had the most applications, with 266 (BELOW). Across all construction sectors, housing accounted for the most green roof applications in 2016, with 42% of the total. The rise may be due to environmental effects, awareness of biodiversity and the potential financial benefits of installing a green roof, according to Barbour Product Search. **H**



BIOPHILIC DESIGN: The Next Big Thing in Home Design?

Biophilic design promises a science-based approach to promoting the health and wellbeing of a building's occupants — from improving sleep to reducing stress. Nick Robbins investigates how it can help you improve your home

Introducing Nature

A green wall, which introduces natural, living elements to your home, is a simple way of factoring in biophilic design to a build or renovation project. Here, this basement room is illuminated by a lightwell, with a green wall bringing the 'outside in'.

The origins of biophilic design can be traced back to American biologist and theorist Edward O Wilson, who popularised the term 'biophilia' (literally a love of nature) in his 1984 book of the same name. In the book, Wilson argued that humans benefit from being in close contact with nature, and suffer when excluded from it. He realised that as humans rushed to live in urban spaces towards the end of the 20th century, they were becoming increasingly divorced from the natural world, which was having a detrimental impact on their health.

In architectural terms, it's generally considered to be the idea of fusing design with natural elements to bestow wellbeing benefits.

Roger Ulrich's 1984 study is considered a major milestone in biophilic design as it provided objective proof that the environment can affect health. Ulrich found that patients recuperating from gall-bladder surgery in a room with outside views had shorter postoperative stays and took less pain relief medication than patients recovering from the same surgery in rooms with views of a brick wall.

The science behind biophilic design is of interest to Oliver Heath, an expert in the field of sustainable architectural and interior design, and author on the subject of biophilic design. "What's different about biophilic design to a traditional design process is that it largely takes an evidence-based approach," says Oliver. "We discuss architecture as a cross between a science and an art, but the science aspect is not something that many of us necessarily undertake. Biophilic design brings the science back into design because it's about using evidence and research to inform how we can best create spaces."

Pinning down an exact definition of biophilic design had been difficult until recently. Terrapin Bright Green's *14 Patterns of Biophilic Design*, released in 2014, has been instrumental in providing a framework for designers to work to. "It provides a comprehensive list of principles that many designers refer to, including us," explains Koru Architects' Tegan Tallullah.

Those 14 patterns are divided into three sections: 'nature in the space', 'natural analogues' and 'nature of the space'. Oliver Heath defines the three sections as: "[Nature in space] is how you improve the direct contact with nature, so it's how you introduce water, trees, plants and natural light into the space — the real forms of nature."

"The less well-known one is how we use natural analogues — using elements that mimic aspects of nature: natural materials, colours, textures and patterns. And most easily forgotten is how you create spaces that allow people to reconnect with nature."

But what does this all mean for your building project? Some degree of biophilic design is evident in plenty of homes — perhaps without the owners or designers even realising. "People use biophilic design often without knowing the word," says Tegan Tallullah. "The word and the evidence is new and trending, but the ideas and practices are ancient."

Research + Design's director Robert Bednar goes further, suggesting that biophilic design taps into an evolutionary desire for humans to live in connection with nature. "Why are people drawn to living by the coast or on the moors or in the middle of the woods? Why are these the most coveted places? Is it just the clean air or sense of ownership where you can't see another house or is it something deeper — something more profound and primal?"



NIGEL RIGDEN

Ninety per cent of respondents to the UK Home, Health & Well-being report by major manufacturing company Saint-Gobain (2016) wanted a home that didn't compromise their health and well-being, with a third of those willing to pay more for it. But, as Oliver Heath says: "It's not about money, it's about creativity and recognising opportunity to introduce elements of nature to reduce stress and aid recuperation."

Those opportunities don't occur just because someone is looking to build an eco-friendly house, either. Oliver Heath believes that biophilic design is a more human-centred approach to design than the carbon-led approach that typifies an 'eco home'. Robert Bednar agrees: "A Passivhaus design may achieve 100% energy efficiency but because it's so well insulated, none of the windows can be opened for fresh air, or the windows are so small on the north side that the interior is unwelcoming or even oppressive." Rather than focusing on the building's properties, biophilic design focuses on the connection it affords those living in it to nature. As Oliver Heath says: "People have to love buildings. They have to love being in them and it has to feel good." **H**

CONTACTS

Koru Architects

koruarchitects.co.uk

Oliver Heath Design

oliverheathdesign.com

Research + Design

researchplusdesign.co.uk

Wood For Good woodforgood.org

5 WAYS TO ADD BIOPHILIC ELEMENTS TO YOUR HOME

ADD NATURAL LIGHT TO YOUR SPACE

This is something that is already widely practised by designers and architects. Of particular importance is introducing natural light to bedrooms. "An intense burst of natural light first thing in the morning will help reset your circadian rhythms. It's important because many of us spend 90% of our lives indoors under a single colour temperature of light," says Oliver Heath, who draws on the work of Dr Russell Foster into light and its relationship with sleep patterns.



NIGEL RIGDEN



OLIVER HEATH DESIGN

USE 'NATURAL ANALOGUES' IN SPACES THAT LACK DIRECT CONNECTIONS WITH NATURE

Finding those direct connections is not always possible, but 'natural analogues', or elements that mimic aspects of nature, can be similarly effective. Tegan Tallullah of Koru Architects suggests using natural paints made from plants and earth pigments and choosing nature-evoking colours like greens, blues, yellows and ochres. Alternatively, a natural cladding such as timber or stone could work. Even something as simple as adding artwork depicting nature around the home will make a difference, according to biophilic design principles.

LAY OUT YOUR ROOMS TO TAKE ADVANTAGE OF NATURAL ELEMENTS

According to Oliver Heath: "It's important to connect with nature to create invigorating, exciting spaces; spaces that you walk into and go 'I could really imagine spending some great time here.'" This can range from putting a comfortable chair in sight of the best view in the house to refitting a kitchen or bathroom to better enjoy other biophilic elements that have been added to the build or through the renovation process.



NIGEL RIGDEN



ISTOCK

ADD WATER ELEMENTS TO YOUR HOME OR GARDEN

Water elements are an important element of Terrapin Bright Green's 14 biophilic principles. Defined as 'a condition that enhances the experience of a place through the seeing, hearing or touching of water', Robert Bednar of Research + Design suggests simple changes: "Replace that old piece of PVCu rain pipe in the garden with a copper Japanese rain chain that will create waterfall sounds when it rains and turn that beautiful copper green colour over time."

CONSIDER USING NATURAL MATERIALS LIKE TIMBER

Organisations such as Wood For Good and Planet Ark all extol the virtues of using timber throughout the home, citing a number of studies to back up the wellbeing benefits. These include a Japanese study that found exposure to wooden panels significantly decreases blood pressure, to one from Austria that found volunteers sleeping in a timber-framed bed had heart rates significantly lower than those who slept in imitation wood beds.



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Will Brexit Impact Self-build?

Nearly 12 months on from the UK's decision to leave the EU, and with Article 50 officially triggered, Mark Brinkley assesses the impact of the Brexit vote on the self-build market



Almost a year after the United Kingdom voted to leave the EU, it's still hard to discern what exactly the effect has been and what is likely to happen over the coming years. In particular, what impact will it have on those of us who are building new homes or improving existing properties?

While the pound took an almighty tumble the day after the result was declared – and has yet to recover – when you look at the longer term perspective it's still trading well within its historic range. The economy as a whole continues to grow steadily and the outlook remains about as clear as it always has been – which is to say that no one really has a clue and that Brexit may end up having only a marginal impact.

In the short term, the falling pound matters. I have been pricing a house-load of building materials these past few months for my own self-build, and it is now clear that a lot of exchange rate-fuelled price rises are in the pipeline. The UK runs a huge trade deficit in building materials – and even many of the home-grown products are made using imported materials. A 10% fall in the value of the pound is bound to be reflected in price rises eventually. Many suppliers have held off putting rises through, not wanting to upset the buoyant British construction market, but now that the dust has partly settled, expect to see a lot of price increases in the 10-15% bracket during 2017.

Timber prices have, for instance, been remarkably stable over the past few years, but almost all of our construction-grade timber is sourced from abroad, and so it's hard to see how it can't be charged at a higher rate to compensate for the fall in the pound. By and large, heavy materials like concrete, bricks and roof tiles are manufactured locally, and so price rises here will be more muted, but many of our more upmarket items are imported from the Continent. This was perhaps one of the benefits of Brexit. Our currency being worth 10% less than it was last year could encourage the use of homegrown materials and make imports less attractive. But markets are rather more complex than this, and there has been a tendency over the previous years for many industries to become highly international in their outlook, which means that your bricks are as likely to come from Belgium as Yorkshire. Manufacturers may simply

decide to put all bricks up by around 5% rather than discriminate against the ones made on the other side of the Channel.

But what of the wider implications of Brexit? We will surely survive five or 10% inflation on building costs, if it remains a one-off. But will we, the consumers, still have the confidence to embark on major building projects given all the uncertainties?

The problem with even discussing this is that the vote has polarised opinion in an unprecedented way. It seems that most of the leavers are bullish about our prospects now we're freed from the yoke of a burdensome EU, while the remainers can see no good coming from any of this. While we are all entitled to our opinions, it's far from clear whether we are set to prosper or decline. Only time will be the judge of that and it may well take many years before we can reach some sort of a conclusion.

“The world of self-build has proven remarkably resilient over the years and is unlikely to stop functioning if we hit storms up ahead”

Will the EU even exist in 10 years' time? Will the UK have broken up? Will we see more populist governments? In short, will the world be a better place or will it still be reeling from the aftershocks of the financial mayhem in 2008 that seems to have started all this?

We just don't know, and anyone who says they do is lying. The world of self-build is not immune from all of this, but it has proven remarkably resilient over the years, and it is unlikely to stop functioning if we hit storms up ahead. The desire to create your own space is pretty basic and many of us will continue to dream of doing it, whether we are making loads of money or getting by on a shoestring. We will build our homes according to the cloth we have cut. **H**

MARK BRINKLEY

Mark is the author of the ever-popular Housebuilder's Bible and an experienced builder. He's just started another self-build.

Enter The Daily Telegraph Homebuilding & Renovating Awards 2017

We'd love to see your finished home in Britain's premier awards scheme for self-builders and renovators

Have you recently completed a self-build, renovation, remodelling or conversion project? If so, we'd love to hear from you — as we launch this year's The Daily Telegraph Homebuilding & Renovating Awards scheme for 2017. For over two decades, The Daily Telegraph Homebuilding & Renovating Awards has sought out Britain's very best self-build, extension and renovation projects. The premier search for the best new homes in the UK, this is the perfect opportunity to showcase your project, as well as

show others starting out on self-build and renovation projects what they can achieve — gaining recognition for your designers, builders and suppliers into the bargain. (The shortlisted homes will be visited this summer and will feature in full in the magazine — the best will also gain coverage in *The Daily Telegraph*.)

The categories highlight the broad range of projects we love to see — anything from simple, well-designed extensions to barn conversions, eco homes and large self-builds of any style.

Entering your project takes 10 minutes and best of all, it's free. You can enter online (at homebuilding.co.uk/awards). Alternatively, you can complete the form on page 32 and return it by post (the address is provided on the form). The closing date for entries is 16 June 2017. There are 10 categories to enter (and you can pick more than one).

We can't wait to hear all about your home!

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2017

THE PRIZE

This year's Overall Winner - chosen from the 10 category winners - will win

£1,000 OF JOHN LEWIS VOUCHERS

HOW TO ENTER YOUR PROJECT

Entering your project in this year's Awards scheme is free — and easy. Here's how:

- Complete the online entry form at homebuilding.co.uk/awards and upload your floorplans and photographs. (We need to see at least one photograph of the exterior of your home, and a handful of the main interior spaces.)

- Or complete the entry form on page 32 and send it to The Daily Telegraph Homebuilding & Renovating

Awards, 2 Sugar Brook Court, Aston Road, Bromsgrove B60 3EX, along with photographs and floorplans.

- The deadline for online and postal entries is 16 June 2017.

- Shortlisted projects will be visited in person. You must be willing and able for you and your home to be photographed and appear in the magazine and online.

- Your home needs to be finished (or nearing completion) in order to qualify.





Last Year's Overall Winner

Catherine and Adas Nicholson, with the help of ABIR Architects and Roots Construction, have replaced a dated coastal bungalow with a stunning family home (BELOW, BOTTOM and LEFT).



CATEGORIES

- BEST CONTEMPORARY SELF-BUILD
- BEST TRADITIONAL-STYLE SELF-BUILD
- BEST TRADITIONAL RENOVATION
- BEST CONTEMPORARY RENOVATION
- BEST CONVERSION
- BEST CUSTOM BUILD
- BEST PASSIVHAUS
- WORLD'S MOST AMAZING HOME
- SPIRIT OF SELF-BUILD
- BEST SELF-BUILD STARTER HOME

THE JUDGES

CHARLIE LUXTON

Charlie is an experienced architectural designer and well-known broadcaster, presenting popular homes programmes such as *Building the Dream*.



DARREN BRAY

Darren Bray is an architect at award-winning PAD Studio in Hampshire and teaches part-time at Portsmouth School of Architecture.



NEIL TURNER

Architect Neil Turner is a director at Howarth Litchfield Partnership and specialises in residential design. His own home won our award for best remodel/extension in 2014.



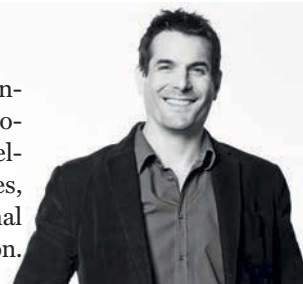
JASON ORME

Jason is the Editorial Director of Homebuilding & Renovating and an experienced self-builder. He is currently extending and remodelling his family home in Staffordshire.



MICHAEL HOLMES

Michael is the Director of Content at Homebuilding & Renovating. He has self-built, developed or renovated 27 homes, and is also Chair of the National Custom & Self Build Association.



THE HB&R EDITORIAL TEAM

Claire Lloyd, Natasha Brinsmead, Daisy Jeffery, Alison Wall and Nick Robbins have been editing *Homebuilding & Renovating* magazine for a combined period of over 30 years.

Turn over for categories and entry form ▶

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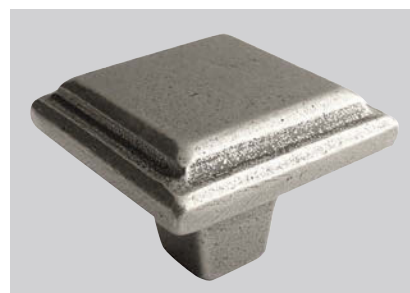
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BEST CONTEMPORARY SELF-BUILD

The judges are looking for the very best contemporary self-build in the UK.

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BEST TRADITIONAL-STYLE SELF-BUILD

Is your home built in a period style, perhaps using natural materials and demonstrating fine craftsmanship?

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With Jewson branches from the Scottish Isles to Penzance, you're never far away from great service, expert advice and the highest quality timber, building materials and services. Visit Jewson.co.uk/Buildworks for more details on everything to do with building your dream self-build project.

BEST TRADITIONAL RENOVATION

Entries are invited for old homes saved through restoration, or existing homes remodelled and/or renovated to combine original features with modern.

Contura **Sponsored by Contura**
Contura designs and manufactures wood burning stoves that are ideal for bringing warmth into any environment. As a leading manufacturer of wood burning stoves in Scandinavia and across Europe, we are passionate about the quality of our products and integrate the highest standards of quality, efficiency and timeless class across our entire range.

BEST CONTEMPORARY RENOVATION

The judges are seeking homes transformed through an imaginative extension or remodel schemes.

IDSystems **Sponsored by IDSystems**
As a family business founded in 2000, IDSystems has built an outstanding reputation for quality, technical expertise and award winning products. For more than 17 years it has installed industry-leading bifold doors, sliding doors and glazing on a wide range of renovation, new build and extension projects across the UK.

BEST CONVERSION

A category for the very best homes that have been created from barns, schools, churches and other such buildings.

ICYNENE **Sponsored by Icynene**
Icynene (icynene.co.uk) is a spray applied insulation system ideal for use in wall, roof and underfloor applications where high levels of insulation and airtightness are required. When applied, Icynene expands 100-fold, sealing all gaps, service holes and hard to reach spaces, completely eliminating cold bridging.

BEST CUSTOM BUILD

This category is open to custom build schemes that have been built or are in the process of being built.

Durisol **Sponsored by Durisol**
British-made insulated concrete formwork (ICF), Durisol is a simple and sustainable alternative to traditional construction methods. Made from recycled timber and cement, this eco-friendly, easy to construct building system can save you time and money. Lead time is minimal and free training is available on how to build with it.

BEST PASSIVHAUS

We are seeking Passivhaus self-builds that combine architectural merit and the highest sustainable standards — and most of all, represent a dream home for their occupants.

HANSE HAUS **Sponsored by Hanse Haus**
Hanse Haus is a premium supplier of turnkey, pre-manufactured, high-efficiency homes. Founded in 1929, it now erects some 400 homes annually Europe-wide and has been active in the UK since 2006. Hanse Haus offers bespoke, timber-frame homes and is a certified builder of the remarkable Passivhaus.

WORLD'S MOST AMAZING HOME

This category is open to both UK and international self-build and renovation projects.

BRETT **Sponsored by Brett Landscaping**
Brett manufactures an extensive portfolio of high quality hard landscaping products for use in a wide range of applications. Our range includes ethically sourced natural stone paving, concrete flag and block paving, permeable paving and kerbs, as well as a range of decorative aggregates all designed to enhance the built environment.

SPIRIT OF SELF-BUILD

Does your new home embody the true pioneering spirit of self-build? Perhaps it's a project delivered against all odds, a new home that represents exceptional value for money, or a new home that has significantly improved the lives of its occupants.

JG Speedfit **Sponsored by JG Speed**
JG Speedfit, from family-owned company John Guest, offers easy to use plastic push-fit systems suitable for plumbing hot and cold water services and heating applications. JG Speedfit also offers a wide range of under-floor heating systems, radiator TRVs, and heating controls — including the new heating controls range JG Aura.

BEST SELF-BUILD STARTER HOME

We're looking for first-time homeowners or those under the age of 40 who have stepped onto the property ladder with their self-build or renovation project.

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★
OVERALL WINNER
This award is given to the most outstanding project shortlisted as part of the 2017 Awards.



If you prefer, complete the online entry form at homebuilding.co.uk/awards and upload your floorplans and photographs. (We need to see at least one photograph of the exterior of your home, and a handful of the main interior spaces.)

ENTRY FORM

Please complete and return with **A SET OF FLOORPLANS AND INTERIOR AND EXTERIOR PHOTOS** to: The Daily Telegraph Homebuilding & Renovating Awards, 2 Sugar Brook Court, Aston Road, Bromsgrove B60 3EX. **THE DEADLINE FOR ENTRIES IS 16 JUNE 2017.** You may use a photocopy of this form. Your project must be complete by the time judging takes place at the end of June, and should have been completed within the past three years. By entering, you agree to potential publicity in *The Daily Telegraph* and *Homebuilding & Renovating* magazine.

Name of entrant:

Address:

Email: Daytime tel. no.:

Number in family and ages:

Size of property (internal area) in m². Please provide the area of any garages separately. Please also state the number of bedrooms and the number of storeys:

.....

Which best describes your project? (please tick):

- ☐ New build ☐ Remodel and/or renovation of an existing house
☐ Conversion ☐ Extension of an existing house

Which category/ies are you entering? (please tick):

- ☐ Best Contemporary Self-build ☐ Best Custom Build
☐ Best Traditional-style Self-build ☐ Best Passivhaus
☐ Best Traditional Renovation ☐ World's Most Amazing Home
☐ Best Contemporary Renovation ☐ Spirit of Self-build
☐ Best Conversion ☐ Best Self-build Starter Home

Name of the owner and address of property:

(if different from above)

.....

.....

Date when work commenced:

Date occupied/completed:

What was the cost of the building plot/house?

(please provide an estimate if already owned)

.....

What was the cost of the project?

.....

What is the current/estimated value of the property?

.....

Please provide the name of the designer or architect:

(if applicable)

.....

What makes your project special?

(you may provide additional information to support your entry)

.....

.....

.....

.....

If your project is shortlisted we will contact you and may request further information. The initial round of judging is based entirely on the details on this form and, more importantly, the images of the outside and inside of your house that you provide with your entry.

These do not need to be of professional quality but in order to portray your home in the best way these should be comprehensive and, if possible, taken on a bright day with a well-lit interior.

Rules of entry: 1. The competition is open to anyone aged over 18 (including architectural practices), except for employees of The Telegraph plc and Centaur Media and their families; 2. The closing date for entries is 16 June 2017; 3. Responsibility cannot be accepted for entries lost, damaged or delayed in transit; 4. Photocopied entry forms will be accepted; 5. No cash alternatives will be offered in lieu of prizes that may be offered; 6. We cannot guarantee the return of entries, including drawings and photographs; 7. Details of entrants and their projects (not including specific location details) may be published in *The Daily Telegraph*, *Homebuilding & Renovating*, *Real Homes* and *Period Living* in print and online at the discretion of the editors and may be used in publicity material (including publicity material used by the sponsors); 8. The judges' decision will be final and unchallengeable. No correspondence will be entered into; 9. The judges reserve the right not to award prizes in any category if entries do not reach the required standard; 10. Unsuccessful entrants may not necessarily be contacted or have their entries returned; 11. In addition to these rules, standard Telegraph rules apply and are available on request from: The Daily Telegraph, 111 Buckingham Palace Road, London SW1W 0DT; 12. You are advised to keep a photocopy of this form for your own information.

☐ Please tick if appropriate. I do not wish to receive any offers from The Telegraph plc, Centaur Media or companies approved by The Telegraph plc or Centaur Media

☐ I agree to be bound by the rules of entry Signed Date.....

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PORTFOLIO

“Whatever good things we build end up building us”

Jim Rohn, American entrepreneur

37



50



74



64



96





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RESCUED FROM THE BRINK

Lesley and Jam Koramshai had to save this Grade II-listed property from collapse before adding a new open plan extension. The result – a home that embraces the best of old and new

Words: **Katie Treggiden** Photography: **Bruce Hemming**

A New Lease of Life

The Old Pest House, an 18th-century, Grade II-listed cottage, has had fresh life breathed into it after it came close to collapse. Unusually, work was carried out on the original building's foundations before planning consent had been granted – Jam stressed the urgency of the repair work, which involved restoring the original roof timbers and underpinning internal and external walls with concrete foundations. ➤

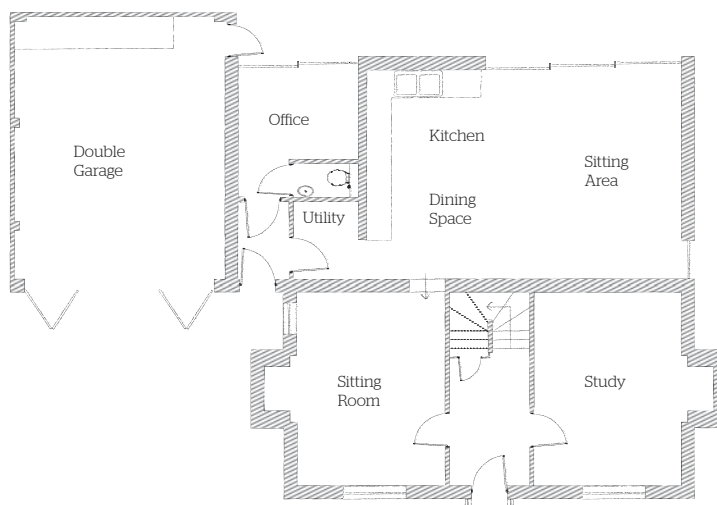




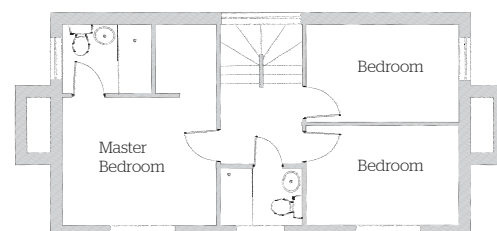
A New Extension

Planning consent required a sloping roof on the new timber-framed extension (Jam had originally hoped to include a green roof), and demanded that materials were matched to the existing house. New bricks were sourced to match the existing, with reclaimed roof tiles specified for the new roof.

Ground Floor



First Floor



Project Notes

Homeowners

Lesley and Jam Koramshai

Project Renovation and new extension to a Grade II-listed house

Location

East Grinstead, West Sussex

Build time Aug 2013 – Sep 2014

Size 250m²

House cost £330,000 (in 2013)

Build cost £290,000

Value £800,000

PROJECT TIMELINE

Plot purchased Jul 2013

Start on site Aug 2013
(prior to planning consent but with permission, due to dangerous structure)

Planning permission approved
Dec 2013

Foundations of extension complete Dec 2013

First fix Jan 2014

Second fix Mar 2014

First fix of extension Jun 2014

Second fix of extension Aug 2014

Date occupied Feb 2014

SELECTED COSTS

Design and application process	£12,000
Demolition and foundations	£46,000
Joinery, walls, insulation and drywall	£58,000
Windows, doors and glazing	£28,000
Plastering and tiling	£10,000
Plumbing	£16,000
Bricklayers and concrete work	£21,000
Roofing	£16,000
Painting and decorating	£9,000
Electrical	£18,000
Bathroom and kitchen fittings	£15,000
Kitchen cabinets and appliances	£18,000
Flooring	£12,000
Landscaping	£20,000



Opening Up the Space

The large open plan living space and kitchen is at the heart of the cottage's extension. This generous space contrasts with the more divided floorplan of the original building. The cottage's exterior wall has been left exposed in the new extension – the original timbers and the brickwork now make for a striking feature wall. ➤







Let There Be Light

The woodwork throughout the house has been whitewashed and the walls painted in the same off-white shade that was specially mixed for the property. Local joiner John Simmonds was brought in to restore the internal doors and replace those beyond repair with copies (ABOVE). The glass connection between the original property and the extension features double glazing that was designed to exacting 5mm tolerances (LEFT), which throws plenty of light into the extended space (OPPOSITE), including a new utilities area.

The Old Pest House was originally built in the late 18th century, in an isolated position in the middle of a common in East Grinstead, West Sussex — designed as a ‘pest’ or quarantine house for people with infectious diseases. By the time architectural designer Jam Koramshai found the building, it was a private home in a residential street that had fallen into disrepair. “There were huge cracks in the walls and the building was leaning,” says Jam. “The structural engineers confirmed that the whole thing was in danger of falling down.”

Having found the property online, Jam and his wife Lesley drove from London to view it. They arrived at 3pm, spent 15 minutes looking around and had an offer accepted by 5.30pm. Once the sale had gone through, they had to move almost as quickly to save the house.

“The first thing we had to do was to make the house secure, which involved underpinning the existing walls with concrete foundations,” he explains. Next, the two main roof beams, one of which had actually snapped in half, had to be replaced. “It was a delicate situation,” continues Jam, who convened a team of specialists and met with local conservation and planning officers early on. “But when you are saving something that’s in danger, it’s all worthwhile.”

With the house safe from the brink of collapse, restoration work could begin. The house was re-wired and replumbed, and damp-proofing, insulation and underfloor heating added throughout. Jam removed modern fireplace surrounds to reveal the original brickwork behind, adding woodburning stoves and restoring the chimneys.

He also took the decision to lower the ground floor level in order to create more headroom. What’s more, having discovered the original roof trusses upstairs, the first floor ceilings were removed to create vaulted ceilings — adding height to the bedrooms and allowing the original trusses to be exposed. “When I saw the structure, I immediately saw the opportunity to open it right up,” Jam explains. Adding a shower room and an en suite bathroom under the eaves space meant that the existing bathroom could be turned into a third bedroom.

Adding to the feeling of light, the walls and ceilings throughout have been painted in an off-white shade that Jam had mixed and the original beams have been whitewashed. “The oak had been painted black upstairs and brown downstairs, and the stairs are a later pine addition — so it was going to be difficult to get all the col-

ours to match,” he says. “The only solution was to whitewash everything, letting the original colours show through slightly.”

Sourcing a team of craftspeople was key to the success of this project. A specialist plasterer, for instance, replastered walls, recreating the rough finish appropriate for the age of the property. “The aim for any responsible designer is always to rescue what is old and then to make sure any new additions don’t go against that,” says Jam.

Local joiner John Simmonds was commissioned to restore internal doors and copy those that were beyond repair. “He was about to retire when I found him,” says Jam. “When he heard that I had bought this house, he changed his mind and agreed to do one last job.” John made built-in wardrobes, consoles and other storage for the bedrooms to match the original doors.

Adding a New Extension

Once the renovation was complete, work on the new extension could begin, starting with the demolition of the existing extension. “It was in very poor condition and had been badly built to start with,” explains Jam.

The planning consent required a sloping roof, putting paid to Jam’s idea for a green roof, and demanded that materials were matched to the existing house. However, he did include one contemporary twist. “I wanted something to connect the extension to the old part of the house, and yet at the same time keep them separate,” he says. He achieved this by connecting them with bespoke glazing — filling the new space with light, and maintaining the profile of the old building.

The timber frame extension comprises an open plan kitchen and living area, a utility, Jam’s office and bathroom and a double garage, and spans the width of the building. Double doors open into the garden from the office and living area. “The good thing about the house is the easy connection between all the areas,” says Jam. “There are no limitations — no walls between spaces, except for my office, which has its own bathroom and entrance.”

Furnishings are kept simple, with muted colours, to let the architecture shine. “Real craftsmanship has gone into this house — the architecture is what you should notice.

“Living here gives me a good feeling,” he continues. “I’m living a modern life in a historic building and that’s the best part — it means everything we planned has really worked.” **H** ➤





Bringing the Outside In

As part of the project, a large sliding door that spans the length of the extension has been added. "I wanted to bring the garden inside somehow," says Jam. The door also brings light into the kitchen (ABOVE), fitted with Howdens cabinets and Bosch and RDO appliances.





A Home for All Seasons

Jam's original idea was to use the new open plan space mostly in the summer months, but it has found use year-round. "It's a really comfortable space now because of the insulation and the underfloor heating," he says.



SUPPLIERS

Design Jam Koramshai of KORPP architecture: korpp.com
Bespoke glazing Arctic Glass: arcticglass.co.uk
Tiling Barge Tiles: bargetiles.co.uk
Clean woodburning stoves Clearview: clearviewstoves.com
Timber preservation and damp proofing Colin Fraser: 01342 331933
Structural engineering Ellis Structures: ellisstructures.com
Steel structure and metal furniture Eric Lamprell Steel Work: 01342 822143
Flooring Havwoods: havwoods.co.uk
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Revealing the Trusses

Having discovered the original roof trusses, Jam removed the upstairs ceiling altogether, adding height to the bedrooms (LEFT), and exposing the original timbers. Adding a shower room and an en suite bathroom (BELOW) into the eaves meant that the existing bathroom could be turned into a third bedroom. **H**





PRACTICALLY PERFECT

Jo and Charles van Berckel have built a family home that, although designed primarily around their eldest son's disability, is also a stunning example of contemporary architecture

Words **Natasha Brinsmead** Photography: **Jeremy Phillips**

Sympathetic Design

The long, low design reflects the form of the old bungalow and single-storey piggery that it replaces. The combination of metal deck roofing, grey render and cedar cladding work together to create a design that is contemporary yet in sympathy with its surroundings.

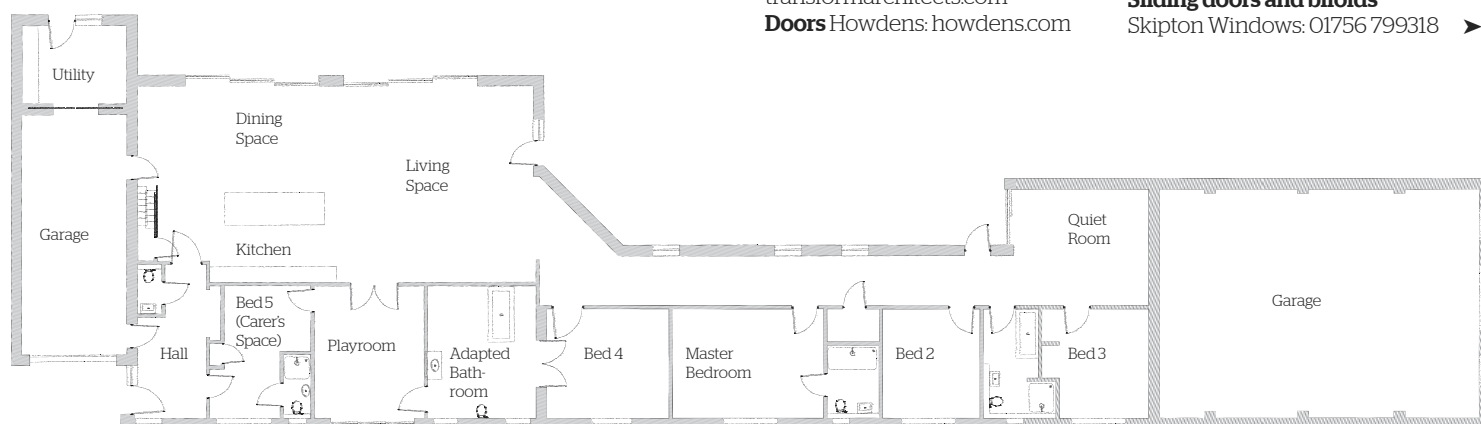






Exterior Design

The house has a distinctly agricultural form, reflecting the old farming outbuildings that once stood here. The large glazed opening and sliding doors lead out on to a level terrace, providing easy access for Kit (RIGHT WITH JO AND BROTHER OLIVER).



Project Notes

Homeowners

Jo and Charles van Berckel

Project Contemporary self-build

Location Nr Harrogate, Yorkshire

Build time Apr 2014 - Jul 2015

Size 398m²

Plot cost £550,000

Build cost £700,000

Value Unknown

SUPPLIERS

Architect Transform Architects:
transformarchitects.com

Doors Howdens: howdens.com

Builders Bowers Construction:
01423 777 606

Building Materials

GH Brooks: 01423 503110

Building Materials Buildbase:
buildbase.co.uk

Kitchen John Longley Kitchens:
01226 248766

Sanitaryware Platinum

Bathrooms: 01709 588822

Wood flooring HG Flooring
(Harrogate): 07958 072593

Sliding doors and bifolds
Skipton Windows: 01756 799318 ➤



A Design For Life

It was important for the family that there were no barriers, visual or physical, within the main living space so that Kit can feel included in every aspect of life. Jo admits, however, that the full-height ceilings and open plan layout can cause sound issues. The couple specified engineered oak flooring throughout this space, as soft flooring is not practical for Kit's wheelchair. The downside, however, is the sound transfer. ➤









Open Plan Living

Level thresholds have been incorporated throughout the house, both internally and between the sliding doors and terrace (ABOVE). The kitchen (LEFT) was designed by a local designer for "a fraction of the price of some of the kitchen showrooms," says Jo. The worktops, which look just like polished concrete, are actually a German laminate product. Meanwhile a space-saving staircase leads off the kitchen and into Jo's office and a mezzanine.

"In the future, when Kit needs it, he can live here and be totally independent," begins Jo van Berckel, summing up the entire reason why she and partner Charles chose to self-build and the motivation behind every decision they made during their project. "We wanted the house to give Kit the most independence he can possibly have," says Jo.

"We were living in a rented house before this," adds Jo, whose eight-year-old son Kit has cerebral palsy and relies on a wheelchair to get around the majority of the time. "There was carpet in the old house – a nightmare with a wheelchair – and no special layout. We lived there until Kit was six, but we managed.

"It was near impossible to find an existing house that took all of Kit's needs into account, and to buy and adapt a house would have been too expensive in this area," continues Jo.

The answer to their problem came in the form of a 3.24-acre plot on the outskirts of Harrogate in Yorkshire. An old four-bed bungalow with several outbuildings stood on site.

They met Martin Bell of Transform Architects at a Homebuilding & Renovating Show. Having told them, "I can design and build you a beautiful family home that takes into account your son's disability needs," Jo and Charles were confident Martin could deliver what they needed.

"I didn't want a long house, and I wasn't keen on a contemporary design either," laughs Jo. "The new house is 88m long from end to end, so I obviously got talked round, but it also worked from a planning perspective." Their new home is on a green belt plot, but Martin, Jo and Charles worked with the planners to come up with a design that suited everyone and secured planning first time around.

The single-storey design replaces the footprint of the old bungalow as well as the old piggery which formerly occupied the site. It has been constructed primarily using a timber frame, with a large steel frame forming the huge vaulted main living space.

Externally, the house uses a combination of materials that were chosen to work together with the local surroundings, including untreated cedar cladding and local Harrogate stone. The pairing of dark grey through-coloured render and the grey metal deck roofing, along with the black aluminium windows and doors, adds to the simplicity and contemporary appeal.

Internally, the layout has been designed with Kit's needs in mind, although the open spaces

are appreciated by the whole family, including Jo and Charles' younger son Oliver.

All the doorways in the house are wide enough for Kit's wheelchair, and most of the doors can be controlled automatically. "The main circulation doors were bespoke widths (1,100mm wide) to accommodate Kit using his walking frame as he likes to manoeuvre all around his house without restricted access," explains architect Martin Bell. "The corridors are minimum 1,850mm wide, which allows for an adult in a manual wheelchair to turn safely, reflecting some of the future-proofing we designed in as this is Kit's house for life."

At one end of the house, near the main kitchen/dining/living space, lies Kit's bedroom with its adapted en suite, and access to a playroom, with quarters for his carer adjacent. Just along from these rooms lie three further bedrooms, one with en suite and a quiet room.

"It was important for Kit to feel included in everything," adds Jo. "So the living space and kitchen are all open and his bedroom is close by – we didn't want there to be any barriers for him."

Kit's bedroom, bathroom and the playroom that he shares with Oliver all feature specialist equipment that enhances the way the family can live in the house, including recessed ceiling tracks for hoists that mean Kit can easily move between these spaces. "I was adamant that the ceiling tracks could be recessed into the ceiling," says Jo. "We are not hiding the disability, but this is a family home and we wanted the adaptations to be discreet."

The house is heated via underfloor heating, powered by a biomass boiler, although Jo says that the house is so well insulated that they rarely need it on. "It is really important for Kit that the house is at an even temperature as his mobility problems mean he can suffer from the cold," explains Jo.

In keeping with both the van Berckel's and Martin Bell's feeling that this should not be a house that looks like it had been designed solely for adapted living, the interior spaces are full of light, striking architectural features and huge sliding doors and picture windows that have been positioned to make the most of the stunning views.

"I wasn't expecting the 'wow' that this house offers," says Jo. "The space and tranquillity that we have, only two miles from Harrogate is amazing."



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Family-Friendly Bedroom

Oliver's bedroom (ABOVE) benefits from stunning views thanks to full-height windows.

Stylishly Adapted

Kit's bathroom (LEFT) features recessed ceiling tracks to which hoists can be fitted, a 'high/low' bath and sensor taps, as well as non-slip floor tiles. "The water pressure here was awful," says Jo. "We had to install a reservoir with a huge pump for around £4,000 in order to get water around the house. Kit's bath is so big that it has its own tank!"

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Stylish Interiors

All of the interior design was carried out by Jo – the family was keen that although this was a self-build that primarily focused on the practicalities of Kit's disability, the finished house would still be stylish and comfortable to live in.

The Playroom

Kit and Oliver's playroom (BOTTOM) features sliding doors to maximise space. Jo had to be creative with furniture in this room as there are doors and full-height windows on three of the walls.



Architect's View: Martin Bell, Transform Architects

"Our main aim throughout was to deliver Kit a home that integrates all the family, provides flexible space, and makes the best use of all aspects of the site and its surroundings. This was delivered through an uplifting architectural design, creating a large open plan central space, having large windows taking in the views on the site, a technology-based infrastructure to allow future changes to the use of the house as Kit gets older, and allowing for the seamless integration of Kit, his family, his care team and visitors in day-to-day life.

"Understanding Jo and Charles' requirements and understanding the supporting infrastructure, for example the care team, medical team, on-site staffing requirements, and so on, was a huge part of the brief.

"The site is 3.24 acres in total and had an existing bungalow that was 154m² in size and an outbuilding that was 348m² – and it sits within the green belt. The rules on green belt land are that you can only extend 50% of the volume of the original house. This house is 400m² – 2.66 times bigger than the existing – so we needed to demonstrate special circumstances to justify the increase in size. We were given trade-off against the volume of the outbuilding, which was reduced, making the overall area developed (main house and outbuilding) on the site only 3m² bigger than the existing.

"The existing outbuilding was sitting on an asbestos base under its concrete slab, which cost £9,000 to remove. And due to the rural location, the electricity is supplied via a transformer outside the site boundary. Requirements for the site were more than the old bungalow so we had to upgrade at a cost of over £9,500." **H**



Part P of the Building Regulations already states that sockets, switches and electrical outlets should be between 1,350mm and 1,450mm high above finished floor level.

An accessible home means different things to different people. For some, it means a home that will adapt with them as their needs change over time — often referred to as a ‘forever home’. For others it means a home that can provide a dignified and practical way of living suited to the needs of a wheelchair user or for another form of special needs. Here we address some of the key features of an accessible home.

Kitchens

Important areas to consider are worktop heights, lowered sinks, front and back taps, ‘rise and fall’ worktops and hobs, and preparation areas with space beneath for wheelchair access. Useful built-in features for anyone looking for a forever home are also widely available and include pull-out worktops beneath eye-level ovens, push-click operated kitchen units and remote control extractor hoods.

Thankfully, it is not just specialist companies that offer these kitchens. Companies such as Howdens and Magnet Trade offer all their kitchen ranges as ‘Inclusive Kitchens’.

Bathrooms

An accessible bathroom should be large enough for a wheelchair to turn easily (considered to be a 1,500mm turning circle) and an accessible shower is recommended. Wall-hung sanitaryware is a must, while the height at which it is set is crucial too.

As well as having a level threshold between the flooring and shower tray of a walk-in shower, a shower seat, grab handles

and digital or automatic shower controls make life easier. Even if you do not install these measures now, ensure you reinforce walls and ceilings to take the extra weight in the future.

Those building a home for life should ensure that the downstairs WC is large enough and has the adequate drainage to be adapted into a shower room should the need arise.

Circulation Space

All doorways should be accessible for wheelchair users. Doorways with a clear opening of 750mm (more where hallways are

narrower) and a minimum hall width of 900mm are advised. The Lifetime Homes Standard advise that there should be a 1,500mm turning circle or 1,700x1,400mm ellipse in living and dining areas and that staircases should be a minimum of 850mm wide.

For external doors, a level threshold is desirable, although if not possible, a slope that does not exceed 15° towards the exterior surface is acceptable.

Practical Layouts

Keep main living spaces open plan. Not only will this make

it easier for a wheelchair user to navigate the layout, but it also means a sense of inclusion for everyone in the household. A lifetime home should have provision for a ground floor master bedroom with facilities, and potentially space for a live-in carer too.

Heating

Underfloor heating provides a constant, even heat often required by those with mobility restrictions. It is also important to make the most of solar gain when building for the future, ensuring plenty of natural light for a sense of wellbeing as well as a source of passive solar heating. **H**

Disabled Facilities Grant

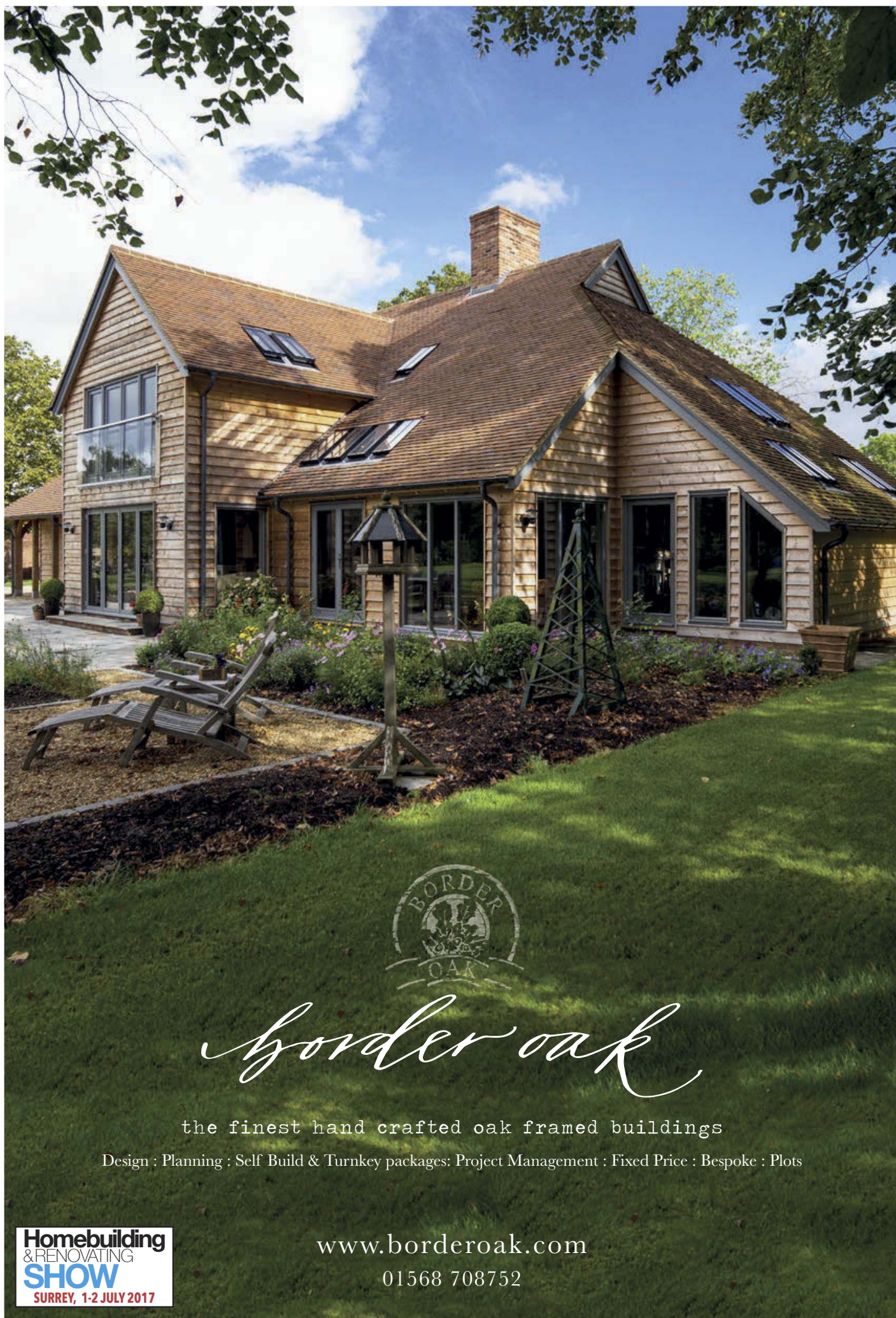
There are grants available for those self-building a home that will be inhabited by a disabled person. How much you will get depends on your household income, although for disabled children under 18 there are grants available without their parents’ income being taken into account.

The Knowledge SELF-BUILDING AN ACCESSIBLE HOME



Lifetime Homes Standard

The Lifetime Homes Standard was developed in the early 1990s to address concerns about how inaccessible and inconvenient many homes were for large sections of the population. The Standard is made up of 16 design criteria that can be applied to new homes at a minimal cost and now forms a national standard that has been laid out as Part M (Category 2) of the Building Regulations. The criteria cover aspects of design including level access, door widths, circulation spaces and window heights and form a useful guide for anyone building with future needs in mind. You can view them at lifetimehomes.org.uk.



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THE DIY ROUTE

When Jackie and David Oliver found their current house just wasn't delivering what they needed, they rolled up their sleeves, enlisted the help of their family and built a contemporary new home that meets their requirements perfectly

Words: **Natasha Brinsmead** Photography: **Jeremy Phillips**





Exterior Details

Blaxter stone, local to Northumberland, oak cladding and through-coloured render combine with details such as the painted timber windows and doors and the striking wraparound veranda to produce a contemporary design that still manages to look at home in its surroundings.





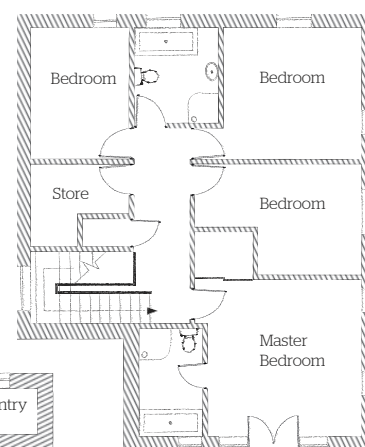
The Veranda

A glass insert has been fitted into the slate roof of the veranda to form a sheltered outside seating area (OPPOSITE). David built the table using leftover oak cladding. Further glazed panels within the veranda roof bring light into the entrance hall (BELOW LEFT) through the glazed sidelights either side of the front door.

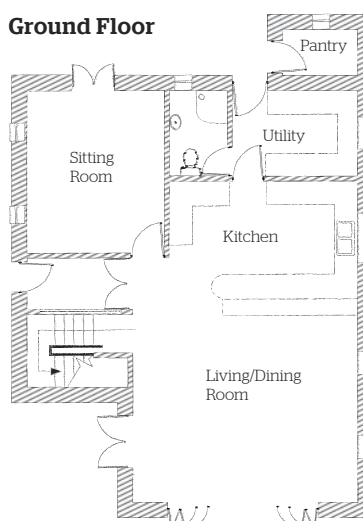
The Carport

The carport (LEFT) reflects the timber frame house, with its slate roof and cladding.

First Floor



Ground Floor



Project Notes

Homeowners

Jackie and David Oliver

Project Contemporary eco build

Build time One year, two months

Size 195m² + pantry and garage

Plot cost £170,000 (in 2011)

Build cost £205,000

Value Unknown

SUPPLIERS

Architect Giles Arthur,
Giles Arthur Architect: 07813
621146; gilesarthur.co.uk

Structural engineers Simply
Structural: 01434 344486

Timber frame Turner Timber
Frames: turnertimber.co.uk

**General materials (incl stone
and external oak cladding)**

JT Dove, Hexham:
01434 600062

Render

Weber: weberfinalfinish.co.uk

Windows and doors

Allan Brothers: allanbrothers.
co.uk

Kitchen IKEA: ikea.com

Sanitaryware/tiles Porcelanosa:
porcelanosa.com/uk

**Elka hardwood floors
and staircase**

Tynedale timber: 01434 605922



Style on a Budget

The sleek grey kitchen, including the extra deep oak island, are from IKEA's bespoke service – the kitchen was also fitted by IKEA. A utility and pantry are positioned behind the internal door shown here. ➤







Gathering Spaces

In keeping with Jackie and David's wish for a home that could accommodate their whole family when they visit, the ground floor layout is largely open plan (ABOVE) and is flooded with light from the timber bifold doors, French doors and strategically placed sidelights and rooflights.

Open Plan Hallway

The hallway was originally designed to be separate from the main living space – however Jackie and David decided it would work better as an open space (engineered timber flooring is laid throughout). The column (LEFT) is actually a vertical steel bracing element within the timber frame.

Downsizing sounds like such a good idea once your children have flown the nest, yet the dream does not always live up to the reality, as Jackie and David Oliver discovered. “When our children left home, we downsized,” says David. “What we hadn’t realised was that although they don’t live with us anymore, they still regularly visit. The new house was just bursting at the seams at gatherings such as Christmas — we wanted something where the whole family could still get together.”

When Jackie and David’s son-in-law came across a plot not far from where they were originally living – one of two plots that had been formed from the garden of a large Victorian house – they decided to go for it. “Building our own home was something that had always been at the back of our minds,” explains David. “We realised that to have the house that we really wanted and to be able to afford it, we would have to self-build.”

The plot came with planning permission for a five bedroom house, but Jackie and David decided to hire an architect that their son, a plasterer, knew in order to come up with a design better suited to their needs.

“Jackie and I were getting close to retiring,” says David. “We wanted a house that we could comfortably live in as just the two of us, but that had the space to deal with all the family too. It had to be energy efficient in such a way that it didn’t cost us a fortune and could offer us the space we needed.”

Although Jackie and David didn’t “go through the hoops” to get the house officially certified as a Passivhaus, they worked with their architect to achieve Passivhaus standards in terms of insulation and airtightness. “We were more concerned with building a house that was comfortable for us to live in, was low maintenance and didn’t cost too much to run,” says David.

Selling their home in order to fund the build, Jackie and David moved into rented accommodation. Although planning went through easily, it ended up taking 11 months to get approval. “We only thought it would take around 12 weeks,” says David. “But it wasn’t dead time as we used it to plan exactly what we wanted.”

The exterior of the house has a decidedly modern look, using a combination of cladding materials, including Blaxter stone, quarried in Northumberland, oak cladding and render. The form of the house is defined by a veranda that

wraps around two side. It provides a sheltered seating area that benefits from several strategically positioned glass inserts that not only deliver light into the veranda but also ensures that light can flow into the interior spaces within.

In keeping with the pair’s wish to have a low-energy home, the house has been positioned to make the most of passive solar gain, with large window openings and a long run of bifold doors on the south-facing elevation combining with rooflights to bring light streaming into the interiors.

Internally, the timber frame house has an open plan layout, with a large kitchen, dining and living area at the heart of the layout providing the sociable family spaces the couple were after. A smaller living room, utility and downstairs shower room have also been included, while a pantry, sited outside the thermal envelope of the house, provides handy food storage space. On the first floor, four bedrooms and two bathrooms provide plenty of space for visitors.

A Hands-on Build

Jackie and David’s remarkably low build costs of just £205,000, including all legal and professional fees, were achieved through their hands-on approach throughout the build.

“Tom, our son, did most of the on-site project management, coordinating trades and subcontractors, as well as plastering the entire house,” says David. “He also carried out all the first fix joinery and installed our mechanical heat ventilation system.

“This was a house that we genuinely built ourselves,” continues David. “Jackie and I sourced all the materials as well as labouring on site, while Jackie took care of all the paperwork and admin that is involved in a build — all while still working! You don’t have to pay through the nose to have a quality build, but you do have to put in the effort to do it on a budget.”

Features such as the mechanical heat ventilation system, high levels of insulation and a design that makes the most of solar gain mean that the house lives up to Jackie and David’s wishes for a home that was easy and cost-effective to run — with their total annual heating bills, including hot water, coming in at less than £300.

“The house is delivering everything we hoped it would,” says David. “Although we have no plans to build again, this project has inspired other members of our family to build — and we will be on hand to help.” ➤



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Architect's View: Giles Arthur

"The house nestles into the site while still enjoying distant views from the upper storey. A courtyard feel has been created by a stepped terrace which links the house to an oak framed garage/studio, and an oak colonnade veranda lends a sense of arrival to the entrance."

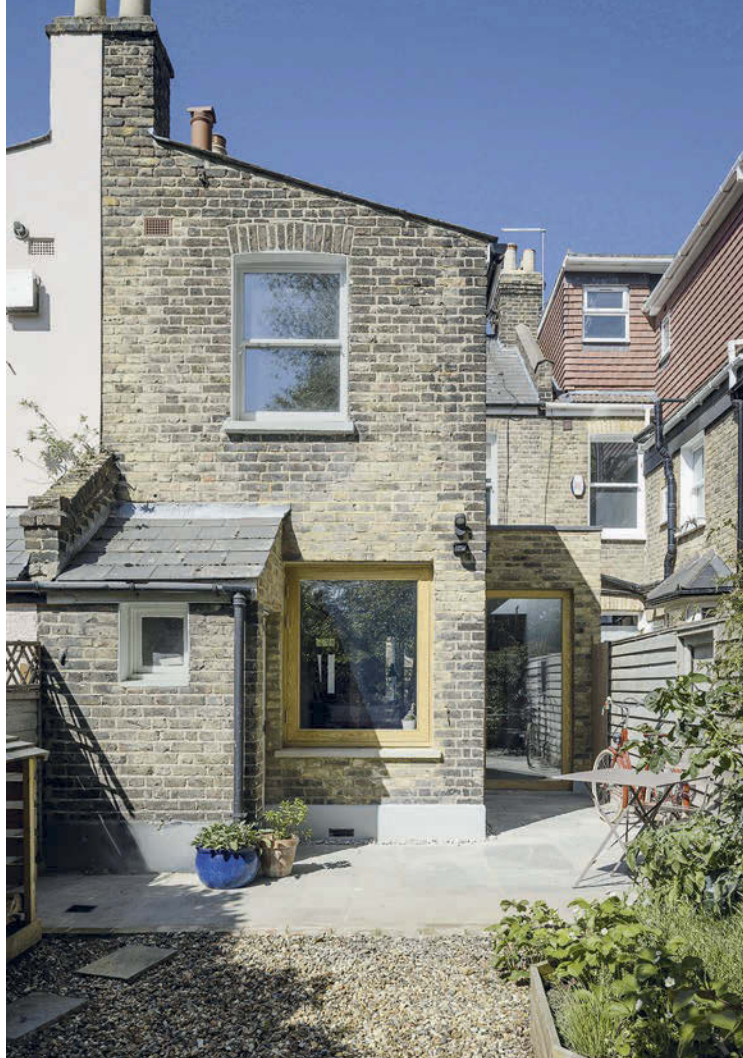
"This characterful, light-filled family home has the 'fabric-first' credentials of super-insulation and an exceptional airtightness rating, yet none of the downsides that can often compromise such eco houses."

"The complementary materials palette of green oak, natural stone and slate, render, zinc and oak weatherboarding will all weather gracefully on this timeless home." **H**

Luxury Features

By carrying out most of the building work themselves, Jackie and David have been able to include luxuries such as the large-format tiles from Porcelanosa, within their impressively low build costs.

"You don't have to pay through the nose, but you do have to put in the effort to do it on a budget"



SIDEWAYS GROWTH

Zelda Gould Loftus and Gary Dalton have added £200,000 to the value of their home by extending into the side return

Words: **Lindsay Blair** Photography: **Tim Crocker**

New Addition

The couple added an 8m² extension to their terraced home in London by building into the side return (TOP RIGHT). They chose not to extend all the way out to the existing rear wall, in order to create an L-shaped internal layout for the new open plan kitchen and living area.

Link to the Garden

Zelda and Gary created a link to the outside space with the addition of a large window that captures the view of the garden beyond (RIGHT). A cast concrete bench, which runs along the rear wall (OPPOSITE), was added by builder Cardonwood. ➤







BEFORE

The Kitchen

Asymmetrical storage above the bespoke run of bleached plywood cabinets allows the couple to store kitchenware and mementoes, with the graphic tiles contrasting against the grey cabinets (RIGHT) – a far cry from the old kitchen (ABOVE). ➤







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Contemporary Touches

The new kitchen diner was converted into a light-filled space by removing the walls between the old kitchen, living and dining room (all achievable under Permitted Development) and adding a rooflight. The large picture window and door were designed by Mustard Architects and constructed by the builder, Cardonwood.





Project Notes

Homeowners

Zelda Gould Loftus
and Gary Dalton

Project Side return extension

Location London

Build time Sep 2014 - Mar 2015

Extension size 8m²

House cost Already owned

Build cost £118,500

Value Unknown

SELECTED COSTS

Building works	£42,000
VAT	£23,000
Kitchen	£18,000
Windows, doors and rooflight	£14,500
Plumbing and heating	£8,000
Electrics and lighting	£6,000
Decorating and tiling	£5,000
Garden and landscaping	£2,000

SUPPLIERS

Architects

Mustard Architects:
mustardarchitects.com

**Builder, joiner,
electrician and plumber**

Cardonwood: 07816 673869

Rooflight

Rooflight Architectural:
rooflight.co.uk

Worktop

Cavendish Equipment:
cavendishequipment.co.uk

Kitchen radiator

Bisque: bisque.co.uk

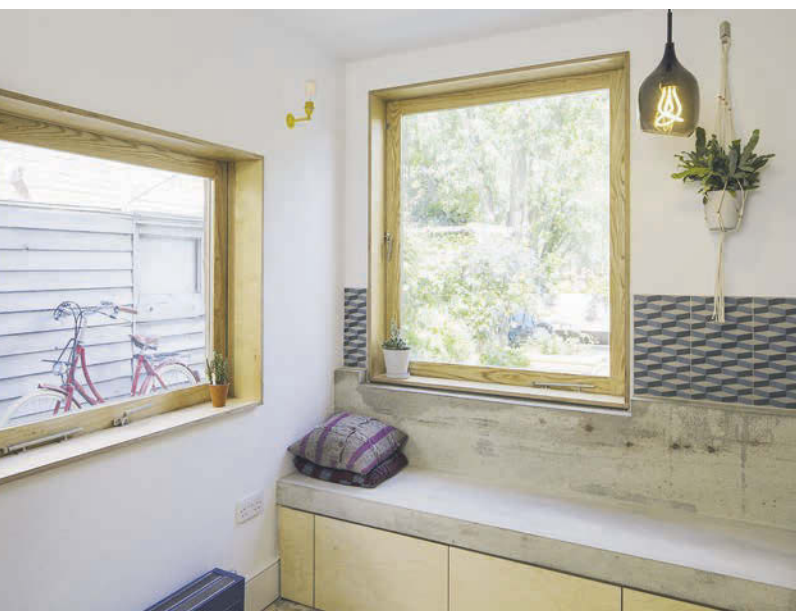
Pendant lights Holloways of
Ludlow: hollowaysofludlow.com

Kitchen McCormack Joinery:
mccormackjoinery.co.uk

Ovens Neff: neff.co.uk

Bosch hob John Lewis:
johnlewis.com

Extractor fan Elica: elica.com



With their keen eye for design, Zelda and Gary knew they'd found a gem when they viewed their Victorian terraced house in Hackney in 2012. "What sold it to us was that it backs onto a park that then backs onto Hackney Marshes. It's such a lovely location," says Gary, a graphic designer. "The house also hadn't been touched for a long time, so we knew we could make it our own."

The couple had a clear idea of what they wanted to achieve: an open plan, light-filled, sociable kitchen diner, with links to the garden and space to display their collection of salvaged pieces and personal mementoes. After selling their old flat nearby, they moved in and began imagining a new design to include a contemporary kitchen, updated bathroom upstairs and redecoration throughout.

Zelda and Gary were keen to modernise the bathroom, which hadn't been redecorated since the 1980s, but to make the most of the space they needed to move an internal wall and take out a chimney breast. "The same chimney took up a lot of space in the kitchen, too, where we wanted a long run of units against one wall. Removing the chimney breasts on both floors made it easier to tackle everything in one go."

In 2014, the couple hired Joanna Coleman, of Mustard Architects, who lives just down the road, to help realise their vision. Although they had lots of ideas, Zelda and Gary were unsure how to tackle the series of small, dark rooms that are typical of Victorian terraces. "The kitchen was separate, so we planned to open up the room to fit in a dining table. We also wanted two ovens, a large prep area, and plenty of worktop space and storage," says Gary. "We'd collected lots of ideas, and knew we liked bleached plywood, concrete and some graphic Italian tiles that I'd spotted in a magazine. We gave Joanna our box of cuttings and said, 'We like these things'."

Joanna suggested extending the space into the side return, adding 8m², and knocking down the walls between the old kitchen, dining and front living rooms, which could be achieved under Permitted Development.

After gaining Party Wall consent from both neighbours, work began in September 2014. "We decided not to extend all the way

out to the existing rear wall, which saved money and created an L shape that gives us more wall space for storage," says Gary. "We can still enjoy the link to the garden, as the large window completely opens out."

For the new kitchen, a length of bespoke kitchen cabinets was made from bleached plywood by McCormack Joinery to complement the new windows and doors, while a made-to-measure concrete bench was cast by the builder. "At first we wanted the whole kitchen to be in bleached plywood, but Joanna suggested that the bottom units would look better painted grey to break up the look," says Gary.

"The first design also featured symmetrical storage boxes, but we preferred them to be uneven. It's the perfect place to display our collection of eclectic objects. I love that it shows off mementoes from experiences we've had together."

On Time and On Budget

The project was scheduled to take six months, and with a tight budget of around £100,000, there was little room for manoeuvre. The couple moved in with Zelda's parents for the duration of the work and soon after discovered that they were expecting their first child, so timing was crucial. Luckily, there were no major delays, but there were some hurdles to overcome.

"Two weeks after the builders started, they discovered that the foundations had to be dug much deeper than expected and three additional steel supports were needed to reinforce both the extension and internal space where the walls had been removed," says Gary. "It was a blow to the budget, but we'd planned a contingency." The couple also had to pay to move the soil pipe, relocate the boiler, and add new wiring and plumbing.

Despite these expenses, the project was completed on time and Zelda and Gary moved back before the arrival of their daughter, Ottoline.

"The new space is designed with us in mind, and the house truly feels like a family home. We've put our stamp on it and increased the value by £200,000," says Gary. "We knew it had plenty of potential when we first moved in, but the finished space is everything we envisaged and more." **H**

Open Plan Living Space

Removing the walls to open up the living spaces of this Victorian terraced property (OPPOSITE) has replaced a series of small, dark rooms with larger light-filled spaces. Despite finding that foundations for the extension needed to be dug much deeper than expected, the project was completed on time – and before the birth of their daughter Ottoline.



THE PASSIVHAUS MODELS

Passivhaus – the German approach to creating high-performance homes – is steadily gaining popularity this side of the channel. Daisy Jeffery takes a look at some of the UK's most impressive Passivhaus homes

A BARN-STYLE HOME WITH LOW RUNNING COSTS

After buying a site in Berkshire at auction – which came complete with an unattractive five-storey water tower – architect Tom Gresford of Gresford Architects (gresfordarchitects.co.uk) set to designing a new home. Tom produced two different designs which he presented at a neighbourhood consultation event, giving neighbours opportunity to comment on the design they preferred. Given the poor condition of the water tower, gaining planning permission for a replacement building was straightforward and viewed as a more attractive proposition for the local area.

“We originally intended to build the house to just be low energy, but when we realised that it wouldn't cost much more to upgrade to Passivhaus standard, this was the obvious choice,” says Tom. The house was built using a prefabricated timber frame, constructed off site and then erected on site to airtight stage within two weeks. Clad in vertical timber panels, the exterior façade nods to the traditional agricultural buildings in the area.

“Performance wise, the house costs virtually nothing to run,” explains Tom. “Another critical aspect of the Passivhaus way of building is that the house provides exceptional levels of internal comfort, year round. A mechanical ventilation heat recovery (MVHR) unit provides constant background ventilation.

“Opening triple-glazed windows and large triple-glazed sliding doors also debunk the Passivhaus myth that the house must always be closed. External blinds are also automatically deployed when the internal temperature reaches 21°C, thus reducing the chance of overheating.”

As a result of applying Passivhaus principles, the home achieves an impressive airtightness measurement of 0.58ac/h@50Pa (air changes per hour at 50 pascals), and has an annual space heating demand of only 13.8kWh/m². (In the average home this figure is 205kWh/m²).

“One thing we're keen on with these kinds of projects is employing a Passivhaus certifier to sign off the house — this makes the design process much more rigorous, because they won't sign the project off unless all criteria is met, but as a result, you end up with a much better quality building,” explains Tom. ➤



A DYNAMIC PASSIVHAUS

The 'stereotypical' Passivhaus is a simple box, aimed at containing the most space as efficiently as possible and maximising windows where they will get winter sunshine," begins Dr Paul Newman, self-build director of Potton (potton.co.uk), which in 2016 unveiled its first Passivhaus show home to the public. "Using the Passivhaus Planning Package (PHPP) – an essential tool used when designing a Passivhaus – HTA Design worked collaboratively with our technical team to design a house that is ambitious in form. Derived from a desire to flood the interior with natural daylight, a series of simple design moves creatively breaks down 'the Passivhaus box', employing large openings and a distinctive butterfly roof, while simultaneously challenging and satisfying the requirements of the PHPP."

Central to the design is a top-lit enclosed 'courtyard' which sits at the heart of the building, filling the centre of the floorplan with natural daylight. Flexible spaces, which are designed to be adaptable to almost any occasion or lifestyle, have been arranged around this courtyard. What's more, a large south-facing opening on the ground floor has been maximised to benefit from solar gain, which, combined with other Passivhaus principles, helps to reduce the energy consumption of the house to 15kWh/m²/yr for heating. The roof overhang then protects this glazing from excessive solar gain and overheating of the interior during the summer, while maximising solar gain during the winter months.

THE CONSTRUCTION

The new show home has been constructed using the Kingspan TEK® Building System (made up of 142mm- or 172mm-thick structural insulated panels, or SIPs), with an additional external layer of Kingspan Kooltherm insulation to provide a 'thermal bridge-free' construction and help achieve the required U value. There is also a 40mm service zone on the inside of the panel.

The roof is constructed using 172mm-thick panels, this time with an internal layer of Kingspan Kooltherm insulation. "We have used the thicker panels for the roof because they are capable of spanning further without requiring additional support," explains Paul. "We then wrapped the entire structure externally using A. Proctor Group's Wraptite System; a self-adhesive, high-performance breathable membrane and air barrier combined in one."

Typically, most Passivhaus builds, particularly those constructed using a system such as SIPs, employ lightweight claddings, like render, carried by the structure of the building. The decision to use bricks for Potton's Passivhaus show home added a further level of complication, due to the need to provide a separate foundation for them. This was a simple strip foundation, completely isolated from the main insulated raft. Long narrow-format bricks with



8mm mortar joints provide a contemporary appearance, while spaced vertical western red cedar cladding is revealed where the brick appears to have been carved away.

The façade is then broken up with triple-glazed windows from Klöeber, which have U values of between 0.71 and 0.79W/m²K depending upon their size; the smaller windows have a higher (worse) U value because of the increased frame-to-glazing ratio — the frame does not perform as well as the glazing. For comparison, the external walls have a U value of 0.10W/m²K.

During the build, multiple airtightness tests were carried out to the property in order to reach the Passivhaus requirement of 0.60ac/h, with the final result coming down to 0.41ac/h@50Pa after the team addressed all areas where air could leak out of the building fabric.

A mechanical ventilation heat recovery unit was also introduced. "Heat recovery is an important part of the PHPP model," explains Paul. "We leant heavily on the expertise of our partners at Total Home Environment for the ventilation, heating and hot water strategy, and decided to install a Genvex MVHR unit with in-line electric heater elements to warm the incoming air. We also added small elements of electric underfloor heating to the bathroom areas and immediately in front of the large 8m-wide glazed opening in the courtyard area. Hot water is provided using a micro air source heat pump that is ducted to outside the property."

The finished show home is a fine example of how a mix of building materials and inventive design can be applied when creating a super energy-efficient home such as a Passivhaus. ➤

Contemporary Façade

The external cladding features long narrow-format bricks (Terca Megaline Grey Multi bricks from Wienerberger). Elsewhere, spaced vertical western red cedar cladding supplied by Vincent Timber.

Fine Joinery

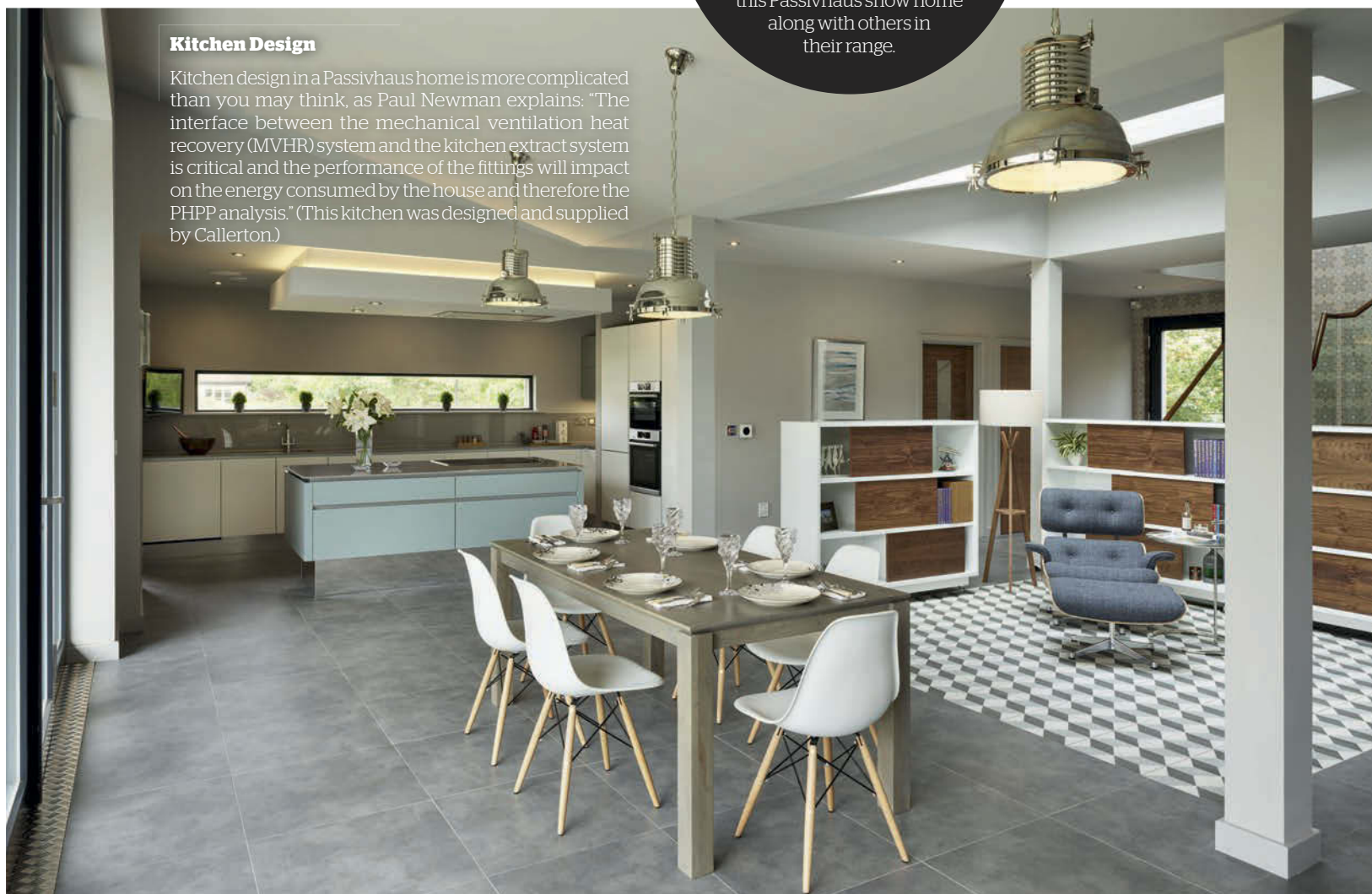
The staircase from David Smith St Ives is constructed from American dark walnut with glass balustrades.

Visit Potton's Passivhaus Show Home

Are you looking to build a Passivhaus and want to see for yourself how one operates – or are you simply looking to self-build a low-energy home? Visit Potton's Self Build Show Centre in St Neots, Cambridgeshire for a tour of this Passivhaus show home along with others in their range.

Kitchen Design

Kitchen design in a Passivhaus home is more complicated than you may think, as Paul Newman explains: "The interface between the mechanical ventilation heat recovery (MVHR) system and the kitchen extract system is critical and the performance of the fittings will impact on the energy consumed by the house and therefore the PHPP analysis." (This kitchen was designed and supplied by Callerton.)

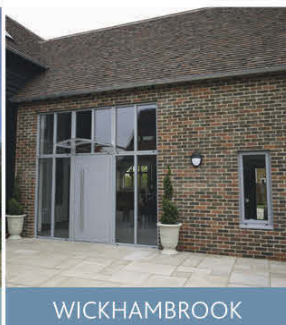


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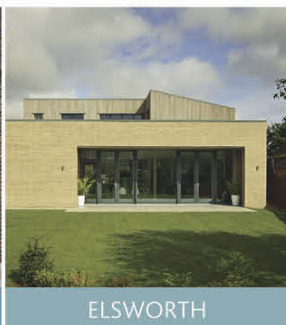
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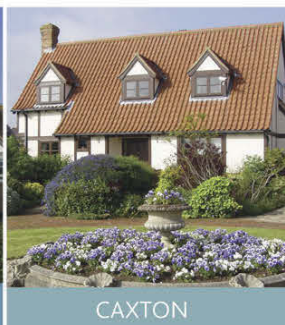
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"We visited the show centre and were able to walk around the houses and get a real feel for the design."
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"After visiting the Potton Self Build Show Centre we loved the look and 'feel' of the Gransden so much, we knew that was the style we wanted to base our new home on."
David Peake



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A Flexible Floorplan

The central 'courtyard' space under the large rooflight is a key part of the design. The finished space introduces flexibility into how the ground floor of the house can be used and reconfigured on a daily basis – it could be used as a dining space or cleared of furniture for parties.



The Bathrooms

The Passivhaus has two en suite bedrooms and a ground floor family bathroom. Each has been designed by Sottini to showcase its latest products and complement the other elements of the interior design. ➤



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A LOW-ENERGY MASONRY BUILD

For years, we had in mind the idea of getting planning to build an energy-efficient house in our garden,” says Angela Dallas, who with husband Paul has built a contemporary-style three-storey Passivhaus on a sloping site in Yorkshire.

“We’d had our architect draw up designs, but it was only when we went into the Green Building Store – because we saw they offered low-energy windows – that we were told what we were planning to create had the potential to reach Passivhaus standards,” begins Angela. Green Building Store then took on the project, putting the original designs through PHPP (the Passivhaus Planning Package), testing out different build elements to value engineer the project, and handled the build up to first fix and airtightness stage, after which Paul took over to complete the final stages of works. “The homeowners had already achieved planning permission when they’d approached us,” says Bill Butcher of Green Building Store (greenbuildingstore.co.uk), picking up the story. “But in order to apply the detailing needed to develop the design into a Passivhaus required the removal of some of the windows on the north elevation and the repositioning of the house on the plot for solar gain. This meant going back in for planning — bravely, considering the last planning application took four years!”

Externally, the project has been finished in stone, which suited the cavity wall construction method — the use of a cavity wall also sat well within the comfort zone of the builders in the area. Cedar cladding adds interest and helps to break up the façade.

“The only sticking point in the design was the large full-height glazed bay window,” explains Bill. “A Passivhaus usually performs better when the elevations are flat, but given that the house is relatively large the building is able to cope with it. When you change any part of the design, the final thermal performance figure changes — the bay section was originally meant to be ashlar cut stone, but this wouldn’t have worked with Passivhaus because of the thermal bridging. The new glazed bay has triple-glazed timber windows with a powder-coated aluminium façade, insulated with polyurethane.

“In order to meet Passivhaus requirements, the building needs to have a heating demand of lower than 15kWh/m²/year — this home achieves 8kWh/m²/year. The house also has an airchange



rate of 0.25/h@50Pa (pascals),” says Bill. “To achieve Passivhaus standards, it’s all in the methodology and applying careful design, particularly in the early stages. For houses like this to work, you need strong leadership from the client’s perspective and everyone has to be on board.”

“It’s comfortable, the fuel bills are minimal, and we receive £135 a quarter back from the Renewable Heat Incentive,” says Angela. “Because Passivhaus is so efficient, the house doesn’t require all sorts of expensive eco technology which has the potential to break down. The house has a simple, inexpensive gas boiler which any plumber in the land could fix.

“It’s very solid, quiet and comfortable. The MVHR is circulating air all the time and the atmosphere is always pleasant. The house has far exceeded my expectations from a comfort level — it’s a joyful home to live in. It’s been a delightful exercise for us,” says Angela.

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THE FARMHOUSE PASSIVHAUS

Positioned in the North Pennine Area of Outstanding Natural Beauty (AONB), Steel Farm is no ordinary Passivhaus — built using traditional masonry construction with the design taking the form of a modern-day farmstead, clad in stone.

“Trevor and Judith Gospel approached me through recommendation as they were interested in building a Passivhaus after living in cold, draughty homes in Aberdeenshire,” explains Mark Siddall, director of LEAP: Lovingly Engineered Architectural Practice (leap4.it). “They’d bought half of a farm here in Northumberland and were after a comfortable home, but were unsure whether building to Passivhaus standard would meet their tight budget. I ran through the calculations with them and was able to determine quite quickly Passivhaus could be achieved.

“One of the biggest challenges with this project was the site itself, being very isolated and 15 miles from the nearest village. Given the isolated location, we were faced with some rather onerous planning restrictions, which dictated the use of traditional materials including natural stone and a slate roof. Fortunately, this was something the homeowners were happy with. Once building work began on site, the house took just six months to build.

“I produced very comprehensive construction drawings which helped to sift, sort and screen the tradespeople down to those who

really showed an interest in doing something new and developing experience in a Passivhaus build. We wanted to attract the right kind of craftspeople. While JD Joinery and Bulding had never built a Passivhaus, they were up for the challenge,” adds designer Mark.

As the site has no main gas, the house is heated with small gas cylinders — only six a year are required — topped up with solar thermal panels for domestic hot water. There’s also a reed bed system for the treatment of foul waste water. AECB’s (Association for Environment Conscious Building) water standards informed the design and have minimised the demand for domestic hot water without compromising comfort. Triple-glazed timber windows and doors from Green Building Store and a mechanical ventilation heat recovery (MVHR) system complete the project.

Trevor Gospel, owner of Steel Farm, has the final word: “There’s nothing at all that we’d change about the house because we got exactly what we wanted. Now we’re finally living in a cosy home, we’re not going anywhere!”

Each year Steel Farm has taken part in the International Passivhaus Open Day event, members of the public get to experience what a Passivhaus is really like. You can watch the popular documentary about the house, and get the opportunity to visit the Steel Farm, at passivhaussecrets.co.uk

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BEYOND THE BOX

Sitting within a garden plot in Norfolk, Lime Tree Lodge challenges the conventional straight-lined form of typical Passivhaus projects, as it curves its way around a protected lime tree on the site. Built by Parsons + Whittle Architects (parsonswhittle.co.uk) as a retirement bungalow for homeowners Rob and Jane Young, who were looking to downsize, the curved design allows the building to make the best use of the site and positions the tree as the central focus for both the building and the garden. Recognising that the tree could provide shade in the summer but allow sunlight through in winter, the opportunity for a large south-facing glazed wall for the sitting room, together with the client's request for a low-energy building for their retirement, all led to the early adoption of the Passivhaus standard.

Built using masonry construction – selected as a result of labour availability and thermal mass – the property features brick cladding to the street-facing elevation which complements the adjacent inter-war and 1980s buildings. Siberian larch provides a softer aesthetic on the rear façade. Large overhangs on this

south-facing elevation also provide protection against overheating. “Curved buildings are usually more complex builds,” says Chris Parsons of Parsons + Whittle Architects, who have completed over 60 Passivhaus projects to date. “Fortunately, the vertical timber cladding meant it was relatively straightforward to create the curve — the only real challenge was the zinc roof, with the zinc panels needing to be tapered to the roof.

“The main challenge with Passivhaus homes, though, is to find a designer who understands the impact that the design will have on the energy performance, and who can work with the constraints Passivhaus homes present,” adds Chris.

The cavity walls and roof have been insulated with blown EPS (expanded polystyrene) platinum beads, while the floor has 200mm of PIR insulation supporting a floating finish. Careful attention to detail, such as specifically designed brick ties (which connect the brick cladding with blockwork) avoid thermal bridging. This highly efficient insulation leads to virtually nothing being spent on heating. Elsewhere, a mechanical ventilation heat recovery unit provides clean air pumped through the house and provides a comfortable environment.

While the construction was carried out by Passivhaus first-timers Grocott and Murfitt, the build went without a hitch thanks to the team's proactive approach — both direct and subcontracted labour were all trained as Passivhaus-certified tradespeople to ensure they were equipped with the knowledge to build the house to certified Passivhaus standards. As a result, the home has a heating demand of 15kWh/m² and an airtightness rating of 0.47ac/h@50Pa.

“We are truly delighted that everything that was promised has been delivered,” says Rob Young. “The curved design with a zinc roof and larch cladding is beautiful and the insulation, triple glazing and mechanical ventilation make it such a comfortable place to live. Inside temperatures have remained constant throughout the winter, even on the few very cold nights. It is wonderful to live in a quiet, draught-free environment with every room the same temperature. Equally impressive are our reduced energy bills. It is exciting in our retirement to learn how to maximise the benefits of Passivhaus living and we are enjoying every minute of it.” **H**



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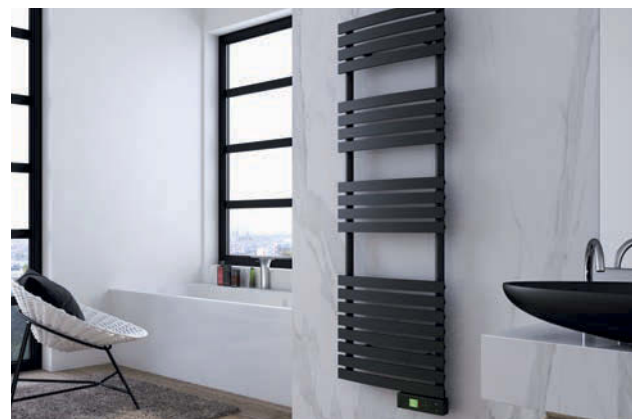
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Before & AFTER



A Double-Height Extension Transforms a 1970s Home

Ian Solley explains how he and his wife Lisa gave their dated house a modern makeover, thanks to a series of extensions and a new rustic external façade

Words: **Mandi Millar** Photographs: **Fiona Walker-Arnott**

Living in London with three young daughters, Ian and Lisa Solley began to realise that they were outgrowing their city lifestyle. With their terraced home selling quickly, the pressure was on to find somewhere. Upon viewing this brick-clad house, the couple could see its potential.

“The layout of the property was very dated – a classic 1970s design with small, boxy rooms – but it had been well looked after,” says Ian. Though the interior décor included lots of Anaglypta and Artex, structurally the house was sound and, best of all, had been built on a great

plot. At a third of an acre, there was scope to extend without compromising on garden space.

An experienced commercial chartered surveyor, Ian wasn't overwhelmed by the scale of the work and took on the role of both designer and project manager. “We had plans to not only extend the house, but also landscape the garden,” he explains. “However, we had to rein in our enthusiasm to match our budget, and so planned to do the work in stages over several years.”

The initial plan centred around creating an open plan, double-height entrance hall from the driveway and an internal garage. The main roof had a 30° pitch, and Ian worked out that they





could follow this line all the way down, incorporating the garage, to create a large, open space.

Once this was done, the couple decided to extend the front of the house to build a new kitchen/breakfast room and, above this, a guest bedroom and en suite, which would replace the bedroom they lost when creating the new double-height hallway. “We left the other three bedrooms as they were, so that the girls could each have a room and we’d still have a guest suite for when friends stay over,” explains Ian.

To the rear, the study was also extended to create a new family room, with patio doors added to this space and the living room on to the garden.

“To tie the extensions together, we clad the house in green oak and had new oak windows made, which gives it a rural feel,” he says.

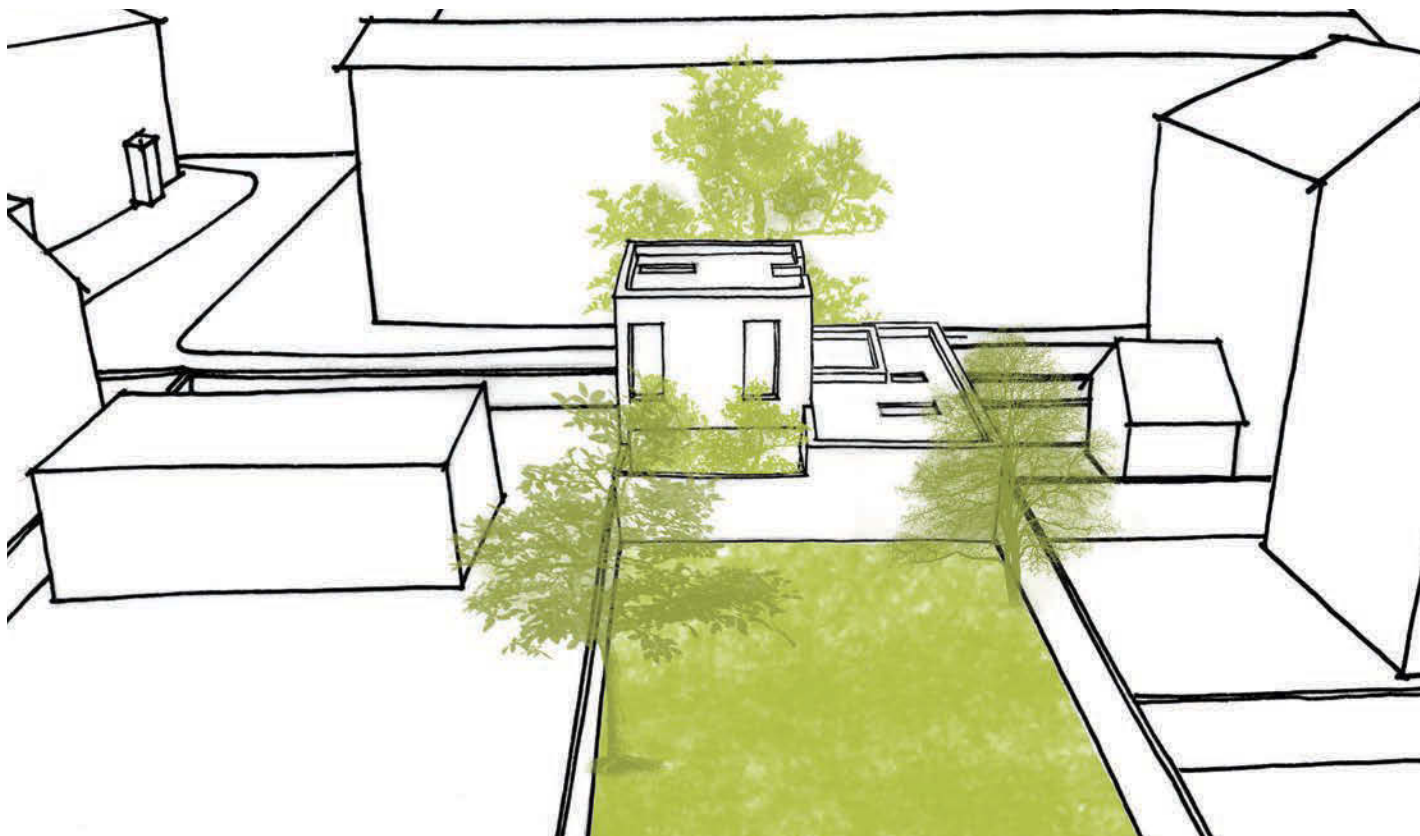
When the building stages were nearing completion, the couple began focusing on the interior, creating contemporary spaces throughout, and then turned their attention to the garden. “The site isn’t level, which, rather than being something negative, adds interest to the layout. So we have terraced patio areas and decking, which offer different vistas,” says Ian.

“Transforming this house has been a long journey, but one that we don’t regret for a minute,” he concludes. **H**

A Rustic Remodel

Set in a third-of-an-acre plot, the original house (TOP LEFT) was a classic 1970s build with boxy rooms. Ian and Lisa have extended to the front and rear to create a kitchen-breakfast room, double-height entrance hall and family room. To tie the design together, they clad the exterior with weatherboarding, which gives a rural feel, and landscaped the gardens, adding terraced areas.

**Planning
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“The Planners Didn’t Want a Two-Storey Home Here, but we Managed to Achieve That”

Melanie Schubert from SAM Architects explains how her practice helped one client achieve planning for a new home in a London Conservation Area



Melanie Schubert

Melanie Schubert is partner at London-based practice SAM Architects (samarchitects.co.uk).

How did you first come across the project?

We were already working with the client and they had found a plot of land that was part of a large garden of a Victorian house within a Conservation Area in London.

Initially the client saw the development potential to build two houses on the site, and we went through a couple of iterations with the design scheme, going through pre-application advice, before applying for planning approval, which was refused.

How did you approach the project after the scheme was refused?

During this process, the client decided that they wanted to make this their personal home, instead of a development, and the scheme was changed to one house. We looked at the reasons for the first planning application being refused, and the brief was changed, too.

As the garden plot was so large and the scheme we were proposing was relatively small, we were able to establish the possibility of developing



the land. However, because of the proposed dwelling's proximity to the tree to the front of the plot, surveys had to be carried out to establish how close we could build. Luckily, the tree didn't have a Tree Preservation Order on it. We couldn't build higher than the neighbouring houses, or lower to create a basement, because of the tree's roots, so this defined what we could and couldn't do with the design.

Our feedback from the planners after the first refusal was that we couldn't create a two-storey building. However, in order to meet the client's wishes we pushed for a first floor that was set back, which is half of the footprint of the ground floor. It was a risky move, as the planners could have said no again.

The local vernacular is mostly made up of Victorian buildings, with a block of 1960s flats opposite the site. The design we have proposed is a modern interpretation of older surrounding buildings, using old materials – mainly reclaimed bricks – glass, a flat roof, and a grass roof and wall to one elevation, to provide the neighbours with a more attractive outlook and to give something back to the area.

Did the neighbours and planners support the plans?

The owner of the Victorian home, which the garden belonged to, was very much on side with our plan to develop the land. They wanted to see a nice scheme built, and knew that the client was buying the land subject to achieving planning consent. There was one neighbour who objected to the development of the land, but things were resolved once the client had spoken to them. We were also fortunate that the local authority was very good, and once we had taken the first floor to half the size, the planners generally wanted to give us planning permission.

What advice would you pass on to others?

Do your research well; look at the local development plan, and check the planning history of the site and the area to help make you aware of any challenges you may face. Most importantly, choose an architect who's done it before and has experience of creating houses that suit the style you're after. And if you're in a designated area, choose an architect who has previous success of achieving planning in that area. **H**

Planned Elevations

The proposed dwelling will be built using reclaimed bricks, a material commonly used in the area. Glass, meanwhile, punctures the façade, and along with the flat roof lends a contemporary feel. The house will also feature a grass roof and green wall to one elevation, to provide the neighbours with a pleasant outlook.

“With Listed Buildings You Have to Love It For What It Is...”

Lawrence Grigg and Lydia Robinson are carrying out a sensitive renovation to a Grade II-listed farmhouse

Following the sale of their award-winning restoration of a pair of miner's cottages in Bath, Lawrence Grigg and Lydia Robinson of Design Storey had been on the hunt for their next project when they came across a Grade II-listed farmhouse in the Cotswolds. They immediately saw the potential to transform the run-down building into a forever home.

“It had previously been owned by the council and had no real basic services,” explains Lydia, “but we saw the potential and felt it was the right opportunity. The building is Grade II-listed as well as being in a Conservation Area and in an Area of Outstanding Natural Beauty, so we have three constraints that will drive the planning process. However, our approach to the house is going to be sensitive and so we hope to work collaboratively with the conservation officer to talk about our programme of repair and the short-term goals to make it a liveable building.”

“When we purchased the house, we knew it needed a lot of work,” says Lawrence. “Being an 18th-century building, it had no foundations and there has been some movement. We believe it previously had a thatched roof which was later changed to heavier concrete tiles.”

A series of alterations had already been done to the building, with the council changing the roof and renewing rainwater goods with unsympathetic PVCu that is not appropriate for the age of the building. “There’s some really beautiful original features but obviously there’s issues with damp, plasterwork, condensation, heave, and a host of other challenges,” says Lydia.

MATTHEW GIBBS



“The first things we will be dealing with are the structural issues, then it will be getting heating, electrics and hot water into the building, and the rainwater goods changed back to cast iron. Hopefully in the summer we will be able to get jobs like the underpinning done while we still have good weather. In autumn we can start to reintroduce the central heating.

“We’re planning on moving into the shell shortly and camping out in the house — spending a bit of time living in it to get a feel for things. Until you’ve lived in the space you can’t get a real sense of what it’s like to be there and the value of certain features. At certain points, we will have to move out for a month or two to allow certain works to happen without us being there holding work up.”

While the couple are not looking to radically change the interior by knocking down walls, they are keen to integrate the lean-to on the side of the house into the kitchen for more flexible space. Other than that, the plan is to keep the original configurations of the house.

So what advice do they have for homeowners taking on similar renovation projects? “Especially with listed buildings, one of the most important things to do is to love it for what it is and not try to transform it into something completely different,” says Lydia. “The reason it is listed is because of what it is, so if you want to change it you may not be able to get permission.” 

See Lydia and Lawrence’s previous renovation project online - including a video house tour - at homebuilding.co.uk/restored-cottages-extended-for-modern-living





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the creation of dream kitchens



Becky-Anne
Exeter

“Inspiration and ideas at the start of the project, helps to achieve a perfect finish to the completed room.”

Becky draws her inspiration from lots of sources, “I love making mood boards for customers, but when I get a customer that’s made one too, I’m totally inspired. It’s a great tool for understanding exactly what the customer wants from their new kitchen.”



Joseph
Aylesbury

“Good designers will see many ways to layout a new kitchen.”

“Many people think that they can only replace the kitchen with a very similar layout, assuming that there must be a reason for what’s positioned where. But that’s rarely the case, we can generally find lots of alternative layouts.”

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Diary of a Home Extension



The Final Piece of the Building Regs' Puzzle

Chartered surveyor Ian Rock searches for a structural engineer to allay some of his fears for his 100m² home extension before sending off the final drawings

When we converted the loft above our double garage into office space a decade ago, Darren Milnes of RWA Consulting did the structural design work and was extremely helpful all round. So with our Building Regulations application for our new extension ready to roll, with the exception of the structural calculations, it made sense to avail ourselves of his service once again. Unfortunately, sod's law dictated that Darren, now running his own business, was scheduled to move house the following week and, in any case, had other projects in the queue ahead of us.

We couldn't afford to delay things too much longer because getting builders' quotes depended on having all the key structural components confirmed. Plus, it doesn't look enormously professional if you submit a 'full plans' application to building control with vital information missing. So a couple of days later, following up a recommendation, I found myself sitting in the plush surroundings of a highly regarded engineering consultancy for a preliminary discussion. These were the sort of top-end consultants I used to appoint in the mid-1990s when I was managing major housing developments for the Guinness Trust, and I was feeling slightly overawed by pictures of cloud-piercing office towers and hi-tech plate system bridges adorning the walls. Our home extension seemed a rather piffling affair in comparison. Inevitably, when their quote arrived, it turned out to be heftier than budgeted. It was back to square one.

A quick online search of the surveying website rightsurvey.co.uk produced a list of structural engineers located within a 15-mile radius. Local firm Cox Clifford Partnership quoted a reasonable sum (£510 + VAT) to provide all



necessary calculations for the roof structures, beams, lintels and floor joists, together with advice on foundations. Any necessary site visits would incur an additional charge.

Structural Calculations

Having emailed over a full set of PDF drawings and photos, I picked up the phone to Anne Wiseman at Cox Clifford Partnership. Anne helped clarify a number of issues that had been bothering me. For starters, the sub-strata below the ground surface in this part of Buckinghamshire comprises layers of thick clay, which, being notoriously prone to seasonal shrinking and swelling, can play havoc with shallow foundations. I wondered whether we'd be required to excavate the trenches to uneconomic depths to reach down to solid 'bedrock'. Also, given the close proximity of the extension to our sizeable garden pond, I was worried that building control might chuck the book at us and insist on expensive pile foundations.

It was reassuring that Anne felt conventional trench fill foundations ought to be sufficient and that it was unlikely we'd have to excavate ➤

Choosing the Foundations

Ian's home in Buckinghamshire is set to be extended, with planning permission granted and the detailed plans for Building Regulations purposes all set to be submitted. (This month, Ian commissions structural calculations and wonders whether expensive pile foundations will be required.)



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much deeper than the minimum trench depth of 1.2m stipulated by Aylesbury Vale Building Control. Given that the clay was of a reasonably firm consistency, she also felt a slip membrane probably wouldn't be necessary.

There were a couple of other issues I wanted to ask her advice about, too. The main roof structure was designed with vaulted ceilings, following the line of the rafters. I wanted to avoid the need for visually prominent purlins supporting the rafters at mid-span. A few swift calculations confirmed that installing a steel ridge beam would remove the need for purlins. The rafters would need to be of 150mm-thick C24 timber spaced at 400mm centres. The adjoining rear roof over the back bedroom was a simpler proposition. Due to the roof's conventional A-shaped design, we wouldn't need purlins or any special ridge treatment thanks to the ceiling joists act which act as collars tying together the rafters on the opposing roof slopes.

Finally there was the question of the bifold doors to the flat-roofed single-storey kitchen extension. Should we run them the full width of the wall like a glass curtain, or frame them with a rendered surround? Full-width glazed doors would necessitate construction of an expensive hidden steel supporting framework. The simpler option would require a masonry corner return column either side, 650mm minimum in width to comply with Building Regs. But would this look right? Inevitably, in any project, a lot of design decisions involve weighing up aesthetics and the desired look against the practicalities and cost.

After mulling this over for some time, and soliciting comments from friends and family, the consensus was that a 'pure' full-width expanse of bifold glazing would clash with the traditional architecture elsewhere. My own feeling was that a white-rendered surround would suit the overall design better and would certainly be a lot lighter on the budget. I think it's fair to say that unless you happen to be blessed with innate streaks of architectural genius, there often remains a lingering trace of post-decision doubt; only when it's built and staring you in the face can you be certain that you made the right call.

Following our discussion, Anne set to work calculating the key components required for the Building Regs application. This meant the drawings could now be finalised and submitted with a summary of the main structural design points, with the detailed supporting documenta-



tion to follow shortly afterwards. With all the key parameters now clearly defined we would soon be able to send out specifications and drawings to invite firm quotes from building contractors.

Preparing for all Eventualities

Notwithstanding the engineer's reassurances, in my mind there remained a nagging worry about the pond being located not much more than 1m away from the foundation trench. Although the pond is shallow, the dark water can give a misleading impression. In the final analysis, regardless of the engineer's advice and what's on your drawings, the ultimate decision on foundation depths rests with the building control officer on the day of excavation.

To pre-empt this risk, I sought to extend the distance to the pond by infilling the overgrown stepped pond edges. This reclaimed stretch of land could then be buttressed with a series of cobblestone-filled gabion baskets, creating an appealing feature worthy of Alan Titchmarsh and Charlie Dimmock at the height of their *Ground Force* glory days. A few hours' hard graft with a concrete breaker made light work of demolishing redundant dwarf garden walls and the patio located in the area earmarked for development; the rubble was then recycled as hardcore to build up the pond edges.

The extra space we'd reclaimed between the pond and the extension front wall meant it would be wide enough to drive across en route to the newly gravelled parking area to the side.

With the pond preparations complete and structural calculations done, it was time to call in the builders. **H**

Reclaiming the Land

Ian dug a trial foundation trench that was in close proximity to the pond (ABOVE). Pre-empting the building control officer's misgivings about the distance, Ian reclaimed space back by infilling the overgrown pond edges.

Next Month...

Ian sets about finding the building contractors to get the job underway

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Diary of a Remodel



Designing in Efficiency

We follow HB&R Editorial Director Jason Orme as he embarks on the renovation and major remodel of his 1960s home – sharing his knowledge along the way

Having finally sorted out the design scheme, it is time to concentrate on one of the most important elements of this remodel – the way the house performs.

In the past, we had enjoyed a fair few years in our previous self-built home, where heating costs were low and jumpers not usually a requirement.

Having now spent three years in a cold, leaky, poorly insulated 1960s home, we vowed to improve things significantly. Our son was particularly affected: his dormer bedroom is currently located in a badly built timber structure, so apart from a few happy months in the shoulder seasons, he is either to be found of a morning freezing cold under any number of duvets, blankets and towels, or lolling around, red-cheeked and stripped on top of the sheets, window wide open and fan on but still slowly cooking. Character forming it may be, but it's hardly good for him.

Additionally, the rest of the house is of uninsulated cavity wall construction, supplemented by the added discomfort of leaky, misted double-glazed windows. What's more, an open fire in the front living room was too hopeless to use and was attracting arctic chills into the whole house.

It wasn't just our comfort that was at stake – our heating bills were shockingly hefty and at least in that first year, when oil was hitting £90/barrel, we really felt it. As a result, we vowed to tackle both the generation and consumption element.

Generation was relatively straightforward as a decision – helped significantly by the government's incentives for installing renewable heat. We ditched the oil tank and replaced it with a brilliant new wood pellet biomass boiler (from Windhager), which sits in our stable block. A heat main was dug under the drive and feeds a large cylinder in the utility. Two years on, it was one of the best decisions we made. The installation cost around £15,000 and we receive payments



of around £3,700 per year (paid quarterly). So it will pay for itself within five years. Running costs are good (although oil has cheapened considerably in the meantime) and we buy around five tonnes worth of wood pellet bags per year. In the winter we were hand-filling the hopper every three to four days; in the summer, typically once every three to four weeks.

Additionally, we opted to replace the open fire with a woodburning stove – as much to seal the flue up as the additional heat it would provide. We're just finishing our first winter with it and the heat it generated on cold evenings undoubtedly reduced our fuel bills and more importantly, provided plenty of cosy comfort – much needed in our house. The 5kW stove (from Aga) has used £120 worth of logs, and the overall fireplace rebuild, by a local chimney/fireplace specialist, using reclaimed bricks, adds a lot in terms of visual appeal.

Clearly, we need to use the remodel to get the heating consumption down, too. The original EPC shows an existing usage of 363kWh/m²/yr, which we are targeting by boosting insulation levels and new glazing. One of the great things about re-skinning existing homes is that it allows you to boost insulation levels externally – more of this in the months to come. **H**



Improving Performance

In order to improve the energy efficiency of his and wife Sarah's 1960s home, and reduce running costs in the process, Jason has installed a new wood pellet biomass boiler from Windhager as well as installing a new woodburning stove to replace the old open fire, and building a new brick surround in the process (ABOVE).

Next Month...
Work commences on site

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With spring well underway, so too is the opportunity to create your dream home. Materials such as Cedral fibre cement cladding from Marley Eternit can help create individual and stand-out exteriors that instantly add kerb appeal

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While allowing your personal style to shine through, Cedral's durability and low maintenance properties help you to combine style with strength by building a property that is designed to last. An alternative to traditional weatherboard cladding materials, Cedral Lap and Cedral Click are an attractive solution due to their resistance to rot and external elements including wind, rain, sea water and sunlight. Cedral's durability makes it a popular choice for both self-build and renovation projects, saving homeowners valuable time.

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Cedral Click is the UK's first and only flush fitting, fibre cement, tongue and groove cladding material, creating a contemporary flat finish to the exterior of a property and showcasing a modern, linear aesthetic. The planks can be installed in a range of formations, creating a visually exciting and sleek exterior.

Offering a more traditional appeal, Cedral Lap is installed in a clapboard effect with the fibre

cement planks overlapping, bringing to life a more classic exterior style.

In Practice

An example of how Cedral Click has simply and easily provided self-builders with the materials to create a unique and contemporary property is a recent self-build project in Newport-on-Tay.

Located on the picturesque banks of the River Tay, the bespoke home was the vision of a retired couple who wanted a beautiful yet modern family home for themselves and their family to enjoy for years to come. The homeowners required a low-maintenance property that was aesthetically striking against the scenic surroundings, while also meeting the strict requirements of local planners. One of the couple's main requirements for their new home was the use of materials that showcased their individual style while also being long lasting. Cedral Click was chosen as one of the leading exterior materials to meet all expectations from both a functional and aesthetic perspective, without compromising on the final design.

Cedral Click gave a lighter shade and another texture to the finish, complementing the overall design. The modern, flat appearance, with a small shadow gap from the tongue and groove profile, was also a notable factor when compared to the more traditional feather edge cladding profiles on the market. For more information on Cedral, visit cedralsidings.com. 



Scottish Self-build

The completed project is a dynamic new build – an aesthetically pleasing, low-maintenance home that can be enjoyed by the homeowners well into their retirement. Cedral Click was specified as one of the main exterior materials.

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12 DESIGN IDEAS FOR MASTER SUITES



JEREMY PHILLIPS

The bedroom is one of the most used spaces in the home – after all, it's where we spend (hopefully) eight hours a night sleeping. As such, considering the design of your master bedroom from an early stage is key to success, says Daisy Jeffery

1 Utilise the Roof Space

Converting the loft can open up the possibility of creating your dream master suite. Whether you're working on a traditional or contemporary project, dedicating an entire floor to a master suite, away from the hustle and bustle of family life, can be an excellent idea. In this conversion – where a 300-year-old barn has been transformed into a home – placing the master suite within the roof space has allowed for the room to benefit from lofty vaulted ceilings complete with beautiful exposed beams. An en suite positioned behind a dividing wall completes this luxurious master suite.

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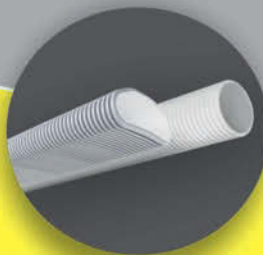
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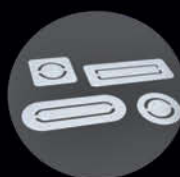
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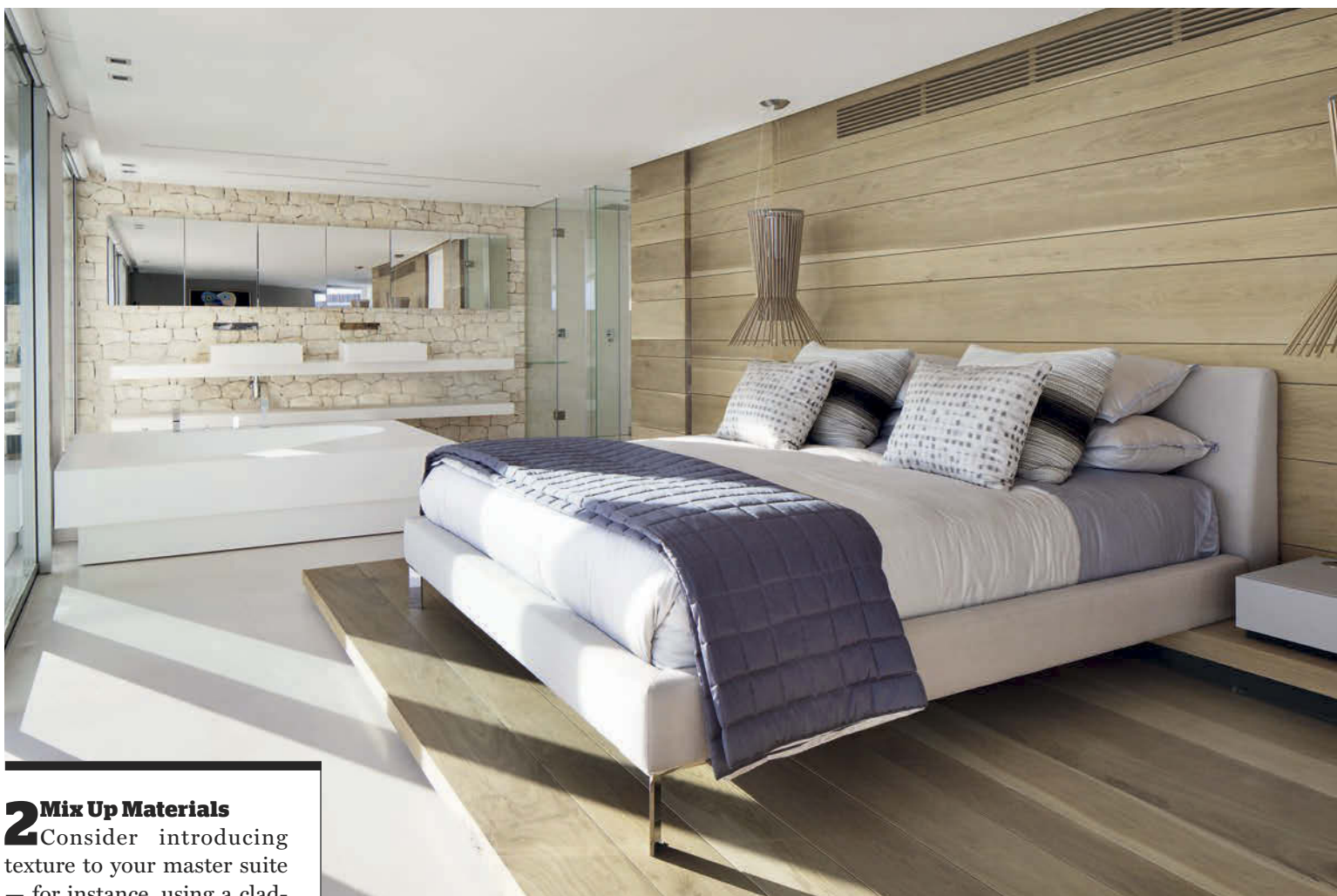
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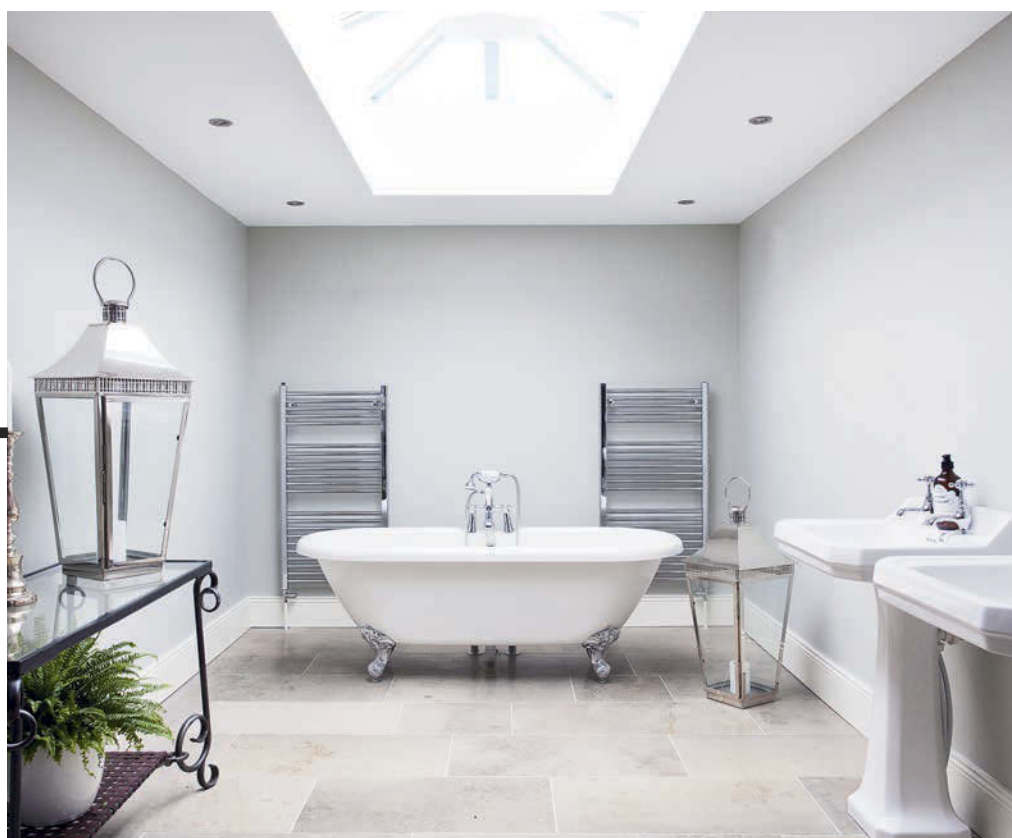


2 Mix Up Materials

Consider introducing texture to your master suite — for instance, using a cladding material to create a feature wall. In this project by SAOTA, timber cladding acts as an effective backdrop for the bed, with timber also used as a platform floor — zoning the sleeping space in the open plan bedroom. Whether you choose timber, stone, metal, brick or even shuttered concrete, you can achieve a unique master suite with wow factor.

3 Double Up

For grand schemes where space is in abundance, double up on luxury by specifying dual fittings in your master en suite. Here, double 'his and hers' basins mean you're not having to fight for the sink during the morning rush. Dual towel radiators, either side of the bath tub, bring additional symmetry to the scheme. ➤



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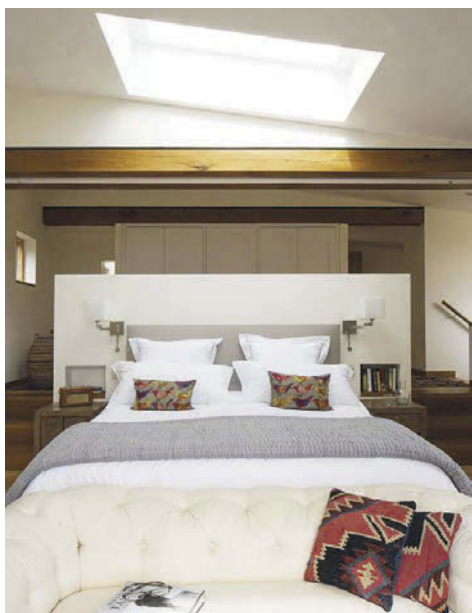
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4 Add Accent Lighting

Your bedroom should be a sanctuary to retreat to at the end of a long day, and to that end, should be as relaxing as possible. While adding tactile, soft textures will add comfort, introducing mood lighting can also make a real difference to the feel of the room. This scheme, designed by John Cullen Lighting, features layered lighting — uplights within the floor provide a subtle glow, while table lamps, well-placed downlights and LED reading lights installed within the headboard of the bed all add to the relaxed atmosphere. Rotary dimmers or a preset mood control is essential to achieving the right mood throughout the morning and evening hours.



6 Include a Juliet Balcony

Where you have the opportunity to include a larger expanse of glazing in the bedroom, including a Juliet balcony will allow you to opt for full-height glazed doors that will not only bring in plenty of natural light, but can be thrown open in the summer months for natural ventilation. They also create a great focal point for the external façade. This project in Wiltshire, complete with Juliet balcony, allows the homeowner to benefit from picturesque countryside views from the bed. ➤

5 Capture Views Beyond

Where standard windows can't be included, or if you simply fancy dropping additional light down into the centre of the room, adding a rooflight into your master suite can help naturally illuminate the space. In this project by Hudson Architects, a rooflight above the bed brings in plenty of natural light and offers a great way to stargaze at night (do remember to include an integral blind – preferably controlled by remote control – to ensure a good night's sleep).



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7 Think Carefully About Glazing

Whether you want to frame a certain vista, or you're after natural light while maintaining a degree of privacy, glazing needs careful planning. Linear picture windows can be a great idea — here, the master suite features internal picture windows either side of the bed that look down onto the double-height living space. Privacy is retained while the two windows borrow light from the spaces beyond.



8 Add Visual Interest

Master bedrooms need not be boring. Consider introducing architectural flair into your master suite — this cantilevered bed (designed by Juma Architects) is a fine example. Supported by steels set within the rear wall, the bed appears to float. Framed in timber, it also provides a contrast with the minimalist backdrop of the room.

9 Consider Built-in Storage

Bedrooms often serve as more than a space in which to sleep. They're typically multipurpose spaces, used for storage, dressing — and in some cases, they double as workspaces, too. Built-in storage can be an ideal means of making the most of every inch of space. In this room, built-in furniture (the Esker range from Kindred) enhances the architectural features of this Georgian townhouse by utilising the alcoves from floor to ceiling.



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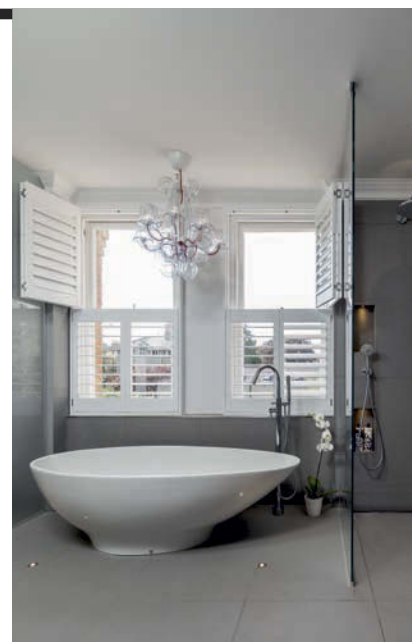
10 Go Open Plan Often commonplace in swanky hotel suites, the open plan en suite bedroom is making its way into our homes, as this project in Gloucestershire demonstrates. For those after a little privacy, position the toilet in its own room. A screen in front of the bath here also offers privacy as well as acting as a subtle room divide to zone the open plan space.



11 Walk Into Your Wardrobe High on the wishlist of many a self-builder and home improver, the walk-in wardrobe or dressing room is becoming a staple of the master suite. For those renovating and limited on available space, you could opt for built-in wardrobes or borrow space from an adjacent room. However, when building from scratch you have the opportunity to include a fully kitted out walk-in wardrobe/dressing room as part of your master suite. Think hanging rails for clothes, tiers of shoes, drawers, dressing table, tie hooks, a centre island for storage, and even a mirrored wall — the sky is the limit. This dressing room in a barn conversion in West Sussex is a prime example.

12 Give Thought to Window Dressings

Give consideration to the window dressings in your bedroom or en suite — not all rooms need to have curtains. Whether you go for expensive timbers or cheaper MDF alternatives, shutters can be an ideal solution for traditional and contemporary schemes alike. In this Oxfordshire home, shutters in the en suite allow the natural light in, while the adjustable slats offer privacy from the neighbouring properties.



A photograph of a modern brick house with a large glass extension and a wooden deck. The house features a dark grey tiled roof with several skylights. The glass extension has a series of vertical glass panels supported by wooden frames. A wooden deck with a table and chairs is in the foreground. The house is surrounded by greenery and a clear blue sky.

THE ART OF

DOWNSIZING

The secret to successfully trading in a large family home for a smaller alternative is clever design, says architectural designer Pete Tonks – who delivers big ideas for small homes



Designing a Home for Life

With a view to downsizing from her former family home, Sue Crowe opted for a timber frame self-build (LEFT), employing the services of Roderick James Architects and Carpenter Oak, which supplied the frame. The new home caters to Sue's lifestyle, with an open plan kitchen/garden room opening out to the garden. A master suite on the ground floor allows the home to be futureproofed, with two additional bedrooms on the first floor for visiting grandchildren.

Big Ideas for a Small Home

When designing the space within your new home, consider an open plan layout where you can enjoy all manner of tasks from cooking and dining to watching TV. An open plan layout also helps to make smaller homes seem more spacious (BELOW).



When it comes to downsizing a property, most people immediately picture an older couple 'rattling' around in their huge home with the offspring having flown the nest — they're left in a home which is no longer relevant to their daily needs. However, in reality, this is not always the case. Downsizing can be an option for almost anyone of any age to consider for a multitude of reasons.

Historically, people tended to downsize when they perceived their home had too many rooms — the theory has always been to 'trade down' to a smaller property with less rooms. But what if it is not just about size? I have designed for many clients looking to move to a smaller place and they have all been concerned about physical size of rooms when comparing their possible new environments with something they may have lived with for decades. It is only when I get into the design process fully with clients that I can begin to open up their minds beyond simplistic like for like comparisons on floorplans.

Regardless of space, a house design should be the result of a clear understanding of the users' requirements and desires, combined with the usual other controlling factors such as planning constraints, budget and build route. While society has always suggested bigger is better, I do not necessarily agree.

I feel we should consider changing the concept of downsizing and not look upon it as a compromise, but instead call it 'right-sizing', to create a home that suits you now and for your next chapters in life. I say right-sizing as I know from experience that you could have the largest of homes, but if it's poorly designed and not fit for purpose then it will fail to deliver. A well-considered design, which is 100% bespoke to you at every turn, can be successful at any size — the right size for you.

Think Open Plan

It is likely that the majority of properties sold to facilitate downsizing consist of large, room-based floorplans, compartmentalised in a formal arrangement with corridors, and as such tend to have negative 'flow'. When deciding to go smaller through downsizing, ➤



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I would suggest you scrap the corridors and get into the open plan way of thinking; be bold and open up large areas of the floorplan. You can then consider subdividing with screen walls, planters and furniture — not just knocking an archway through as one's parents would have done. This will create a living environment that has positive flow and will result in rooms being better connected throughout the building.

There is also strong documentary evidence to support the benefits of good natural light on our wellbeing as humans (see page 24 for more). This is often a failing of larger homes, as historically the floorplans would be of a formal, 'room-to-room' configuration with each room having a single window or double/triple aspect on the primary rooms. This results in a poor window to spatial volume ratio. The benefits that a smaller home can bring are fewer rooms in less overall space, so therefore a greater window to spatial volume can be achieved, thereby improving your connection to the outside. Opening up the layout can also help light to flood into other spaces.

Choose a Low-Maintenance Lifestyle

So what could the reasons be for wanting to or needing to downsize/right-size apart from the obvious one: equity release? You may have always wanted six bedrooms, six bathrooms, a games room, a sauna, a gym and a four-car garage, and there is nothing wrong with that. However, having gone on to realise such a wonderful ambition and enjoyed it for many years, there is often an element of having reached your goals through all of that hard work and general aspiration, and this may be followed by a natural yearning to ditch these material 'shackles' and get back to a simpler,

An Energy-Efficient Forever Home

Anne and Ron Skinner chose an L-shaped dormer bungalow design when building their retirement home. With a brief for a low-maintenance home, the property has been clad in self-coloured render with powder-coated black aluminium guttering and oak-effect PVCu window frames. Solar thermal panels, an air source heat pump, a mechanical ventilation heat recovery system and high levels of insulation ensure that the sealed building is extremely energy efficient, with low running costs.

low-maintenance existence. A smaller house on a smaller plot with less upkeep can often be a refreshing antidote to that almost constant maintenance and upkeep routine every single weekend.

Consider Running Costs

When you have the opportunity of building your own home, you are lucky enough to be able to get it running as efficiently as possible so as to minimise and in some cases, completely remove your running costs. Moving from a larger home to a smaller one will obviously result in less running costs anyway on a pro-rata basis. However, because you are building from new, you can amplify this whole aspect by incorporating the latest eco-tech such as high levels of insulation, airtight encapsulation panels, passive slabs, high-performance joinery, air source or ground source heat pumps, rainwater collection and recycling, solar photovoltaic (PV) panels, the list goes on. While some of this technology seems to cost a fair bit up front, don't forget a smaller house will require less kit and if you get it right, you can end up with zero-carbon performance. In effect, a 'nil-bill' house. ➤



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IDEAS & INSPIRATION



Designing a Home for Life

This new build sits within the garden of the homeowners' previous five-bed Victorian house – they were looking to downsize but wanted to stay in the area. The couple chose to section off part of their two-acre garden and build a new energy-efficient home into the sloping site – minimising running costs in their later years and creating an open plan home that perfectly suits their lifestyle.

Think About the Plot

Another reason you may have to consider a smaller design for your project is the plot you find. Rarely will a plot tick all the boxes you may have set yourself as part of the dream plot brief. Again, do not see this as a compromise. It is just part of the journey of building your own home.

The most successful projects are those that have a contextual relationship with the plot they are built on. All too often I have seen large houses crammed into plots, resulting in a development which could have been so much better if it had been scaled down to better suit its location. This may happen if a developer was building the project to sell and therefore the decision-making process throughout the build would have been dominated by squeezing every last possible square metre out of the build. This does not need to happen if you are self-building and more importantly, if you are working with an experienced architect or designer who understands how to 'play' with space.

The Golden Rules of Downsizing

When it comes to the actual design of your smaller home, there are a few golden rules to remember if you are going to maximise on available space:

- Set a detailed brief to include m²/ft² restrictions and make sure you stick to it.
- Make a list of the furniture you want to take with you from your current house and keep note of the dimensions to pass to your architect or designer so they can ensure everything can fit.
- Remember you are supposed to be downsizing and therefore de-cluttering, so be ruthless.
- Look to identify the best lines of sight through the building to the outdoor spaces and then plan your layout around these.
- Understand that just because you are planning on a smaller design, this does not mean everything reduces accordingly. Aspects of design such as stairwells, galleries, storage, and circulation space still need to be accommodated and function as they would in a larger dwelling. I have often had clients show me designs with smaller stairs on floorplans because they have 'run out of space', but of course all such elements need to be Building Regulation size, so just be aware of this at the early stages of the design process.
- Consider multi-functional zones in the home. For instance, your living room could equally be your home office as well, and your kitchen could easily be a dining room or family space if designed with this in mind from the outset. **H**

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Mark Brinkley

Mark Brinkley is the author of *Homebuilders' Bible* and an experienced builder; he's just started another self-build project.

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Immensely strong, versatile and sustainable – engineered timber products such as glulam and cross-laminated timber offer many advantages for the self-builder and renovator, says Mark Brinkley

Timber is one of our key structural building materials, but it has always been thought of as rather lightweight and insubstantial compared to steel or concrete. While timber might be fine for small, easy-to-build projects, building designers have tended to go elsewhere once the stakes are raised.

But a gradual development in timber technologies over the years has brought us to the point where architects and engineers are now reassessing the role of timber in new buildings. There is already a 10 storey, 33m-high residential block called The Cube in Shoreditch, London constructed using cross-laminated timber – something quite unthinkable just five years ago. And serious proposals are afoot to build wooden skyscrapers (or 'woodscrapers') in London and Sweden.

So what's it all about? And how could it shape your plans to build a house? What we now call timber engineering has had a lengthy gestation. The story begins with the development and adoption of plywood for internal use in Edwardian times. Improvements in the way we made glues in the 1930s made plywood waterproof, which meant it could then be used externally for walls and roofs. From these small improvements grew all manner of incremental changes: the development of structural insulated panels (SIPs) in the 1950s, then oriented strand board (OSB) and engineered floor joists, all based on clever ways of combining glues with timber. This led onto creating structural beams as strong as steel, which are known as glue-laminated beams or glulams.

All these developments started life as curios but have become increasingly important aspects of the way we build today, so much so that we now take most of them for granted.

The engineered floor joist is a good example. Developed in the US by Trus Joist Macmillan, these timber I-beams were originally marketed as Silent Floor. The manufacturers realised that they would have to sell them for rather more than regular timber joists and therefore offered them up as a solution to a very real problem, namely squeaky floors.

Squeaks were caused by the fact that timber in its natural state shrinks and moves as it dries out. As central heating became widely adopted in the 1950s and 1960s, the issue came to the fore as more and more homeowners found their floors developed squeaks and their upstairs shower trays sprang leaks. Engineered floor joists were a solution and housebuilders saw the sense in using them because they saved on costly callbacks. Timber I-beams have now become a successful product and most new homes incorporate them in one form or another. ➤



Structural Support

Glulam beams offer structural support and provide a striking feature both internally and externally in this self-build project (RIGHT), designed by Mole Architects.



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The number of options has also grown: metal web-joists, originally developed in Europe, are now just as common, fulfilling much the same function. Their open-web design makes it much easier to run pipes, cabling and ducting through the floor void during construction.

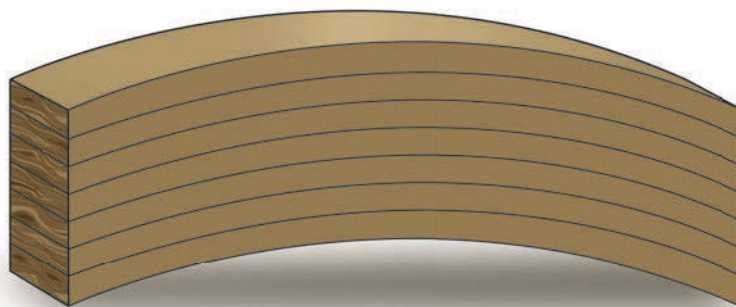
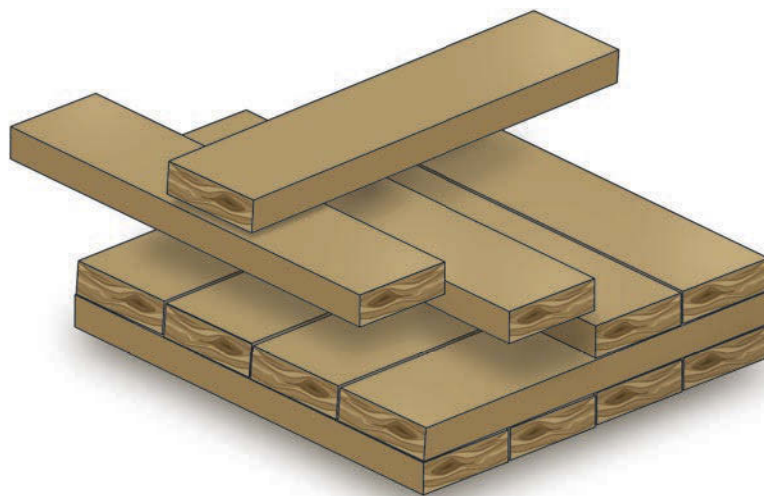
Cross-Laminated Timber

The current surge of interest in timber engineering, responsible for these tall wooden buildings, has been sparked by a relatively new development known as cross-laminated timber or CLT (or X-Lam). Timber engineers seem to be very good at producing new acronyms, if nothing else! Developed in Switzerland and Austria in the 1990s, CLT techniques enable us to build solid walls of softwood timber, by glueing small pieces of it together into one large panel. CLT is produced by placing these panels in layers stacked at right angles to one another and then glued together under high pressure to make immensely strong panels that can be used for walls and roofs. The panels can be up to 13.5m in length and are available in three, five, seven or nine layers, varying in thickness from 57mm to 300mm.

One of the innovations used in CLT manufacture is the use of non-toxic polyurethane adhesive (solvent- and formaldehyde-free) which helps boost the environmental credentials of CLT. Sustainable builders love the fact that a timber building is actually locking up CO₂ in its structure, rather than just reducing the amount burned by incorporating energy-efficiency measures.

Another benefit derives from the way the sections are made. Because the timber elements are laid across each other, the movement typically present in solid timber is reduced to insignificant levels. CLT sections can also bring the beauty of timber inside the home. Here is a walling material that is good to look at in its own right, and doesn't require a sheet of plasterboard to cover it up. KLH, one of the principal producers of CLT, now grades its output into three distinct visual categories: domestic visual quality, industrial visual quality and unseen, designed to be hidden behind wall finishes.

Obviously, the inclusion of CLT as an interior design element requires thought, because there will still be issues with running cables and pipes in front, but used carefully it can make a stunning feature.



In cost terms, CLT remains at the upper end of the structural element spectrum, especially as it normally requires added layers of insulation placed outside the wall or roof in order to obtain satisfactory U values. However, CLT is not quite like other wall materials because it can also act as a beam in its own right and can therefore be used over open spans without any further support. Consequently, there are several architectural practices that have worked with it and know best how to use its strength and elegance. Increasingly, we are seeing it used on self-builds and residential schemes, and it offers a unique approach to homebuilding. **H**

Timber Technologies

Small pieces of timber are glued together and stacked at right angles in one large panel to form cross-laminated timber or CLT (TOP); while glue-laminated beams or glulams (ABOVE) can be formed into bespoke curved shapes.

Contacts

ARCHITECTS WORKING WITH CLT

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John Pardey Architects: johnpardeyarchitects.com
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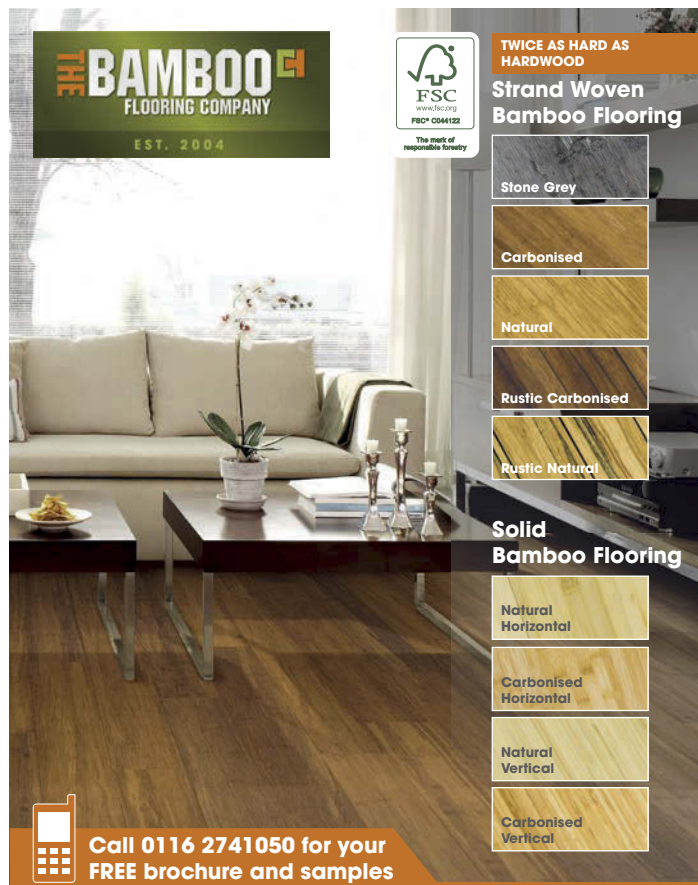
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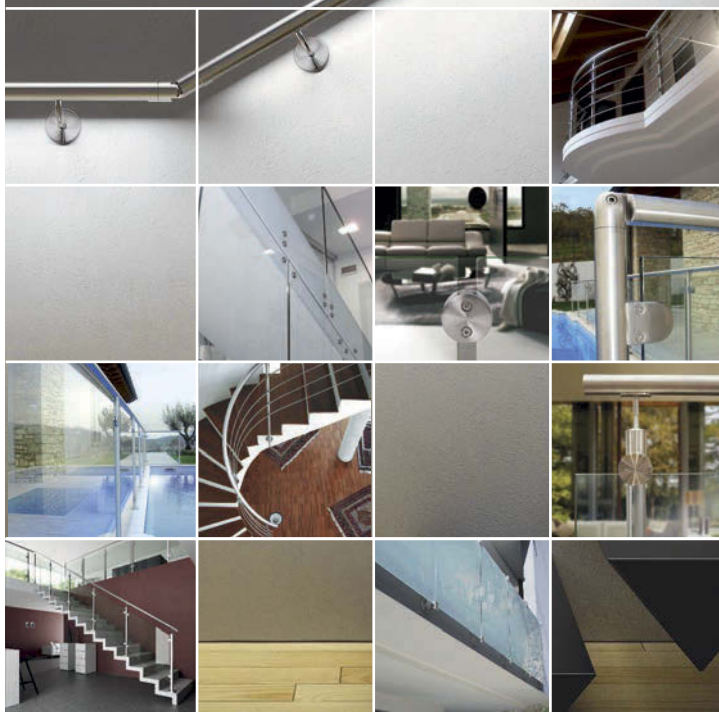
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10 THINGS YOU NEED TO KNOW ABOUT GROUND SOURCE HEAT PUMPS



Tim Pullen

Tim is an expert in sustainable building and energy efficiency.

He runs the green home consultancy Weather Works, advising clients on renewables and energy efficiency.

As the financial incentive for ground source heat pumps improves, Tim Pullen picks out 10 key things to consider before taking the plunge

This year the government raised the Renewable Heat Incentive (RHI) tariffs for both ground and air source heat pumps. (The RHI is the Government's initiative to encourage the adoption of heat-generating renewables, with homeowners receiving quarterly, tax-free payments for a period of seven years, designed to help recoup the cost of installation.)

On 1 April, air source heat pump and ground source heat pump tariffs were adjusted to 7.63p and 19.64p/kWh respectively – from 7.51p and 19.33p/kWh – keeping these heating sources firmly on the planning agenda for self-builders and renovators. And as thermal efficiency in new build housing improves, so too does the argument for installing heat pumps. Heat pumps may seem complex, and for some they appear to be a step into the unknown, but a few simple ideas will help clear up the situation.

1

How to measure a pump's efficiency

A pump's efficiency used to be noted by the Coefficient of Performance (COP), which was a fairly meaningless snapshot of how a heat pump performed under a given set of circumstances. This has since changed to the Seasonal Performance Factor (SPF) which indicates performance over a whole heating season, but still within set parameters. (The Ofgem database uses a Seasonal COP or SCOP, but the calculation is the same.)

An SPF of 4.0 indicates that the heat pump will produce 4kW of heat for each 1kW of electricity it uses. The RHI pays only for the renewable element, not the electricity it consumes.

The calculation is $1-1/\text{SPF}$ (for example, $1-1/4=0.75$). A house with a heat load of 20,000kWh will be paid the RHI tariff of 19.64p/kWh at the rate of $20,000 \times 0.75 \times 19.64 = £2,946$ per year, for seven years. ➤

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Installation

Slinky pipes are one of the most common array types; every 1m of slinky trench contains 5m of pipe, which reduces trenching costs and makes the most of the available energy in every metre of ground. The heat pump being installed here is by Cornwall-based manufacturer Kensa Heat Pumps (kensaheatpumps.com).

2

It's not new technology

It's worth remembering that everyone who owns a fridge or freezer owns a heat pump. And the first heat pump used to heat a building in the UK was installed in the Royal Festival Hall in 1952. The idea that it is new and unproven technology does not bear scrutiny. The basic components of heat pumps are all pretty much the same — it is the peripheral control systems that differ and become the 'quality' issues.

3 Establish the running cost

A house with a heat load of 20,000kWh will need to buy 5,000kWh of electricity to run the heat pump (assuming a SCOP of 4.0). At a tariff comparison rate (TCR), which includes VAT and standing charges, of 17p/kWh, that will cost £850. The current average price of mains gas is about 5.4p/kWh (including VAT), so heating the same house on gas will cost £1,080. The heat pump saves just £230 per year — but don't forget the RHI payment.

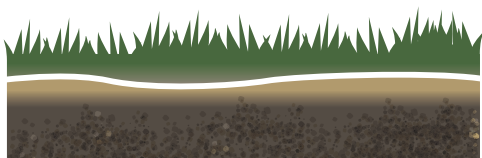
4 Consider an inverter heat pump

These pumps, which are also called modulating heat pumps, vary the speed at which the compressor operates to vary the heat output. A house with a heat load of 20,000kWh would have a peak load of 14kW, so we need a 14kW heat pump. That peak heat load is calculated to deal with an outside air temperature of (usually) -2°C. Obviously, it is not always -2°C outside so we do not always need 14kW. An inverter heat pump varies the heat output to suit prevailing conditions, saving electricity and improving efficiency.

5 KNOW YOUR GROUND

Heat pumps used to be called (and still are, in some cases) geothermal energy, though this is a misnomer. A ground array (either installed horizontally or vertically via boreholes) collects heat that is introduced to the ground by the sun. It is therefore finite and quantifiable. The amount of heat available to be collected will vary with the type of soil — for example, clay holds more heat than sand.

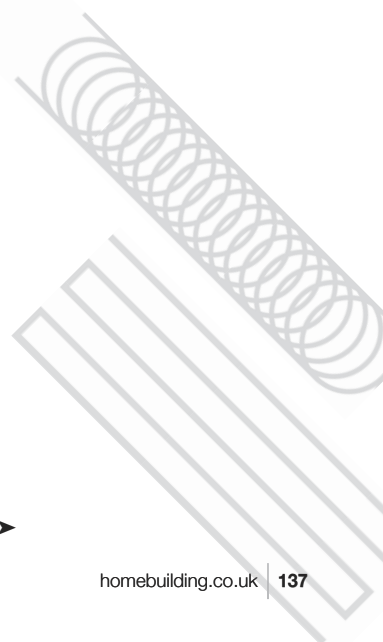
A good installer will check the ground conditions before sizing and pricing the installation. People who do not check may not be considered a 'good' installer.



6 STRAIGHT OR SLINKY?

There are two kinds of horizontal ground array: straight and slinky pipes. People who like straight pipes don't tend to like slinkies, and vice versa. The reality is that both work as well as each other and whatever your chosen supplier is happiest with will be fine.

The key is ensuring there is enough ground to allow pipes to be properly spaced. The calculation for clay soil is 50m²/kW output, so a 14kW heat pump needs 700m² of unshaded land. Bear in mind that the array needs to be kept at least 5m from any boundary, and that straight pipes need to be 3m apart and slinkies 5m. Cost will vary with the size of the array, but for a typical domestic property it will be around £3,000-£5,000. ➤





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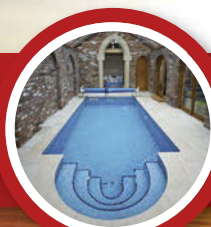


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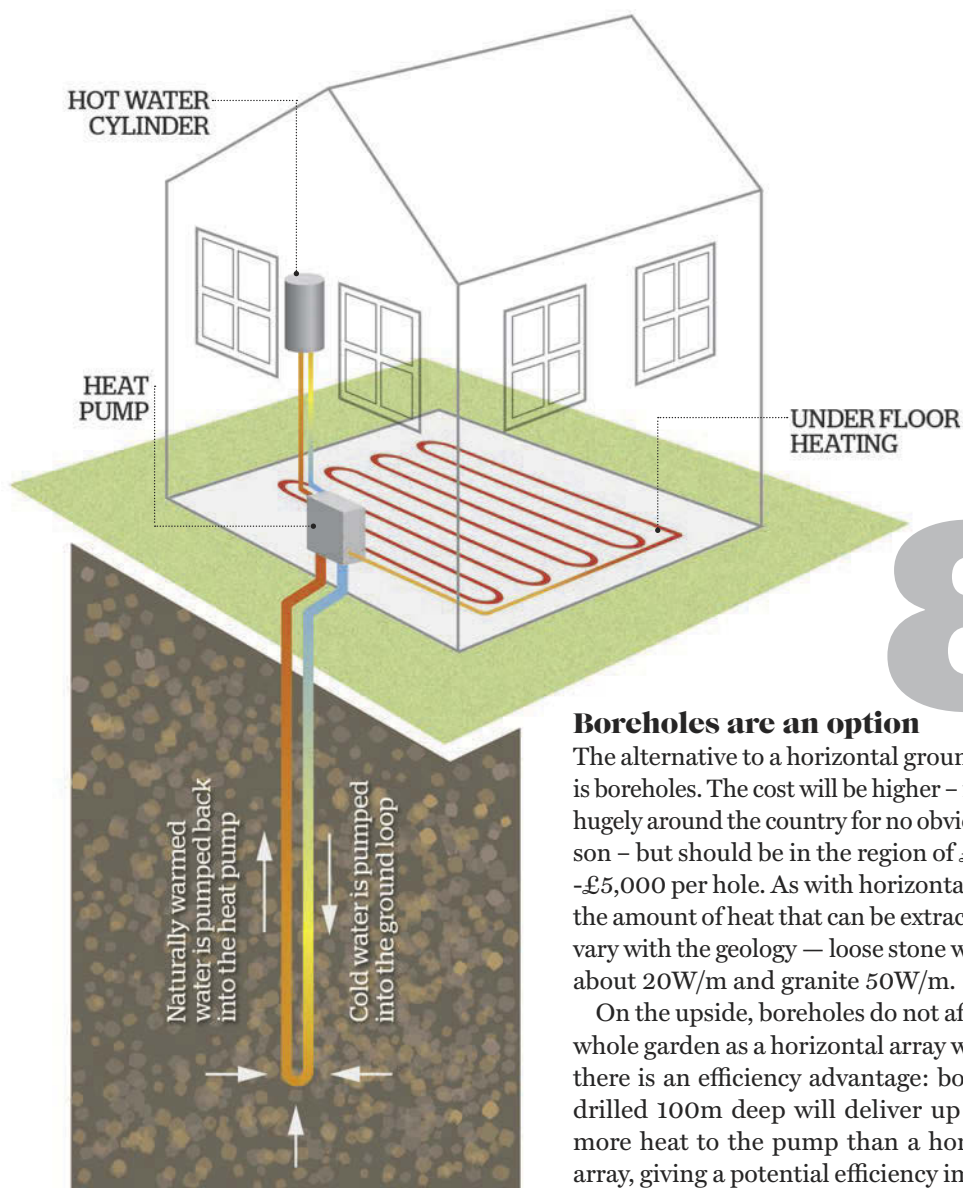


7 It works well with underfloor heating

Let's say the headline SCOP for a typical GSHP might be 4.6, and that will indicate performance when the heat pump is delivering water at 35°C — ideal for underfloor heating. If the flow temperature rises above 35°C (for domestic hot water or radiators, perhaps) the SCOP will fall. With a flow temperature of 55°C, the SCOP drops to 3.5. To keep the heat pump efficient, keep the flow temperature down.

9 They have a long useful life

A heat pump needs the same number and type of back-up systems as a gas or oil boiler, usually an immersion heater. Because a heat pump does not suffer from the corrosive effect of burning gas or oil their efficiency does not drop off, and they will have a useful life of 20-25 years compared to 10-12 years for gas or oil boilers.



8

Boreholes are an option

The alternative to a horizontal ground array is boreholes. The cost will be higher — it varies hugely around the country for no obvious reason — but should be in the region of £3,000-£5,000 per hole. As with horizontal arrays the amount of heat that can be extracted will vary with the geology — loose stone will have about 20W/m and granite 50W/m.

On the upside, boreholes do not affect the whole garden as a horizontal array will, and there is an efficiency advantage: boreholes drilled 100m deep will deliver up to 5°C more heat to the pump than a horizontal array, giving a potential efficiency improvement of 20%.

CONCLUSION

Heat pumps are not a new technology, but the problem is that we don't really know how to buy them or get them installed. Admittedly, the same can be said of a gas boiler; we don't really understand them either, but the difference is that we trust the plumber to install the right boiler in the right way. The plumber's usual answer is to over-specify and install a boiler that is too big to ensure it's big enough. However, we really don't want to do that with a heat pump as they are more expensive and, perhaps counter-intuitively, one that is too big will be less efficient.

The key is to find a trustworthy installer. There are indicators — someone who checks the soil conditions and offers quality equipment, for instance — but it usually comes down to due diligence: checking the installer's history and the references they supply. **H**

10 INSULATION MATTERS

Heat pumps are all about efficiency — efficient use of energy and operating an efficient heating system. Heat pumps run on electricity and that will always be an expensive form of energy. System efficiency therefore starts with minimising the amount of heat required and the amount of electricity needed. A well-insulated house will need a smaller heat pump, a smaller ground array (or fewer boreholes) and less electricity, reducing capital and running costs.



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The plot is off the mains gas grid and has an old oil-fired boiler

The existing construction is cavity block walls with a render finish

An overgrown area to the side of the house will be grubbed out and a ground array for a heat pump installed

The bungalow is in fair condition, and sits on a 1.5-acre plot

The existing concrete floor is to be retained with underfloor heating installed



Tim Pullen

Tim is an expert in sustainable building and energy efficiency.

He runs the green home consultancy Weather Works, advising clients on renewables and energy efficiency.

How to Heat a 1960s Bungalow

Tim Pullen investigates how to improve energy efficiency and reduce the running costs of your home. Here, he reveals how to heat a remodelled 1960s bungalow

The clients have purchased a 1960s bungalow in fair condition, with a 1.5-acre plot and stunning views of the Brecon Beacons National Park. The location means that the footprint cannot be increased, so the plan is to add a second storey and increase the accommodation to provide a four bedroom, three bathroom home.

The existing construction is cavity blockwork walls with a render finish. The only insulation is 100mm mineral wool in the loft.

The plan was to fill the existing cavity with loose insulation and to use the same construction system for the new work, at Building Regulations standard. This would produce the U values shown on page 142 — a peak space heating load of 13.09kW and annual space heating consumption of 13,166kWh per year.

Projected Running Costs

The plot is off the mains gas grid and has an old oil-fired boiler, with mains electricity. There would be three people living in the house with a typical work/school occupation pattern. Assuming a new oil-fired boiler is installed, running costs are likely to be a total of £1,557 a year, comprising:

- £673 (at 90% efficiency) for space heating (13,166kWh@4.6p/kWh)
- £184 for hot water (4,000kWh@4.6p/kWh)
- £700 for electricity (5,000kWh@14p/kWh).

This is a long-term home, but perhaps not the clients' forever home. The clients recognise that the construction system being offered is not thermally efficient and they would like to do better, in that respect, than Building Regulations demand. The objective is a warm comfortable house with long-term low running costs. ➤

Problem Areas and Budget

In terms of the construction, the only problems were insulation to the existing ground floor walls and to the floor slab. The major problem for the project as a whole was convincing the builder that a construction system other than block cavity might have merit. The clients were able to allocate £12,000 for 'extra' works that provided a clear guide on what could be achieved.

Suggested Energy Strategy

To achieve what the clients wanted, the obvious first step was to address airtightness. Switching the construction system from cavity block to SIPs (structural insulated panels) was acceptable to the architect and clients and, eventually, the builder was persuaded that this option could be made to work.

Walls Installing SIPs to the first floor meant that a concrete ring beam needed to be cast on top of the existing blockwork walls. This in turn allowed foam injected cavity insulation rather than loose fill to be used. The SIPs gave a U value of 0.19W/m²K, but even with injected foam the ground floor walls still only reached 0.33W/m²K. (The clients allowed an estimated £3,000 to change to SIPs construction.)

The existing external render had to be removed in any case, so installing an external insulation system was relatively easy and got the U value down to 0.2W/m²K.

Roof The initial plan was to install a 142mm SIPs roof, with a further 30mm internal insulation to bring the U value to 0.14W/m²K, but this was a step too far for the builder. A truss roof was installed instead, with two layers of rigid foam insulation, 75mm between rafters and 75mm under the rafters. This gave a U value of 0.15W/m²K and as the insulation layers were laid across each other, with the joints taped, it also gave a good level of airtightness. £700 was allowed for the extra roof insulation.

Ground Floor The existing concrete floor was to be retained and the clients wanted to install underfloor heating over it. Even though the roof was being removed, the potential to increase the ceiling height was still very limited (due to a roof ridge height restriction on the planning consent). The trade off was to install low-profile underfloor heating with a further 10mm, foil-backed insulation below it. This raised the floor level by 25mm and left a reasonable ceiling height, and U value.

Windows and Doors Double-glazed windows in PVCu frames were installed throughout, with a U value of 1.4W/m²K. There will be one set of bifold doors installed to the rear, south-facing elevation, but not so large that they would cause an overheating problem. The doors will achieve the same U value as the windows.

Airtightness and Ventilation Achieving high levels of airtightness in this property was necessary to meet the remit. A permeability of <5m³/hr was achieved with the SIPs installed to the first floor, wet plaster (rather than plasterboard) to the ground floor, plus some attention to installing windows and doors and to pipes and cables. At that level heat recovery ventilation was not needed, but whole house ventilation was installed instead. Much of the airtightness work is focused on attention to detail rather than direct cost; £1,000 was allowed for direct works and £2,500 for ventilation.

Heating System Implementing the suggested insulation and airtightness regime reduces the peak heat load from 13kW to 7.6kW, with energy demand of 7,800kWh for space heating and 4,000kWh for domestic hot water.

A new oil-fired boiler will cost around £2,000-£3,000 installed, as the existing oil storage tank, delivery pipes and so on were all in good order. Although this is a relatively low capital cost, the clients were clear that oil was 'last-century technology' and they wanted to get off it.

The property had a small garden to the front and rear but over an acre to the side had become completely overgrown with bramble and scrub. This was all to be grubbed out, giving an excellent opportunity to install a ground array for a heat pump. Under these circumstances the installed cost of an 8kW heat pump was just over £7,000, with running costs of around £400 per year. Ground source heat pumps qualify for the highest rates of the Renewable Heat Incentive and will produce an income of around £1,755 per year for seven years. Allow an extra £5,000 for the ground source heat pump over the cost over an oil-fired boiler.

The thermal efficiency strategy reduced the peak heat load to 7.6kW. This is a good improvement that more than met the remit. The clients considered that this was the right long-term solution and represented good value for money.

Electricity The plan is to install 100% LED lighting; no other change is needed. 

Conclusion

The biggest issue was getting the builder on side. He was extremely competent but could see no point in mixing construction systems. He predicted all sorts of problems with marrying the SIPs to the blockwork, none of which occurred. When the potential benefits were fully explored with him, he got right behind the project. At the conclusion of the build, everyone agreed that it was a better house than would otherwise have been constructed. It was warm, comfortable and 'airy' with projected running costs down from £1,557 per year to £584, for a total extra budget of £12,200.

Element	Existing U values	Final U values*
Walls	0.43 and 0.3W/m ² K	0.19W/m ² K
Floor	0.5W/m ² K	0.45W/m ² K
Roof	0.16W/m ² K	0.14W/m ² K
Windows	1.8W/m ² K	1.40W/m ² K
Doors	1.8W/m ² K	1.40W/m ² K
Airtightness	<10m ³ /hr	<5m ³ /hr

* THE LOWER U VALUES RELATE TO BETTER THERMAL PERFORMANCE



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THE ULTIMATE RENOVATION CHECKLIST

Ian Rock pulls together the ultimate guide to scouting out a potential renovation property, picking out what to avoid and which jobs shouldn't scare you off



Ian Rock

Chartered surveyor Ian Rock MRICS is the author of eight popular Haynes House Manuals, and is a director of Rightsurvey.co.uk.

As discussed in last month's article, acquiring the right property is the cardinal rule when looking to start a renovation project. You can improve your knowledge through a residential property survey, but there is plenty of value in walking through the property yourself and spotting potential hazards. Some of these should be strong signs to steer clear, but many may put off other buyers or drive down the price while being relatively cheap and easy to fix. Here's a checklist of common things to keep an eye out for when assessing whether the property is the ideal canvas for your next project.

If you missed last month's guide to assessing a renovation project, visit: homebuilding.co.uk/renovation-assessing-the-potential



CHIMNEY STACKS

As with roofs, the need for scaffolding can make even minor chimney defects to chimney stacks expensive to repair.

☐ **Leaks**
The main thing to check is leaks at flashings causing internal damp patches in lofts, walls, ceilings and chimney breasts, usually evident in the form of brown staining.

☐ **Surface damage**
Render is especially prone to cracking and coming loose. Mortar joints to brickwork commonly suffer from erosion and, in more severe cases, will need repointing.

☐ **Leaning**
A small degree of lean is quite common in old stacks, but in most cases this tends to be within acceptable tolerances. Where more severe leaning is evident, a structural engineer will need to advise on stability and any remedial work, such as taking it down or partial rebuilding (which is likely to be expensive).

☐ **Damaged pots and flaunching**
Look for any broken, missing or crooked pots, as well as for loose mortar flaunching at the base of the pots. All such defects will need to be urgently remedied due to the risk of injury from flying debris, as well as damp ingress.

ROOFS AND LOFTS

It's rare to encounter properties in need of complete re-roofing (except flat roofs – see overleaf). However, some relatively straightforward repairs that involve working at height can still be costly to fix if scaffolding is needed. On the other hand, smaller jobs may be accessible with scaffold towers, which are comparatively cheap to hire at around £100 for a week. Probably the simplest check involves nothing more than looking at the other roofs in the street to see if any have been reclad. This can provide a useful indicator as to whether the original tiles are nearing the end of their useful life. The need for recladding would not normally be expected on most houses built in the last 70 years or so.

Phase two of your roof inspection needs to be done from up in the loft. Most roofs built up to the 1940s didn't originally have underlay beneath the tiles, although some better quality roofs are clad with boarding known as 'sarking timbers'.

☐ **Defective flashings and valleys**
The most common defects are found at junctions with stacks, parapet walls and dormer windows. Look for any gaps or cracks to flashings. Valleys where roof slopes meet are another vulnerable area, with a tendency to become blocked with moss and debris. Any resulting leaks and damp patches can often be seen in lofts, and in the rooms below on ceilings, walls and chimney breasts. Lead flashings are durable but sometimes come loose and need refixing. Watch out for cheap mortar fillets too, which are prone to cracking, or botched repairs with short-life DIY tapes.

☐ **Slipped or missing tiles**
The odd slipped tile isn't usually a problem, but where you can see larger numbers of missing or damaged tiles (typically about eight or more per slope) the roof is likely to be nearing the end of its life and will need stripping and re-covering. The most common cause of slates slipping is rusted fixing nails. The standard method for securing loose slate is with small metal clips called 'tingles'. Avoid properties where there are more than about four or five clips evident per roof slope, as the problem is likely to be more widespread.

☐ **Sagging roof slopes**
Slight settlement in roofs is not usually a problem. A certain amount of 'dipping' is fairly common, particularly where the rafters have settled next to end gables or party walls. More serious sagging may be due to original lightweight Victorian slate roofs having been reclad with heavier modern concrete tiles without first strengthening the roof timbers. It may also be due to 'roof spread' where rafters have pushed the wall outwards and sunk in the middle. In severe cases remedial structural work may be needed (which

will require Building Regulations consent) and a structural engineer should be consulted.

☐ **Deleterious roof coverings**
Asbestos-based roof tiles or artificial slates are uncommon. The former typically take the form of large, dark pink tiles laid in a diamond pattern, notably on some inter-war bungalows. Artificial slates were used during the 1970s and 1980s for new roofs as well as for recladding. The cost of removal can be significant, so such properties are best avoided. Any roof clad externally in cheap shed roofing felt or painted over with thick sealant should be avoided.

☐ **Leaks**
Check for signs of water penetration and damp patches, especially at junctions between roof slopes and where roofs meet walls and chimneys. Switch off the light in the loft to see any gaps around the perimeter (thin slivers of light between some tiles are usually fine as they provide ventilation). Don't worry if some of the underfelt is drooping or torn, as it's not usually significant.

☐ **General dampness**
If the loft smells damp but there's no sign of leakage, it may be the result of condensation. This can normally be resolved by improving ventilation and upgrading loft insulation to 300mm thickness. Sloping ceilings at roof edges can be drylined with insulated plasterboard fixed over vapour barrier sheeting.

☐ **Missing firebreak walls**
Missing firebreak walls between neighbouring lofts (between terrace or semi-detached homes) can allow fire to rapidly pass from one property to another, as well as robbing the roof slopes of support and posing a security risk. Mortgage lenders often won't approve a loan until a new firebreak wall has been constructed.

☐ **Structural defects and alterations**
Check for any botched alterations such as half-baked DIY 'loft conversions' and ill-advised cutting out of supporting struts, collars or hangers. Check also for the removal of chimney breasts in bedrooms below completed without the provision of proper support to the remaining masonry in the loft. If Building Regs consent hasn't been obtained get a structural engineer to specify any necessary remedial works. Where the undersides of roof slopes have been spray-foamed internally, do check that it isn't concealing a failing roof. ➤



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FLAT ROOFS

Most flat roofs are covered with cheap roofing felt, which has a short lifespan of around 10-15 years, so there's a good chance it'll need replacing. Artificial rubber (EPDM) is a better alternative. To comply with Building Regs when re-covering flat roofs, you need to insulate them to current standards.

☐ Defective coverings

Look for puddles forming on the surface; in dry weather these can appear as dark, silt encrusted patches. Any plant growth and debris also suggest that re-covering is overdue.

☐ Leaks

An otherwise sound roof can suffer from leaks at junctions. Check for cracks and gaps at the upstands around the edges, or old botched repairs with paint or tape. Other weak points include rooflights or projecting pipes. As with main roofs, damp can also be due to condensation (often attracting black mould on the ceilings below). These problems can normally be resolved by fitting new flashings to prevent leaks and lining ceilings with insulated plasterboard over a plastic sheet vapour barrier.

RAINWATER GOODS

The blame for many so-called 'rising damp' problems can be laid at the door of dodgy gutters and downpipes. Fortunately, most repairs can be undertaken without the need for scaffolding, instead using hired scaffold towers and safe access ladders, and are relatively inexpensive to put right.

☐ Leaking or damaged gutters

Check for wet, stained external walls with puddles to the ground below, blown internal plasterwork and damp smells. Often all that's required to remedy the problem is clearing accumulated undergrowth from gutters and then allowing the walls sufficient time to dry out. Leaks at gutter joints are common and can often be repaired by fitting new joints or providing better support with additional brackets. Rectifying poor gutter alignment and overflowing may also require additional support with new brackets.



☐ Leaking or damaged downpipes

Check for signs of damp and mould on walls and to the ground directly below. Blocked downpipes or hoppers can be cleared, and any that are split or cracked can be replaced. Damp problems at ground level can also develop where downpipes discharge onto the ground next to the house or where gulleys have become blocked.

CEILINGS, INTERNAL WALLS AND FIREPLACES

☐ It's rare to find significant problems with ceilings, and most issues are cosmetic. Unsightly **Artex** can be skim plastered over or steamed and scraped off (wear a mask as some types contain asbestos fibres). Alternatively, old ceilings can simply be plasterboarded over and either taped and jointed or skimmed prior to decoration.

☐ Older **lath and plaster** can usually be retained but may need localised repair if it has been damaged by leaks or vibration; in many instances, any loose areas can normally be patched or re-secured.

☐ Ceilings clad with **asbestos cement sheeting** are extremely rare but are occasionally encountered in inter-war houses. These are best avoided, as the cost of removal can be prohibitive.

☐ The main problems with **internal walls** tend to arise when load-bearing walls have been 'knocked through'. Similarly, unless a Building Regulations completion certificate has been obtained for **chimney breast removals**, there's no proof that the masonry above has been properly supported. Avoid, or get a structural engineer to check.



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Damp

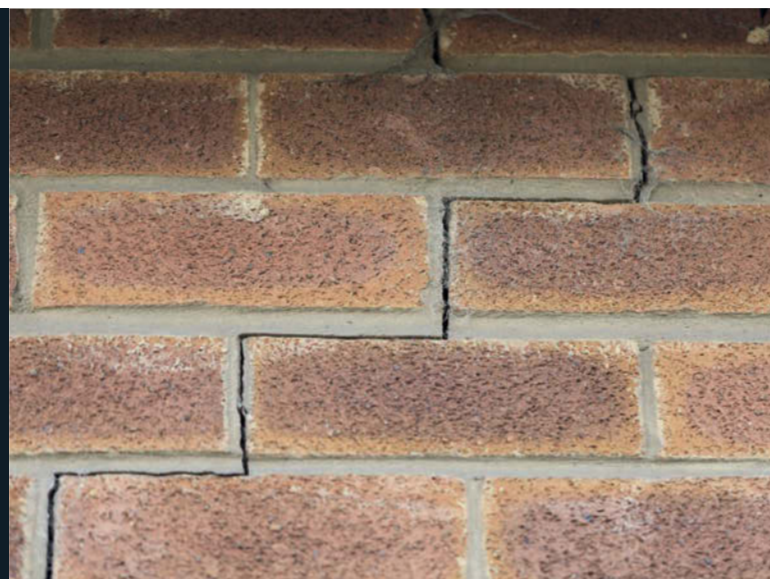
In older properties with solid ground floors the odd discreet spot of damp isn't necessarily an issue. The main worry is where there's a danger of it causing rot to adjacent timbers, particularly floor structures. In most cases the solution comes down to implementing a proper maintenance programme to deal with common causes of dampness, such as high ground levels, leaking gutters and downpipes, eroded window sills, cracks around door and window frames and climbing shrubs harbouring moisture.

☐ **To deter damp from penetrating**, any badly eroded mortar joints should be raked out and repointed (using lime mortar rather than cement for older solid wall houses). Note, however, that this is normally a localised issue and you rarely need to repoint a whole wall.

☐ **Damp caused by condensation** should be dealt with by fitting extractor fans in bathrooms and kitchens to expel humid air. Fit trickle vents to windows to improve ventilation and improve insulation to the walls and other cold surfaces where possible.

☐ **Minor erosion to old brick or stonework** is common and needn't be a concern where it only affects a few localised areas. But in cases where erosion has become excessive, the damaged masonry will need to be repaired or replaced.

☐ **Render** generally requires more maintenance than brick or stone because it tends to develop hairline cracks that allow the ingress of moisture. These can be prone to freezing, which loosens the face of the render. Blown areas sound hollow when tapped. Eventually chunks of render can fall off, leaving exposed patches of wall. However, in most cases this looks a lot worse than it really is, with only localised repairs required.



Structural movement

Anything that hints at structural problems will naturally cause buyers to worry, but most cracking isn't serious. To get to the root of the problem there are two important questions: 'What's the cause?' and 'Is it still moving?'. One obvious clue to recent cracking is that it's clean inside, unlike older cracks that will have accumulated dust and dirt. Assessing the true cause of movement can be complex, but there are key clues that surveyors look out for.

☐ **'Thermal movement'** is caused by materials expanding and contracting. It is sometimes found in long stretches of walls built without expansion joints, but more commonly at interfaces between different materials, such as where old solid brick walls are joined to new blockwork or studwork walls. Lightweight thermal blocks in newly plastered inner leaf wall construction are notoriously prone to 'shrinkage cracking' as room temperatures cause them to dry out.

☐ **Cavity wall tie failure** is sometimes found in early to mid-20th century houses. It appears as distinct parallel lines of regularly spaced horizontal cracking developing along mortar joints that corresponds to the position of the rusting ties.

☐ **Old houses** have often settled over many years until they achieve a stable position. The consequent distortion tends to look a lot worse than it is. Another common type of movement in outer leaf cavity wall brickwork is stepped cracking above window and door openings (as pictured above). This is usually linked to poor quality replacement window works and may require the insertion of new remedial lintels.

☐ **'Differential movement'** is commonly found where new extensions with deeper foundations are added to buildings with shallow footings. In many cases fitting an expansion joint may be all that's required to accommodate future seasonal movement. ➤





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WINDOWS, DOORS AND JOINERY

Defects in these parts of the property are usually fairly obvious.

☐ **Misted up double-glazed sealed units** are a common problem. It's now often possible to replace just the defective sealed units without sacrificing the frames. Houses with first-generation replacement double-glazed windows will need them replaced.

☐ In **period properties** (1930s and older) it's normally advisable to retain and overhaul the original windows and doors where they still exist, and it's also cheaper than replacement. Fitting inner secondary glazing in combination with the original windows can provide an excellent solution both for thermal and sound insulation.

☐ In more **modern properties** the timber tends to be of poorer quality than that used in the inter-war and Victorian/Edwardian periods, so timber windows will often need replacing. The cost of installing new windows and doors throughout is obviously going to be substantial so, as with any big expense, this would need to be reflected in the purchase price to make refurbishment viable.

☐ **External joinery** normally refers to timber or PVCu eaves and bargeboards, and in some houses decorative half-timbering or cladding. It's essential for 'kerb appeal' that these look neat and they are likely to need sprucing up.



FLOORS

☐ **Rotten or infested timbers**
Traditional suspended timber ground floors of the type found in most Victorian houses are potentially vulnerable to rot where exposed to damp in adjoining walls. Tell-tale signs to look for are springy, soft boards near the main walls, blocked air bricks in the lower walls and high ground levels. Evidence of localised woodworm (wood-boring beetle) is common in older houses but in most cases it's not active and may have already been treated, so ask to see any timber treatment guarantees. One clue to active infestation is fine sawdust ('frass') around the affected wood.

☐ **Weak floors**
Modern chipboard is easily damaged and prone to creaking, so it's common for the odd panel to need replacing. More serious weakening is sometimes caused by butchered cutting of joists to accommodate pipe runs (notches should be no deeper than 1/8 depth cut from the top of joists). In most timber floors, a small amount of spring is to be expected but where it's excessive, for example where nearby furniture vibrates as you walk

past, it may indicate that the joists are undersized or were not braced. Such floors can be strengthened with additional bracing or noggins, or additional support provided.

☐ **Sloping floors**
In older buildings it's not uncommon for floors to slope in tune with old settlement in supporting walls, and this is not usually a concern where the movement ceased long ago. Corresponding gaps to skirting boards are often concealed with strips of timber beading.

☐ **Solid floors**
A certain amount of unevenness is not unusual in older solid floors. If it's not excessive, the simplest solution is to lay a levelling screed over the existing surface. The main cause of more pronounced sinking is poor compaction of the original hardcore prior to it being covered in concrete. Although rare, mid-20th century houses sometimes suffer sulphate attack where a chemical reaction due to materials used in their construction can cause floors to expand and hump upwards. This can require specialist remedial works pumping in pressurised grout, which isn't cheap. ➤

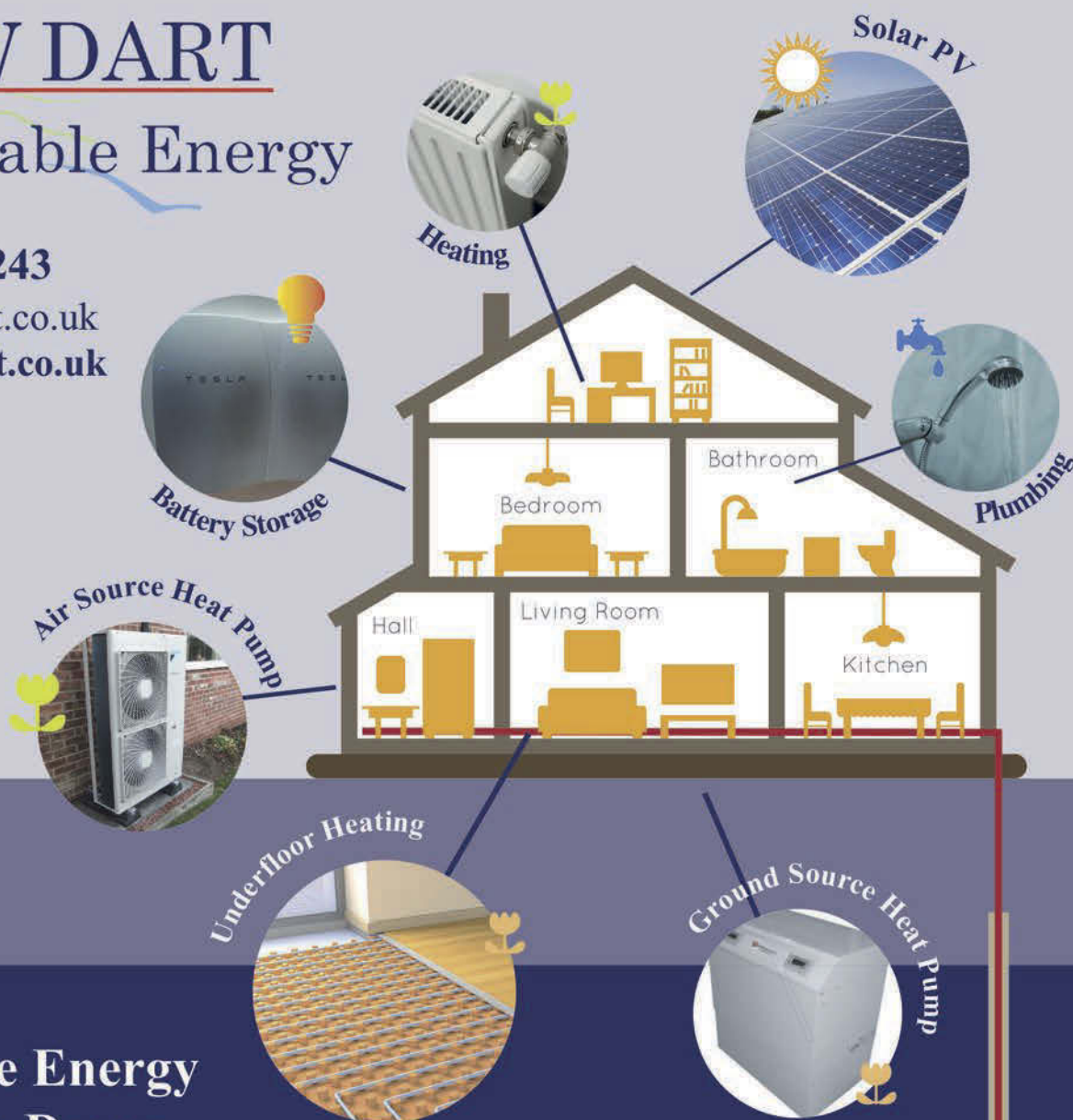
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SERVICES

☐ Most properties purchased for renovation will need electrical rewiring as well as a new heating and hot water system.

☐ New kitchen and bathroom fittings will need hot and cold water supplies and waste plumbing.

☐ The drainage system can be checked by lifting inspection chamber covers to check for evidence of any blockages, errant tree roots or loose render. You can even do your own test by inserting an inflatable bung to temporarily seal underground pipes at a chamber and then run the taps until sinks are full; wait a couple of minutes and the water level shouldn't drop.

☐ If you've got a private, off-mains septic tank system, ask if you can also look inside the chambers. It's worth asking when it was last emptied and where the 'refined' liquid run-off discharges. Also check that any external soil and vent pipes are secured and the drainage gulleys serving kitchens and bathrooms are clear.



GROUND

☐ Things to check outdoors include the condition of any garden walls, especially retaining walls which can be hugely expensive to rebuild. It's also a good idea to consult the deeds to see who's liable for maintaining which boundaries.

☐ Check any externally run electric cables.

☐ Note the condition of any ponds and outbuildings. Where any of the surrounding land slopes down towards the house there will be a potential flood risk in storm conditions from surface water, so fitting a drainage chan-

nel to intercept may be advisable. Conservatories are generally of poor quality and most would benefit from at least partial rebuilding — and in a lot of situations you may be better off replacing them with something new.

☐ Garages and outbuildings sometimes have potential for conversion, but many are in such poor condition they're barely able to stand erect unaided.

☐ Finally, note any shared driveways or rights of way evident in the form of gates in boundary fences, and have your conveyancer verify legal rights of access. **H**

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David Hilton

David is an expert in sustainable building and energy efficiency and a director of Heat and Energy Ltd, providing consultancy and training to end users and trades.

Renewables have become mainstream options for heating systems and electricity generation in our properties. The government is also pushing for their inclusion in our homes and in our construction projects to 'green up' the energy mix and lower our carbon emissions. We are also continually being told by the industry how much revenue they can earn and how much energy they can save, but how much do they cost to install and what are the hidden costs that we need to be aware of when working out the potential value for money of each system? ➤





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Photovoltaics (PV)

Solar PV systems are the most common form of renewable energy systems, largely due to the generous Feed-in Tariffs (FiTs) that historically represented a good return on investment, even when considering the incentive payments alone. PV will not give you all of the energy you require in your home without the use of batteries, and currently the FiT's payment is not as good as it used to be. But the installation costs are considerably less than they were, and when you plan your lifestyle and energy consumption to maximise the use of the generated electricity it is still a good option.

A system of around 4kW generation capacity (under optimum sunshine) is the most common, as installers can install and self-certify 16 amps (power (W) = volts x amps) without special permission from the distribution network operator (DNO). Such a system will usually be between 12 and 21 panels, depending on their efficiency and exact dimensions, and have an installed cost of around £6,000-£7,000 for on-roof panels, £7,000-£8,000 for in-roof panels (installed flush with the roof cladding and usually replacing the tiles) and £8,000-£11,000 for more discreet slate-type individual panel systems.

PV systems are fairly low-maintenance products and periodic visual inspections of the wiring and panel integrity, as well as maintaining the cleanliness of the panels, is all that's required. The inverter unit should last over 10 years (mine, however, failed after five years) and costs in the region of £600-£1,000 to replace. Many inverters now have Apps that monitor the generation and will quickly flag up any irregularities.



With pragmatic planning the payback period for a PV system at current electricity prices is usually around £500-£600 per year. You could therefore expect the £6,000 system to be paid back in 10-12 years, leaving you with 8-10 years of free energy benefit.

Heat Pumps

The next most popular renewable energy product is heat pumps. Effectively a fridge in reverse, the heat pump uses the refrigeration cycle to move heat from the air or the ground and transfers it as useable heat in your home. These units physically replace the boiler, but as they deliver lower temperatures than a boiler, they need to be carefully designed into well insulated, airtight homes for optimum efficiency.

There is a bit of a science to heat pumps so to work out the installation cost we first need to know how big the actual unit needs to be. For a quick sizing exercise, use the chart below. The size of the finished floor area (not footprint) of the property is in the far left column. Run ▶

Air source heat pump conversion key*

16KW=	10.5KW
14KW=	9.4KW
12KW=	8.5KW
9KW=	6.2KW
5KW=	3.9KW

* FIGURES SHOW THE ACTUAL EXPECTED OUTPUTS OF GENERIC AIR SOURCE HEAT PUMPS AT WORST CASE SCENARIO

Budget Sizing For Ground Source and Air Source Heat Pumps (Budgetary heat pump size, not heat loss calculation)

EFFICIENCY OF THE PROPERTY (W/M²) ▶	150	120	100	90	80	70	60	50	40	30	20	10
HOUSE SIZE: M² FINISHED FLOOR AREA ▼	Uninsulated		c.1990s					Current		2016	Passiv	
60	9kW	7.2kW	6kW	5.4kW	4.8kW	4.2kW	3.6kW	3kW	2.4kW	1.8kW	1.2kW	600kW
75 Av. UK house	11.25kW	9kW	7.5kW	6.75kW	6kW	5.25kW	4.5kW	3.75kW	3kW	2.25kW	1.5kW	750kW
100	15kW	12kW	10kW	9kW	8kW	7kW	6kW	5kW	4kW	3kW	2kW	1kW
120	18kW	14.4kW	12kW	10.8kW	9.6kW	8.4kW	7.2kW	6kW	4.8kW	4kW	2.4kW	1.2kW
140	21kW	16.8kW	14kW	12.6kW	11.2kW	9.8kW	8.4kW	7kW	5.6kW	4.2kW	2.8kW	1.4kW
160	24kW	19.2kW	16kW	14.4kW	12.8kW	11.2kW	9.6kW	8kW	6.4kW	4.8kW	3.2kW	1.6kW
180	27kW	21.6kW	18kW	15.75kW	14.4kW	12.25kW	10.8kW	9kW	7.2kW	5.4kW	3.6kW	1.8kW
200	30kW	24kW	20kW	18kW	16kW	14kW	12kW	10kW	8kW	6kW	4kW	2kW
250	37.5kW	30kW	25kW	22.5kW	20kW	17.5kW	15kW	12.5kW	10kW	7.5kW	5kW	2.5kW
300	45kW	36kW	30kW	27kW	24kW	21kW	18kW	15kW	12kW	9kW	6kW	3kW
350	52.5kW	42kW	35kW	31.5kW	28kW	24.5kW	21kW	17.5kW	14kW	10.5kW	7kW	3.5kW
400	60kW	48kW	40kW	36kW	32kW	28kW	24kW	20kW	16kW	12kW	8kW	4kW

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along the row until you get the efficiency of your property. Use 50W/m^2 for a home built to current Building Regulations standards and 40W/m^2 for a square-ish shape built to better than Building Regs standards. If your property falls into a coloured block then a heat pump is suitable. The figure in the block is the energy that the heat pump must deliver to the home at worst-case scenario. This is the figure you would use to size a ground source heat pump, but as most air source units lose output power in colder weather we need to use the heat pump conversion key alongside the graph on page 157. For example, a 9kW air source heat pump will deliver around 6.2kW at worst case. If you are expecting the heat pump to also deliver hot water then we need to add an average allowance of 200W per person, which is calculated as the number of bedrooms in the home plus one.

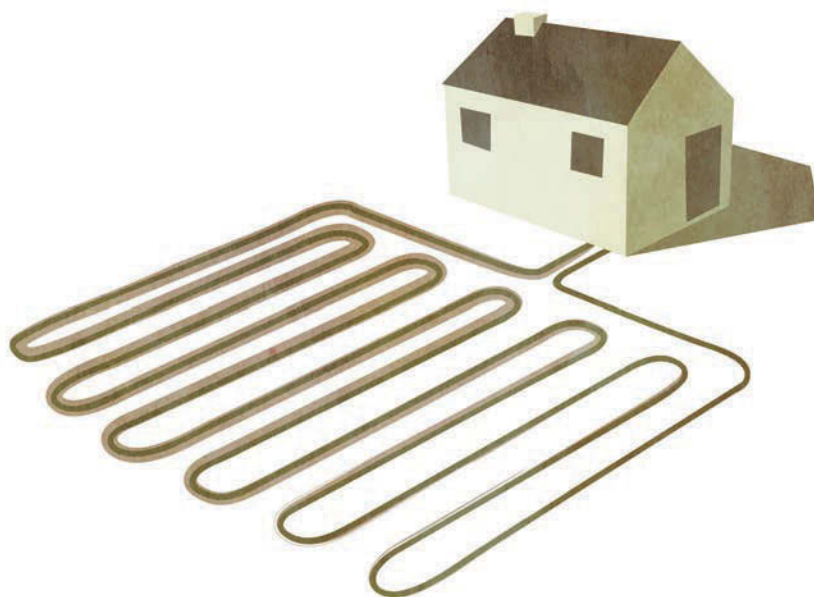
Therefore, as an example: a four bedroom, 200m^2 home, designed to be better than current Building Regulations, would be $200 \times 40\text{W} = 8\text{kW}$. Plus $5 (4 \text{ beds} + 1) \times 200 = 1\text{kW}$, which totals 9kW , so you would need to install a 9kW ground source or a 14kW air source unit.

The cost of installing a ground source heat pump is around $\pounds 1,500\text{--}\pounds 2,000$ per kilowatt. An air source heat pump will cost around $\pounds 5,000$ as the base cost, and then an additional $\pounds 500$ per kilowatt.

Solar Thermal

Not to be confused with solar photovoltaic panels that generate electricity, solar thermal systems use the heat from the sun to heat your hot water.

Flat panels with an area of approximately 2m^2 each, or glass vacuum tubes also made up into panels of approximately 2m^2 , are mounted on the roof and a mixture of water and anti-freeze is pumped through the panel in a closed loop with the coil in the bottom of the hot water



cylinder. The heat that has been generated in the roof panel is then transferred to the cylinder.

Solar evacuated tubes are slightly more efficient than flat panels and are very useful for difficult installations. An evacuated tube system, by virtue of the plug-in nature of the individual tubes, can be installed by a single fitter as there is no heavy lifting involved. Some units can also be mounted on a flat roof with the individual tubes rotated to the optimum angle for a discreet installation.

In most cases the solar thermal system is designed to supply hot water to the domestic hot water cylinder and makes no contribution to the central heating. The argument for this is that there is less solar resource during the heating season and therefore it would not be of much benefit.

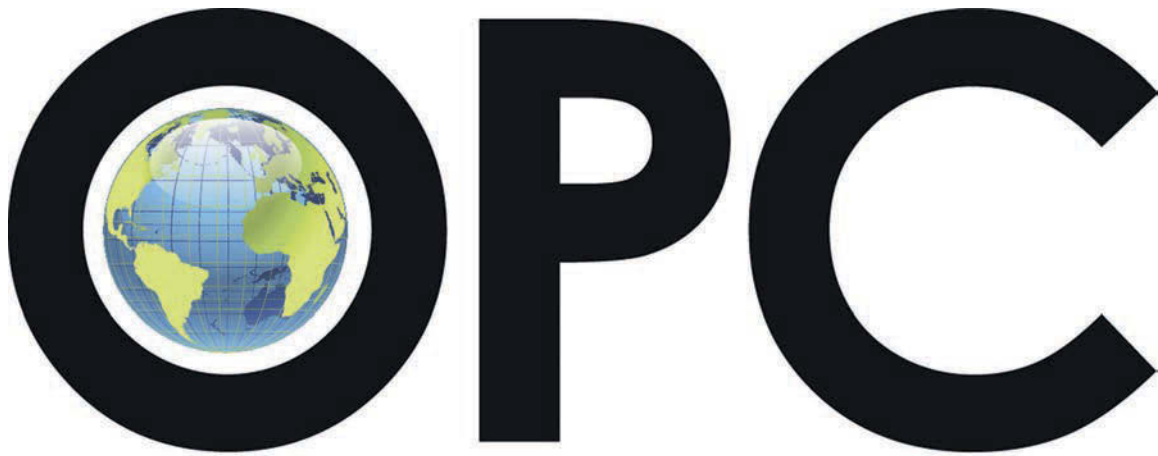
There have, however, been some new developments in thermal store and cylinder design and under certain circumstances, especially where a high temperature boiler back up is employed, it could actually be beneficial to use the low-grade heat in the winter months to aid central heating rather than focus solely on domestic hot water.

A solar thermal system installation will cost from around $\pounds 5,000$ for a two panel flat plate system and around $\pounds 6,000$ for a similar capacity evacuated tube system.

With the rapid uptake of PV systems and the availability of add-on controllers that redirect any excess electric generation to the immersion heater, the role of the solar thermal system has been largely marginalised. Now that the PV FiT payment amount has dropped, and combination thermal stores are more mainstream, the focus is rightfully returning to the solar thermal system.

Biomass

Biomass heating is the combustion of grown products and although there are boilers designed ►



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for the combustion of corn, grass and other harvest by-products with higher ash content, the main products are all wood based — namely logs, wood pellets and wood chips. The calorific value of wood delivers between 3.5–5kW per kilogram of dry wood. Any combustion appliance will require an uninterrupted supply of fresh air. Any wood-burning appliance has an allowance of 5kW without the requirement for an air brick. Most boilers will have direct air intake from outside, but if you have a log burner in your lounge or snug, you need to make sure that it also has a direct air intake from outside and satisfies the conditions of local Building Regulations or you may be required to cut a hole in the wall.

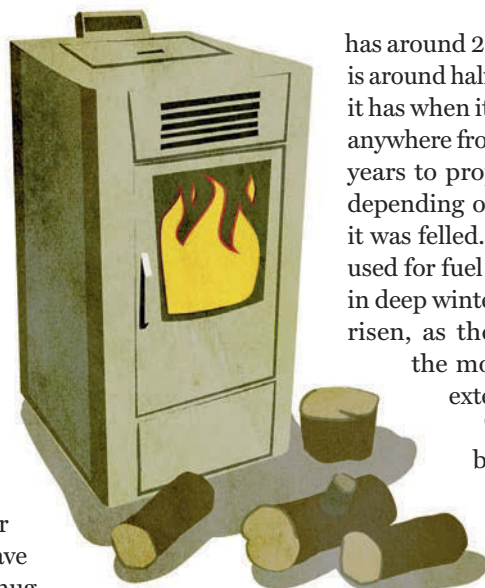
When considering any combustion product it is important to make sure that the emissions are controlled, as there are many areas where you are simply not allowed to have any smoke pollution from heating appliances and the units must be certified as being clean. The fuel must also be from an approved source if you want to benefit from any incentives.

Wood chip boilers are mainly used in projects requiring at least 40kW, as the fuel is inconsistent and requires maintenance to avoid spontaneous combustion and the space requirement for fuel storage and plant equipment is large.

Log batch boilers burn fuel at (gasification) temperatures of between 800°C–1,200°C to efficiently extract all of the calorific value from the timber and transfer it to a storage cylinder, resulting in very little ash, soot or any other waste. They require quite a lot of manual labour, as the logs need to be cut and prepared to an even thickness and equal lengths that are specific to the particular boiler, and to enable even burn times.

The boiler is manually loaded and depending on your heat load and boiler capacity that could be a daily exercise in winter and down to once a week in summer. Add solar thermal panels to the system and the summer gap between burns could be even longer. You will also need a well-insulated thermal store that has a capacity of around 50litres per kW output of the boiler. Therefore a typical 20kW boiler will require around 1,000litres of storage capacity.

Log storage requires a large amount of space, especially if you are harvesting the logs from your own property and need to store them as they are seasoned (dried). The ideal seasoned log



has around 20% moisture, which is around half of the moisture that it has when it is felled. It can take anywhere from six months to two years to properly season wood, depending on its size and when it was felled. Trees that are to be used for fuel should be cut down in deep winter before the sap has risen, as the sap will increase the moisture content and extend the drying time.

The cost of log batch boilers is around £5,000–£10,000 depending on the capacity and quality. The cost can also vary

depending on the capacity and quality of the thermal stores and the complexity of the integration of the system with the home.

Wood pellets can be automatically fed into the stove or boiler and therefore can be operated by the homeowner in a similar way to conventional oil or gas systems. The size and moisture content of pellets is fairly consistent so these systems can be run continuously or as part of a thermal store system. It is prudent to make sure that they are not allowed to work in short cycles, as the ignition of the pellets and then the cool down period results in a much less efficient system.

The pellets need to be stored in carefully designed hoppers or 'silos' if you want to avoid the manual labour of loading the boiler and also benefit from purchasing the pellets in larger quantities, which are blown into the store rather than delivered in 20kg bags.

The cost of installing pellet boilers starts from around £6,000–£12,000 depending on the quality of the boiler and the complexity of the flue and pellet store. Often the cheaper boilers have a higher ash tolerance so they are able to burn lower quality pellets, but you will then also have lower efficiency and higher emissions.

There are also boilers that can burn logs or pellets. Some have different grates in the fire chamber that need to be manually changed when the unit is cool, but there are also automated versions available for a premium.

Biomass systems will often be set up as district heating systems with one boiler serving at least three separate properties. They can have all of the heating plant built into a pre-built plant room, around the size of a shipping container, and delivered to site with little disruption. These systems are often bespoke and costs will be proportional to size and project complexity. **H**

Contacts

Air source heat pumps

Dimplex: dimplex.co.uk
Earth Save Products: earthsaveproducts.com
Mitsubishi Ecodan: heating.mitsubishielectric.co.uk

Biomass

Windhager: windhager.co.uk

Combined pellet and log burners

Solar Focus: solarfocus.com/en

Ground source heat pumps

Dimplex: dimplex.co.uk
JKN Renewables: jknrenewables.co.uk
Kensa: kensaheatpumps.com
Stiebel Eltron: stiebel-eltron.co.uk

Log batch boilers

Baxi: baxi.co.uk

Pellet burners

Burn-it by Sunsystems: sunsystemuk.com
Froehling: froehling.com
Windhager: windhager.co.uk

Photovoltaic systems

Environment Logic: environmentlogic.com

Solar thermal

Kingspan: kingspan.com



Barn-Like Addition

This double-height extension (OPPOSITE), by Westwind Oak, could convincingly pass as a barn conversion. Inside, the principal members and oak rafters have been exposed.

Glazed Gable

This kitchen diner extension (RIGHT) has been clad in stone – the glazed oak frame gable is the only sign of the oak frame from the exterior. Inside, the ceiling has been vaulted and the oak frame, from Welsh Oak Frame, has been exposed to dramatic effect.



Extending in Oak

Want an extension with instant character? Oak frame could provide the solution. Claire Lloyd investigates what you need to consider before extending in oak

There's no denying it, oak frame is experiencing a spectacular renaissance. However, it's not just self-builders creating new individual homes who are looking to oak frame — homeowners planning to extend an existing property are also seeing the benefits.

Although 21st-century oak framing is very much a modern method of construction (more of which later), oak is a natural and traditional building material that lends itself to creating an extension with instant character. "One benefit which homeowners tend to appreciate is that the oak frame evolves in situ and develops more character as it ages," says Paul Brierley of Yorkshire-based oak frame

specialist Paragon Oak. "Consequently, due to the quality of the space created, we often find an oak frame extension becomes the most used area of the house."

However, there's a lot to consider before extending — and more specifically, extending in oak. So we decided to speak with some of the UK's leading oak frame specialists to find out what you need to know before specifying an oak frame extension.

Design Considerations

A major part of oak frame's appeal is its flexibility — from barn-like additions to Tudor-style extensions and oak frame sunrooms, this construction system can be used to create a wealth of different ➤

Adding Interest

This single-storey sunroom and two-storey oak frame extension (RIGHT), both from GreenRooms by Oakwrights, are pleasing additions to the existing property.

A Space to Entertain

A new extension need not be simply used as a kitchen diner – you can create fantastic spaces for family and friends to enjoy, as this GreenRooms by Oakwrights project (BELOW) demonstrates. This dramatic addition hosts a swimming pool beneath the dramatic vaulted ceiling.



The Modern Sunroom

This circular garden room from Arboreta has provided space for a dramatic, light-filled dining space. Oak frame offers a more sympathetic material for this traditional-style stone house (as compared with products such as PVCu). High-performance glazing and a tiled roof mean it can be used throughout the seasons.



styles. “Oak frame is very adaptable, meaning it can work with a wide range of properties — so extending a 1970s house is just as likely as extending a listed cottage,” adds Merry Albright of Border Oak, which works nationwide.

To begin, an oak frame extension can be clad in a range of materials. Traditionally, the frame would have been infilled with materials such as wattle and daub, or brick. Today, the oak, while providing the structural frame, is encased or ‘encapsulated’ within a system such as SIPs (structural insulated panels) or timber panels. This allows the extension to meet Building Regs’ standards for thermal efficiency.

“Oak frames can be encapsulated with almost anything,” explains James Townhill of Westwind Oak. “We are currently working on an oak frame that will have straw bale walls, making the structure and envelope of the building carbon negative. Currently, the most common system used is SIPs; the main benefits are the low U values and high airtightness, combined with the short site time required to fit them and provide a dry shell.”

The encapsulation system means an oak frame extension can still be an option in a stone belt region where the planners may insist on a local stone cladding, for example. Render and timber cladding can just as readily be an option, so too can brick (although heavier claddings such as brick and stone often have to be built off their own foundations).

The type of frame specified can also impact on the aesthetic; post and beam is the most common, but options such as cruck frames, with their curved timbers, can provide a medieval look, for instance. What’s more, you may opt to expose more oak, which often gives a traditional look, or choose a more pared-back, modern feel. “There are different levels of exposure which can be achieved with oak framing — you can have just the basic principal members on show, or you can increase the content of oak by exposing the floor joists and rafters, for example,” explains Paul Edmunds of Welsh Oak Frame. An oak frame can also be combined with steel tie rods for a modern aesthetic.

As with every construction system, there are both design possibilities and challenges when it comes to designing an oak frame extension. Oak frame provides the opportunity of creating architectural features such as vaulted ceilings with relative ease — particularly useful in single-storey extensions, where vaulting can create an illusion of space and allow for rooflights and other such devices to bring in light from above.

“Oak frame also partners well with glass, and homeowners tend to want an extension to add light so it can really become an architectural asset — introducing the proverbial ‘wow’ factor, as well as adding extra space,” says Merry Albright.

But there’s a few key points to bear in mind. A designer or specialist company with experience designing oak frame buildings will have a working knowledge of the possibilities and limitations of this construction system. “Oak is very versatile but has some ►

The Rules and Regs

As with any extension, regardless of construction system, an oak frame extension must comply with Building Regs and the planning rules. Your new extension may or may not need planning permission — the work may fall under Permitted Development. “It is very important to speak to the planning authority regarding size, style and specific requirements and policy restrictions — some extensions may not actually need planning approval but some houses will have lots of conditions and restrictions,” says Border Oak’s Merry Albright.

Mike Hope of Roderick James Architects adds: “I would say the most important thing when extending your house is a good measured survey of the existing building, the boundaries and proximity to your neighbour(s), to ensure that your extension fits and complies with all necessary regulations.”

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Introducing Light

A glazed link introduces light to this home, and connects the new oak frame garden room from Border Oak (ABOVE); Introducing light from above with rooflights and roof lanterns – as shown by this oak frame extension from Oakmasters (BELOW) – helps bring light deep into the floorplan.

limitations with regards to spans before you need a post (the maximum span is +/- 6.5m unsupported) before you start using massive timbers. Therefore, if someone is looking for a huge span completely open with minimal posts, oak frame may not suit,” says Charlie Mills of GreenRooms by Oakwrights, which works nationally.

As with any new extension, the connection to and impact on the existing house requires careful thought. “With regards to layout, I encourage clients to think about what they may be losing from the existing property in order to connect to the extension,” says Merry Albright. “For example, if you are adding a two-storey extension and you want access from the existing first floor, can you use the existing landing or do you need to lose a bedroom? In this instance, a second staircase can help maximise the new space you create.”

Again, a new extension can also mean sacrificing windows or doors which bring light into the existing house. While the new addition might be filled with natural daylight, it’s important to consider how light will be introduced into existing rooms. A glazed link is one popular solution; not only will this device visually separate old from new, but can help draw light into the house.

And on a final note, architect Mike Hope of Roderick James Architects (a practice well versed in designing oak frame homes and extensions) offers a clever tip for making a new extension feel instantly at home next to its host. “We recommend that you include some other oak frame elements to the house if possible – such as an oak porch or an internal glazed oak screen – which would help to visually tie the extension to the existing house.”

Construction On and Off Site

A further benefit of building in oak frame is the speed at which an extension can typically be made watertight on site. Not only is the oak frame manufactured off site, but the encapsulation system is often constructed under factory conditions too. Architect Mike Hope explains: “An oak frame extension can have a quicker build time as the timber frame and SIPs are prefabricated off site before the works begin — this minimises disruption and you are quickly left to enjoy a stunning new addition to your home.”

Most oak frame specialists require the homeowner to commission a builder or groundworking company to complete the foundations. As such, good communication between the homeowner and/or their builder, and the oak frame specialist is inevitably key to keeping the build programme on track, and ensuring that there are no lengthy delays between the groundworks and the oak frame being delivered to site and erected.

Due to the prefabricated nature of oak frame construction, access to the site can be an important consideration; a crane is commonly used to erect both the frame and the SIPs. “Good access (for vehicles, storage and lifting devices) to the area that you want to extend is crucial,” says Merry Albright.

However, where access is limited, there are solutions. “Anything is possible with an oak frame (as it can perhaps be carried by hand if necessary),” says architect Mike Hope. Paul Brierley of Paragon Oak continues: “We’ve not had a job yet where we couldn’t deliver an oak frame extension due to access. Difficult sites often involve specialist lifting equipment — occasionally the oak frame has been craned over the house, and there is lifting equipment available that can fit through the space of a garden gate. We will account for this in the quote following a site visit.” Another solution is building the encapsulation system on site (this would typically be a timber frame system). ➤





Extending a Period Home

This sympathetic extension to a Grade I-listed building in London (LEFT) was designed and erected by Living Oak. It provides a light-filled kitchen diner inside. Using a similar tile on the roof helps tie in this new addition with the existing house.

A Modern Kitchen Diner

This pared-back oak frame, from GreenRooms by Oakwrights (RIGHT), lends a modern look in this kitchen diner extension. The glazed gable brings light into this deep room.

Contemporary and Traditional Aesthetics

Proving that oak frame can suit an array of properties, this oak frame extension to a semi-detached house (BELOW), provides a large kitchen diner inside – this extension is by The Green Oak Carpentry Company; Exposed oak rafters in this vaulted single-storey extension, designed by Roderick James Architects (BELOW RIGHT), provide a more traditional feel.



USEFUL CONTACTS

Arboreta: arboreta-oak.com
Border Oak: borderoak.com
Carpenter Oak: carpenteroak.com
Castle Ring Oak Frame: castleringoakframe.co.uk
GreenRooms by Oakwrights: greenroomsbyoakwrights.co.uk
Living Oak: livingoak.co.uk
Oakmasters: oakmasters.co.uk
Oakwrights: oakwrights.co.uk
Paragon Oak: paragonoak.com
Roderick James Architects: roderickjamesarchitects.com
The Complete Oak Frame: thecompleteoakhome.co.uk
The Green Oak Carpentry Company: greenoakcarpentry.co.uk
Traditional Oak and Timber Co.: tradoak.com
Welsh Oak Frame: welshoakframe.com
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Be Prepared for Shrinkage

Oak frame is typically constructed in green oak (recently felled timber) — its relatively high moisture content means it's easier to work, but also means that the oak continues to dry out and consequently, shrink, with time. Air-dried oak, which has a lower moisture content (and is more expensive), can be used, but again, the oak will still shrink to some degree.

This can mean that gaps (or 'shakes') can appear in the oak. This does not (typically) impact on the structural integrity of the oak frame and for most homeowners it adds character, but do be prepared for this change. "Oak is a natural material and even with offers of 'dry' oak, the timber will still crack and move slightly — it's not a structural weakness, simply a feature," says Charles Mills of GreenRooms by Oakwrights.

The drying out process can also open up gaps between the frame and other elements of the extension, unless this movement is properly designed in and accommodated for during the build. "Each element of the build needs to be considered in order to accommodate for the shrinkage and movement — which is why it's important to opt for an oak specialist with experience building oak frame structures rather than simply approaching a joiner," says Paragon Oak's Paul Brierley. "For instance, where the oak frame abuts plaster, we tend to use a stop bead; so when the oak shrinks, the gap that opens up is neat."

Glazing is an area that requires particular attention. "If a window is desired in the middle of a wall, a casement window can be used in the envelope using the standard manufacturer's detail. If casement windows are used between the oak frame, however, there is a possibility that weathertightness and operation of the windows will be compromised when the oak shrinks and moves," explains James Townhill of Westwind Oak. A method called face or direct-applied glazing can be used to overcome this issue.

'Tying' the Extension into the Existing House

Given that green oak shrinks, how do you (or more precisely, how does your oak frame specialist or designer) go about tying in the new extension with the existing house?

"We usually treat the extension as a stand-alone element — structurally independent of the host house, which means that we don't need to mess around with the main building (often this is an old building and you never know what you may find). This route can offer more control over the whole project and the costs involved," begins Merry Albright of Border Oak.

"There are various ways to do this — if we can, we try to keep the structures independent, so the new frame is effectively sitting next to the host building (with weatherstripping details in between to form a seal) and is not using the host house for any structural support.

"We also undertake a lot of extensions that are attached to the main building via a connecting 'link' — this can often utilise an existing opening (such as a doorway or window) and keeps the new roof separate (often where roofs join is the most complex and expensive, so avoiding this can make a real difference)," adds Merry Albright. "The link building can be very much part of the

design concept and is an excellent transition space." Glazed links are a particularly popular option.

How to Achieve an Oak Frame Extension

If you have decided on an oak frame extension, approaching an oak frame company who can provide an in-house design service, or an architectural practice with experience designing oak frame buildings, is typically the most cost-effective route. "Oak frame is a specialist construction system that needs to be designed and built accordingly," says Paul Brierley.

Some companies offer oak frame kits for smaller projects such as sunrooms, but for larger extensions, a bespoke design service is a good idea. Remember, an extension's success is not simply about the new space you're creating, but the extension's relationship (both in aesthetic and practical terms) to the main house.

There are numerous oak frame specialists across the country; some offer services regionally, others work nationwide. Most are based in the south, the Midlands and on the English-Welsh border, although there are a handful of companies based in the north, such as Paragon Oak in Yorkshire.

It's important to note that oak frame suppliers provide different levels of service, and some offer a range of options to choose from. A few offer a complete turnkey service, some will deliver the build to watertight stage, with your main contractor completing the foundations and the finishing work, and others will design, supply and erect the oak frame, with your builder or main contractor completing elements such as installing the roof, shell and fitting joinery. Finding the right option for your project is often a case of establishing how involved you aim to be in the build (do you perhaps hope to manage the finishing trades?), and your budget. **H**

The Cost of Building in Oak Frame

Oak frame is considered a premium building material. "Building with oak is a little more expensive but not hugely, so if budget is the driver, this may be a limitation," says Charlie Mills of GreenRooms by Oakwrights.

"We advise a project cost of £2,500/m² (including groundworks through to finishing)," he adds, providing a rough estimate. "There are several factors that could impact on cost, such as the amount of oak used. For instance, using oak roof rafters rather than softwood would inevitably cost more. The amount of glazing in a building and choice of joinery will also impact — introducing numerous bifold or sliding door systems, for example. The joinery becomes the largest cost of a build. Again, features such as roof lanterns will be more expensive than tiling the entire roof." Factors such as the complexity and the location of the build will also affect the cost.

For a guide to how much your new extension may cost, visit homebuilding.co.uk/extension-cost-calculator.

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**A Building
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A BUILDING REGS' GUIDE TO: FOUNDATIONS

Regardless of your site conditions, foundations depend on two key factors: the load placed on them, and the type of ground they sit on, says building control officer Paul Hymers



Paul Hymers

Paul Hymers has been a building control officer in Kent since 1984 and has written eight books on home improvements and developing, including the best-selling *Home Extensions – The Complete Handbook*, now in its fourth edition.

While site investigations dramatically reduce the risk of surprises, opening up the ground for foundations is often a step into the unknown and nobody is entirely sure what it will reveal until it's done. Ultimately, the decision will lie with your building control officer and warranty provider.

Foundations depend on two things: the load placed on them and the nature of the ground they bear on. For conventional foundations (such as trench fill), natural, undisturbed ground of an acceptable bearing capacity is required. The natural ground conditions across the British Isles vary tremendously. Silts, sands, rocks, chalks, gravels and clays – we have it all.

Some conditions, such as rock and chalk, are excellent for building on and relatively shallow foundations (approaching 700mm deep) prevail in these situations – just deep enough

to avoid frost damage. Others, like sand and clay, may have good load-bearing characteristics but they do have a tendency to move and cause subsidence.

Clay, prevalent in the south and south-east regions, can vary in colour from blue to grey, to brown and orange – with the colour variations there are differences in plasticity as well. As a shrinkable material, clay can change volume dramatically. In the summer, it dries out and shrinks, and in the winter it becomes water-logged and expands (a process described as heave) – either way, clay has the potential to cause structural damage. A minimum foundation depth of 1m is usually considered safe in clay soil. However, clay is more susceptible to change when trees are present.

The Impact of Trees and Hedgerows

The effects of trees are worse at the surface. Much deeper foundations can be necessary depending on the plasticity of the clay, the water demand and mature height of the species, as well as its distance away from your self-build. Your warranty and building control surveyors will be able to advise you on the minimum depth they are looking for in traditional foundation trenches. They will likely refer to foundation depth tables based on these factors, but where traditional foundations over 3m deep would be needed, it would be advisable to use 'special' foundations instead (more on which later).

In the case of hedgerows, it would be appropriate to base the foundation depths on the 'worst case' species in the vegetation mix. Even if the tree is young at present, the foundation depths must be based on its mature height when fully grown.

With mature trees that have to be retained, care should be taken not to damage the roots or branches in order not to destabilise them. Cutting through a live root of 50mm diameter or bigger is not considered to be a good idea! Instead, your foundation should be designed



Trench Fill Foundations

Conventional trench fill foundations excavated in chalky subsoil.



to bridge over roots, allowing enough space for future growth without the structure exerting pressure on them. Tree roots, in turn, can exert considerable pressure on lightweight structures like a house, and during growth they may cause structural damage. If you are building that close to a tree, you should seek the advice of a registered arboriculturist.

It is important to extend your foundation depth below any visible root hairs in the trench to a further 300mm – to a zone where the soil does not suffer from desiccation. This is important with fully mature trees that may have developed a root system beyond that which was predicted.

Removing Trees on Site

If you have a large tree on your site, you may be able to remove it as long as it doesn't have a Tree Protection Order, or it isn't forming part of your landscaping. However, removing the tree may not help if the subsoil is clay. With the tree removed, clay can become waterlogged and swell to an extent that causes damage to foundations. The effect is known as heave. This is the reverse of shrinkage but the resultant damage can be just as bad. It is, however, possible to build in anti-heave precautions at relatively

low cost. Lining the walls of the trenches with heavy gauge polythene will create a slip plane that can help to prevent heaving clay from exerting pressure on the sides of the foundations. Better still is using anti-heave boards to line the sides of foundation trenches. The boarding is weak enough to absorb the pressure of heave, but you will need to seek advice on what thickness to adopt. It can be anything from 50mm to 300mm thick. You may even have to use anti-heave precautions on the foundation's inside face where trees remain.

Inspections

Foundation preparations are critical for building control purposes and you must notify your building control body for inspection before concreting them. Likewise, your home warranty surveyor should also be notified.

In some areas, planning conditions may be imposed that require all excavations over a certain depth to be inspected by archaeologists prior to concreting. The Ancient Monuments and Archaeological Areas Act 1979 creates the conditions where you may have to give notice before excavations are carried out and development may be delayed to allow archaeologists to simply observe or undertake their own ➤

Excavations

Conventional trench fill foundations being excavated in chalk subsoil not affected by tree roots (ABOVE LEFT); Trial excavations in made up (backfilled) ground (ABOVE).

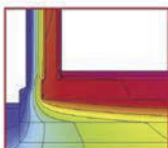


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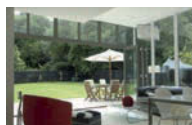
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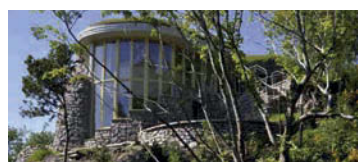
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Strip Foundations

Strip foundations reinforced against differential movement in clay subsoil (ABOVE); Sleeved piling caps awaiting ground beam foundations (ABOVE RIGHT).



investigations. Contact should therefore be made at an early stage if you have an archaeological condition imposed on your planning permission. Fossils, antiquities and objects of value should remain under your ownership although the archaeologists may remove them from site for examination. In declaring historically important finds, you can expect to be compensated if the archaeologists find a 'treasure trove' of national importance.

Traditional Foundation Types

There are two types – strip foundations and trench fill foundations:

Strip Foundations Usually wider than trench fill (e.g. 600mm or more for cavity walls), strip foundations use less concrete – they utilise a reduced thickness, leaving substructure blockwork to be raised. If you have a sloping site, you will need to step the foundations to keep the bases level. Steps should overlap at least the width of the trench when concreted and that means shuttering across them. Strip foundations are often necessary in softer soils like sand, since they spread the load of the building out over just the base of the concrete.

Trench Fill Foundations Typically these are narrower machine-dug trenches – 450mm (for cavity walls) – with the concrete mass filled to within 150mm of the surface ground level. The sides of the trench fill foundation play as much

a part in supporting the load as the bottom, and so this foundation must only be used in stable ground where the trench walls are firm and capable of bearing loads as well as the base. Chalky soils and those with clay in them are often ideal for trench fill foundations.

Contaminated Ground and Other Risks

Contaminated ground can be removed in a controlled manner, or sometimes capped over, but if there is a risk from ground gases like methane or radon nearby then special measures for sealing your building at ground level and sometimes venting the ground are needed to ensure gases aren't trapped and allowed to build up in voids.

Aside from gas, previously dug or made up ground (whether purely soil or aggregates and man-made materials) usually requires digging through to naturally occurring subsoil beneath. Should it prove too deep, special foundations like rafts, pad and beam or piling may be needed (see page 177).

Apart from the ground conditions, other dangers can be avoided by:

- Not excavating trenches alongside existing buildings below their foundations.
- Exposing, en-sleeving and protecting (by introducing lintels over) existing drains and services crossing the foundations.
- In the case of public services and public shared sewers, building over them may require the approval of the services authority ►

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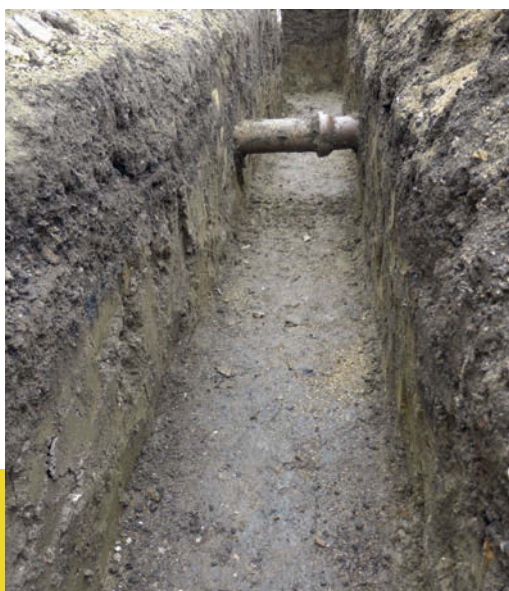
Special Foundation Types

There are a number of special foundations for different soil types and conditions:

Raft Foundations are reinforced concrete slabs cast with reinforced thickened edges around the perimeter, known as edge beams. Usually the slab reinforcement is a pre-formed steel fabric mesh laid in sheets that are overlapped and tied to each other and to the straight bars in the edge beams, but they can be formed from straight bars on sites, too. The concrete is a higher strength grade than normal foundation concrete.

They have the advantage of needing only a minimal depth of excavation and so are ideal where groundwater tables are high or backfill material is on site. They might also be chosen for other reasons:

- To spread the load over a larger area in soft ground, or in made-up ground where they can be designed to bridge across weak areas in the soil.
- In cases where differential settlement is likely to be extreme.
- Where mining subsidence is likely to occur.
- Where the soil is susceptible to excessive shrinking and swelling. In this case the raft should be formed on top of selected non-cohesive fill material (such as clean stone), having reduced the natural ground level to a given depth. There are some drawbacks, however:
- A level site is a prerequisite for them to be worth considering.
- The house design needs a fairly uniform loading along the edge beams, avoiding concentrated point loads from piers.
- Drainage becomes more exacting when ducts for pipes need to be cast in through the centre of the edge beams and slab at the formation stage.



Pad and Beam Foundations consist of a series of mass-filled 'pads' of concrete, formed at the necessary depth and designed to carry reinforced ground beam foundations that span between them, much as lintels do above ground. The pads are usually located at corners and at regular intervals in between. As the pads transfer the whole weight of the building to the ground, they are individually sized by the base area – calculated by considering the load (Kn) applied to the soil and its accepted bearing capacity (Kn/m²). Consequently, they will often vary in size.

This type of construction may be used where deep foundations are required due to nearby trees. Since the reinforced ground beams are strengthened against any ground movement they can be shallow, with only the pads extending deep in the affected tree root zone. If this method is to prove economically worthwhile, though, you do need to have good load-bearing ground for the pads; otherwise they'll have to be oversized. If heave is a problem, the same measures can be taken as described for conventional foundations.

Piled Foundations have become more common in housebuilding due to the rising cost of soil removal and concrete. The piles act to support reinforced ground beams in the same way as pads do for pad and beam systems, but are more economical when excessive depths are required.

Piled foundations are even available for extensions, and specialist contractors can design and install mini steel-cased or precast concrete piles, driven down in sections to a given depth measured by the resistance from the ground. The system can be quicker than digging and filling large pads. Piled foundations are suitable in clay soils, where trees exist or have been removed, or where nearby slopes or geological faults occur but also on brownfield sites with slip collars placed over pile tops.

Piles are either subjected to a load test or over-designed in terms of load capacity to prove their adequacy. Sonic tests can be carried out to check if they have been damaged (cracked) during installation. If this is the case, extra piles will be implanted near the failed one to compensate. Systems are also available that provide precast ground beams that fit to the pile caps and carry the walls and ground floor beams in a modular floor. In these systems, precast concrete piles are usually driven into the ground to a given recovery (or set) and provided with a suitable cap size for the reinforced ground beams to bear on. **H**

CONTACTS

Abbey Pynford Foundation Solutions
housedeck.co.uk

Advanced Foundation Technology
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Braemar Arboriculture
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Exposed Drain Pipe

This exposed existing drain pipe will be protected by supporting lintels in below-ground masonry walls after strip foundations have been concreted beneath the pipe (LEFT).

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FOUNDATIONS COST KNOW-HOW

If your foundations are deeper than expected, it's important to understand how the works will be priced, says build cost expert Steve Whitby



Steve Whitby

is managing director of Estimators Ltd (estimators-online.com), the UK's leading building estimating service.

Before you start any foundation works, you should know the exact price for these tasks. If you're using a builder or specialist groundworks contractor, you must ensure the price for this element is clearly separated – and you know what it includes – as you may need this figure later. This is because it's impossible to know the final foundation depth of excavation at the pricing and planning stages. Many factors govern the required depth. Ground conditions vary greatly depending on the location. For example, sandy soil, clay, shale, chalk and peat all have different requirements.

Estimators Ltd's standard default specifications for strip foundations are:

- Cavity walls: 775mm concrete into 1,000mm deep strip excavation, at 600mm wide.
- Internal load-bearing walls: 775mm concrete into 1,000mm deep strip excavation, 450mm wide.

(When using the trench fill method, it is good building practice to concrete 225mm below ground level to allow for either one course of block or three courses of brick to bring the foundations to ground level.)

The first fundamental milestone of any build that requires foundations is the visit by the building control officer, to inspect the excavations prior to concreting. The building control officer will determine the final depth of excavation necessary to secure a firm foundation.

Let's look at one example: A new self-build dwelling with 36m (linear) of cavity walls, foundations of 1,000mm depth with a cost of £6,500. Now let us assume that the officer requests the final depth to be 1,500mm: an additional 500mm. This becomes a variation to the works, and will cost more.

The calculation used to work out the additional cost is: 36m (total length of cavity walls) x 0.775m (depth of concrete) x 0.6m (wide) = 16.74m³ (total cubic metres). £6,500 divided by 16.74 = £388.29/m³.



Using the rate per m³, we will now work out the additional costs: 36m (total length of cavity walls) x 0.5m (additional depth of concrete) x 0.6m (wide) = 10.8m³ x £388.29 = £4,193.32.

This includes all labour, plant and materials for additional excavations, waste removal and concrete. (Other costs may apply if the additional depth requires shoring the trench walls.)

Knowing the basics will protect you from being overcharged for an element that couldn't be quantified, without a site inspection.

If you are unfortunate and the foundations happen to cost more than planned, you should have this covered in your contingency sum. This example would be an additional cost of 2.5% on a £170,000 build – well within, say, a 10% contingency fund.

Finally, another good tip is to renegotiate your concrete price with your supplier once you know the total quantity. The likelihood is the price per m³ will be lower, based on the additional quantity. **H**

SELF-BUILD PROJECT PLANNER

However you're getting it built, you'll need to know how a house is constructed. Here is our definitive guide to each stage of the process

PREPARE SITE

- Groundworkers create site access
- Clear site and strip vegetable soil; stacking material to be retained out of the way
- Set up site hut and equip with drawings and safety equipment
- Set up toilet
- Secure lock-up/lorry container (hired in or purchased) to be positioned
- Water board to bring supply to stopcock on boundary
- Plumber to connect water standpipe
- Surveyor marks out building on cleared site and transfers the lines to profiles well clear of any construction work
- Bring in bricks and blocks and stack clear of future construction
- Set up mixer station close to cement store and sand heap

FOUNDATIONS/OVERSITE

- Groundworkers excavate foundations
- Wait for approval of building control and warranty inspectors
- Position any reinforcement bars, mesh or cages in the trenches
- Position any compressible

- material or slip membranes required within the trenches
- Lay ducts for services to enter through the foundations
- Arrange foot scaffold if necessary and shutter for any steps in the foundations
- Pour concrete footings and tamp to level
- Obtain approval from building/warranty inspectors to proceed
- Bricklayers build up foundation blockwork to damp-proof course
- Install cranked air vents
- Install drainage exit lintels
- Fill cavities with lean-mix concrete to level with external ground level
- Bed and lay damp-proof courses, linking these with any radon membranes or barriers

START THE SUPERSTRUCTURE

- Groundworkers to dig service trenches and lay pipes and ducts to proposed stopcock/meter positions
- Load out concrete floor beams to each bay and position
- Install drainage and vent pipes, proud of the oversite
- Infill floor beams with blocks
- Lay coursing blocks and

- position ventilator grilles
- Brush grout
- Arrange for building control/warranty inspection
- Commence building superstructure
- Install templates for future windows and doors, etc.
- First lift of scaffolding required

SUPERSTRUCTURE

- Bricklayers continue superstructure brickwork and blockwork including work on any chimneys
- Install and bed lintels including fireplace lintels
- Install flue liners as work proceeds
- Build in meter boxes for gas and electricity
- Electrician to install temporary consumer unit within electricity meter box
- Service suppliers to carry out their work to the boundary
- Plumber to reroute water supply to stopcock position
- Electricity providers to install meter and connect
- Second scaffolding lift required
- Arrange crane to lift first floor beams onto each bay and position
- Position plasterboard batten clips

- Lay infill blocks
- Brush grout

SUPERSTRUCTURE CONTINUED

- Continue building superstructure to wallplate
- Third and then fourth lift of scaffolding required
- Wallplate to be scarfed, bedded and tied down with proprietary wallplate straps
- Warranty inspection sometimes required
- Carpenters to build end trusses as templates
- Continue building up gable ends and chimney
- Additional lifts of scaffolding required at the gable ends
- Plumber to fit lead flashings, trays and skirts to chimney
- Plumber to install vent pipes and flashing skirts as they come through the roof
- Bricklayers to top out and fit chimney pot
- Bricklayers to point chimney flashings

CONSTRUCT ROOF

- Carpenters to sling roof trusses, and trusses to be fixed down to wallplate
- All binders and bracing to be fixed at node points
- Layboards to be fixed to valleys

- Dormers to be constructed at this point
- Fascia and soffit to be fixed together with any necessary ventilation grilles or strips
- Warranty inspection sometimes required
- Any roof tanks must be installed at this point

ROOF COVERING

- Roofers begin to cut and lay undercloaking to the verges
- Roofers to felt and batten
- Tiles/slates to be laid
- Ridge/hip tiles to be laid and bedded
- Valley tiles to be laid, or fibreglass or lead valleys to be laid
- Plumber to dress down flashings and skirtings
- Decorators to paint/stain facias, soffits and barge

EXTERIOR & INTERIOR FITTINGS

- Plumbers to fix guttering
- Window suppliers to fit external joinery
- Plasterers to carry out any external rendering
- Scaffolding to come down
- Plumbers to fit downpipes and connect to drainage upstands/gullies
- External decoration
- Carpenters to commence first fix by fitting door linings, building any studwork partitioning and fixing window boards
- Carpenters to fix plasterboard noggins and box in vent pipes
- Plumber and carpenter to liaise with building of any necessary stands in roof
- Carpenter to fix loft trap

FIRST FIX

- Plumbers to lay flooring membrane and insulation, taping all joints and sealing up to the damp-proof course
- Underfloor heating (UFH) loops to be laid and fixed

- All first fix plumbing for hot and cold and waste within floor zones to be laid
- Internal gas pipework installed
- UFH pipework to be brought to manifolds and outlet positions
- Supply and fix company to pump in and lay level floor screed and leave for three days
- Protective hardboard/cardboard to be laid on screed
- Electrician to fix carcass wiring for lighting and power circuits together with all backplates
- Consumer unit/units to be positioned
- Wiring taken to external lighting points
- TV aerial/satellite cables to be installed to required positions
- Internal telephone wiring to be installed to required positions
- Home entertainment/smart systems/alarms to be carcassed

DRAINAGE/EXTERNAL

- Ground-workers to begin digging the trenches for drainage runs
- Trenches backfilled to 150mm with pea shingle
- Drains laid to required falls
- Brick/concrete section manholes constructed, or purpose-made manholes, rodding eyes and gullies set in runs
- Building inspector to approve laid drains
- Drains haunched over with pea shingle
- Drainage trenches backfilled
- Work to connect to main sewer in road to be carried out by approved contractors
- Carpenter to finish boxings and noggings ready for plasterer
- Groundworkers to commence driveways

and pathways

- Bricklayer to build any fireplaces and hearths
- Gas meter to be installed and connected
- Plumbers and electricians to liaise on all cross bonding and earthing

CEILINGS/ DRY LINING

- Main staircase to be fitted by the carpenter and protectively covered
- Dryliners/plasterers tack ceilings
- All external and blockwork walls lined with plasterboard on dots and dabs
- All studwork walls and pipe boxings tacked with plasterboard
- All joints and angles filled and scrim taped
- All abutments of differential materials jointed with mesh
- All joinery to be sealed internally and externally with mastic
- Dryliners/plasterers to skim coat all walls and ceilings
- Decorator to paint/treat backs of all skirting and architraves
- All roofing insulation to be installed

SECOND FIX CARPENTRY

- Carpenters hang internal doors
- Skirting and architrave to be fitted by carpenters
- Bottom tread of staircase to be fitted, balustrading and handrails to be fitted, as well as linen cupboard shelving
- Fit of loft door and ladder
- Timber floors to be laid by carpenters or specialists and protected
- Ceramic floor tiles to be laid by specialist tilers and protected
- Carpenters/specialist suppliers to fit/build built-in bedroom and bathroom furniture
- Kitchen units to be fitted

SECOND FIX

- All wiring connected to consumer unit
- Boiler to be positioned, plumbed and then wired in
- Sink units to be plumbed in, earthed and cross bonded
- All sanitaryware to be fitted and plumbed in
- Radiators and towel rails to be fitted and plumbed in
- Underfloor heating loops to be connected to manifolds
- Electrician to check cross bonding and earthing to all sanitaryware, sinks, radiators, etc.
- Boiler to be wired in; control systems and room thermostats to be wired in
- Plumber and electrician to attend firing up and commissioning of boiler
- All pipework and connections to be flushed through and pressure tested
- Central heating to be left on 'test'

DECORATING

- Worktops, made from the previously taken templates, to be fitted
- House to be thoroughly cleaned with all debris and dust removed to outside
- Decorators to snag any holes, blemishes or rough patches on walls, making good
- Internal timber to be sanded smooth or rubbed down with wire wool
- Decorators to paint all walls and ceilings, mist plus two coats of emulsion
- Internal timber to be knotted, painted, primed, undercoated and top coat glazed, or internal timber to be two-coat stained
- Specialist tilers to fix ceramic wall tiles to kitchen and utility rooms
- Baths to be filled, in order to settle, before tilers fix any wall/splashback tiles
- Water meter to be installed ➤

LANDSCAPING

- Groundworkers or landscape gardeners to level the ground and prepare
- Topsoil from storage to be placed where required, with extra shipped if necessary
- Site hut to be removed or re-sited if intended for use as a garden shed
- Secure site storage to be sold off or returned to hirers
- Groundworkers to complete driveway surface
- Patio slabs to be laid
- Bricklayers to build any required dwarf/decorative walling
- Lawned areas to be levelled ready for seeding or turfed
- Approved contractors to complete any bellmouth and kerbing to road

COMPLETION

- Whole house to be thoroughly cleaned out
- All windows polished and all labels removed from glass and appliances
- All polystyrene packing to be removed from cookers
- All stabilising bolts to be removed from washing machines/driers
- Site toilet and any remaining plant on hire to be off-hired
- Readings to be taken on all meters
- Central heating switched to 'run'
- Telephone company to connect
- Contractors to install TV aerials and/or satellite dishes
- All trades return for any snags
- Carpets to be laid
- Local authority to be advised of completion to arrange for council tax valuation
- Energy Performance Certificate to be prepared and sent to building control
- Building control final inspection and issuing of Completion Certificate
- Warranty inspector's final inspection and issuing of warranty
- Arrange protective covering for floor surfaces prior to delivery of furniture
- Switch self-build site insurance policy to homeowners' policy

HOW IT WORKS

1 Identify your build route from the four options

Your level of involvement in the project will influence the build costs. For simplicity, the four most common build routes have been identified below:

● Build Route A: DIY + Subbies

Building on a largely DIY basis, substituting around 30% of labour costs with DIY, and employing help with the rest of the building work. Materials purchased directly.

● Build Route B: Subbies

Building using tradespeople hired directly – you will be project managing, but there is minimal DIY involvement. Most or all materials purchased directly.

● Build Route C: Builder/subbies

Building using a main contractor or package supplier to complete the structure to a weathertight stage, with the remaining work undertaken by subcontractors with most materials purchased by self-builder direct from suppliers.

● Build Route D: Main contractor

Building using a main contractor. Building in this way requires the least involvement from the self-builder.

2 Identify your expected level of specification

The standard of specification that you choose will have an enormous influence on your build cost. For estimating purposes, three general categories of quality have been identified:

● **Standard:** This represents a basic build quality equivalent to that offered by most speculative developers. A house may include standard softwood joinery, studwork partitions, a contract kitchen, basic sanitaryware and radiator central heating.

● **Good:** This is equivalent to that offered by quality developers. Features may include high-end off-the-shelf softwood joinery, blockwork partition walls, contract quality kitchen and sanitaryware and underfloor heating (UFH) downstairs.

● **Excellent:** A very high standard. This house may include hardwood joinery, blockwork partition walls, a bespoke kitchen and quality sanitaryware, and UFH, for instance.

3 Multiply the figure by your house size

We use gross internal floor area as a measure (it's the most common in the industry). It's the area of a building measured to the internal face of each perimeter wall for each floor level. It includes areas occupied by internal walls and partitions.

CALCULATING YOUR BUILD COSTS

A simple cost-estimating guide for people building their own home

One of the most important aspects when planning your self-build or home renovation/extension project is working out how much it is going to cost.

This figure will depend on the size and shape of the house, the level of your own involvement, where in the country you intend to build, and the materials you're going to use. If you can make even rough decisions about these factors, then you can begin to work out how much it is going to cost.

As a very general rule of thumb, expect a building plot to cost between a third and a half of the end value of the finished house. The costs of building a house will then depend on the variables listed above. All building work is usually quoted on a cost/m² basis. For example, a typical new four bedroom self-built home is around 200m² (with 100m² on two storeys) and usually varies

between £900-£1,500/m² (although self-builders achieve costs between £300-£3,000/m²).

Renovation costs are more difficult to establish as they involve many variables, but allow at the very least £1,000-£1,300/m² for work. This, added to the cost of the plot/house and with a 10-30% contingency, should result in less than the final end value of the house.

The table below, based on information from the Building Cost Information Service (part of RICS, the Royal Institution of Chartered Surveyors), is updated monthly to help you work out a more accurate estimate (note, however, that these figures are for build costs only and do not account for VAT, which is not charged for self-build projects). There is a free interactive online version at homebuilding.co.uk/calculator. 

		BUILD ROUTE A (DIY + Subbies)			BUILD ROUTE B (Subbies)			BUILD ROUTE C (Builder/Subbies)			BUILD ROUTE D (Main Contractor)		
		Standard	Good	Excellent	Standard	Good	Excellent	Standard	Good	Excellent	Standard	Good	Excellent
SINGLE STOREY													
>90m ²	Greater London	1249	1445	1738	1323	1530	1841	1396	1616	1943	1470	1701	2045
	South-East	1096	1268	1525	1160	1343	1615	1224	1417	1704	1289	1492	1794
	NW, SW, East & Scotland	996	1154	1387	1055	1222	1469	1114	1290	1550	1172	1358	1632
	Mids, Yorks, NE & Wales	953	1103	1326	1009	1168	1404	1065	1233	1482	1121	1298	1560
	Greater London	1144	1388	1804	1211	1470	1910	1279	1552	2016	1346	1633	2122
91-160m ²	South-East	1004	1217	1582	1063	1289	1675	1122	1360	1768	1181	1432	1861
	NW, SW, East & Scotland	913	1108	1441	967	1173	1525	1021	1238	1610	1074	1304	1695
	Mids, Yorks, NE & Wales	873	1060	1377	925	1122	1458	976	1184	1539	1028	1247	1620
	Greater London	1019	1336	1676	1079	1415	1775	1138	1493	1873	1198	1572	1972
161m ² +	South-East	893	1171	1470	946	1240	1557	998	1309	1643	1051	1378	1730
	NW, SW, East & Scotland	813	1066	1339	860	1128	1418	908	1191	1496	956	1254	1575
	Mids, Yorks, NE & Wales	777	1020	1279	822	1080	1354	868	1140	1490	914	1200	1505
TWO STOREY													
90-130m ²	Greater London	1202	1391	1709	1273	1473	1809	1344	1555	1910	1414	1636	2010
	South-East	1055	1220	1499	1117	1291	1587	1179	1363	1675	1241	1435	1763
	NW, SW, East & Scotland	959	1110	1365	1016	1176	1445	1072	1241	1525	1128	1306	1606
	Mids, Yorks, NE & Wales	917	1062	1304	971	1125	1381	1025	1187	1457	1079	1250	1534
	Greater London	1012	1226	1555	1072	1298	1646	1132	1370	1738	1191	1442	1829
131-220m ²	South-East	888	1076	1364	941	1139	1444	993	1202	1524	1045	1266	1604
	NW, SW, East & Scotland	808	979	1241	855	1037	1314	903	1094	1387	950	1152	1460
	Mids, Yorks, NE & Wales	773	936	1186	818	991	1256	864	1046	1326	909	1101	1395
	Greater London	934	1196	1501	989	1266	1590	1044	1337	1678	1099	1407	1766
221m ² +	South-East	820	1048	1318	868	1110	1395	917	1172	1473	965	1233	1550
	NW, SW, East & Scotland	746	954	1199	790	1010	1269	833	1066	1340	877	1123	1410
	Mids, Yorks, NE & Wales	713	912	1146	755	966	1214	797	1019	1281	839	1073	1349

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ASK THE EXPERTS

Looking for impartial, expert advice on your project? Our team of experts are here to answer your need-to-know questions. This month, our experts tackle planning for an extension and loft conversion, and choosing a heating system



Tobias Paul

Tobias Paul of
Planning Helpline/
Zyda Law (zydalaw.com)



Brian Horne

Brian is knowledge manager
at Energy Saving Trust
(energysavingtrust.org.uk)

Q: If I am granted full planning permission for a side extension on my detached bungalow, can I then undertake a loft conversion with dormer extension under Permitted Development – without building the side extension first? My side extension cannot be completed under PD as it is greater than 4m high, but I don't think I will get permission for the dormer extension if I submit all the changes under one planning permission.

A: TOBIAS PAUL You can apply for planning permission for a side extension and then subsequently apply for a certificate of lawfulness for a dormer extension. You do not have to construct the side extension first. I'd recommend three sets of plans to accompany the second application, showing: the existing house; the already consented side extension; and the proposed dormer extension. This is to make clear that the roof enlargement proposed under the General Permitted Development Order (GPDO) is confined to the dormer only.

Although the 'proposed' plans would show the yet-to-be-constructed side extension, the certificate should still be granted. No enforcement action could be taken by the local planning authority: the side extension benefits from express planning permission and the dormer is permitted by the GPDO.

Condition B.2(b) of the GPDO should not be a problem, because the dormer extension would join the original roof to the roof of a side extension. The GPDO does not require that the side extension in question actually exists and does not restrict the side extension in question to only those erected under Permitted Development rights.

One final point to bear in mind – the combined additional roof space of both the side extension and the dormer must not exceed 50m³, even though only the dormer is being constructed under the GPDO.

Q: We want to update our heating system and reduce running costs. An air source heat pump (ASHP) is one option; a gas boiler is another. We've been told an ASHP would not be cost effective as we're on mains gas. With the gas boiler, we could use a twin coil cylinder and add solar thermal. Or would diverting any available 'free' electricity from our existing photovoltaic (PV) panels to the immersion heater in the cylinder be just as efficient?

A: BRIAN HORNE There are a number of systems that divert surplus solar-generated electricity to an immersion heater when appropriate. Currently these can provide some financial benefit, simply because Feed-in Tariff payments for electricity exported to the grid are usually based on an estimate of how much you export, rather than on metered export. However, if you get a smart meter installed, your exported electricity will be metered and your Feed-in Tariff payments are expected to be based on how much you actually export. How much you could save with one of these devices will depend on how much electricity you use from the PV panel to heat water, how much hot water you use, how much electricity you export to the grid, and how much you get paid for exporting electricity to the grid.

You could still opt for additional PV panels rather than solar thermal if you prefer – you will need to compare the projected income and savings for both before you decide which is best.

Note that an ASHP can be a cost-effective alternative to gas heating in some cases. This will depend on a number of factors, including the insulation levels and heat distribution system in your home. If installers have visited your home and consider a heat pump to be inappropriate then they probably have a good reason to say so, but you should not rule out heat pumps on this basis alone. There are also heat pumps that work alongside a gas boiler (hybrid heat pumps) which may be worth investigating. **H**

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Garador has launched a new website-based tool to show exactly what a new Garador garage door will look like on a property.

Garador's Visualise your Door lets you upload a picture of your property, mock-up an image of a garage door and then print it off.

Garador created the Visualise your Door tool to help people see what their garage door will look like on their property before they buy. It has been designed to be easily accessible from a desktop PC or tablet; making adjustments with a mouse or just your fingers on an iPad.

The complete range of Garador doors and colours; including Up & Over, Sectional, GaraRoll and Side Hinged garage doors, is available. Positioning a Garador garage door onto an image of your property is easy, and you can change the style and colour of the door at the click of a button.

Getting the right Garador garage door helps to maximise the value of your property, and this new tool is the easiest way available on the market to ensure you get it right.

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The new Heritage range of In-Frame kitchens by **Terence Ball Kitchens** is available made to order in 30 paint finishes



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Blum drawers can be supplied up to 650 deep with carcasses 700 deep and worktops 750 providing up to 44% increased storage when compared to standard 450 deep drawers. Blum concealed softclose hinges are fitted as standard or exposed butt hinges are available for In-Frame ranges.

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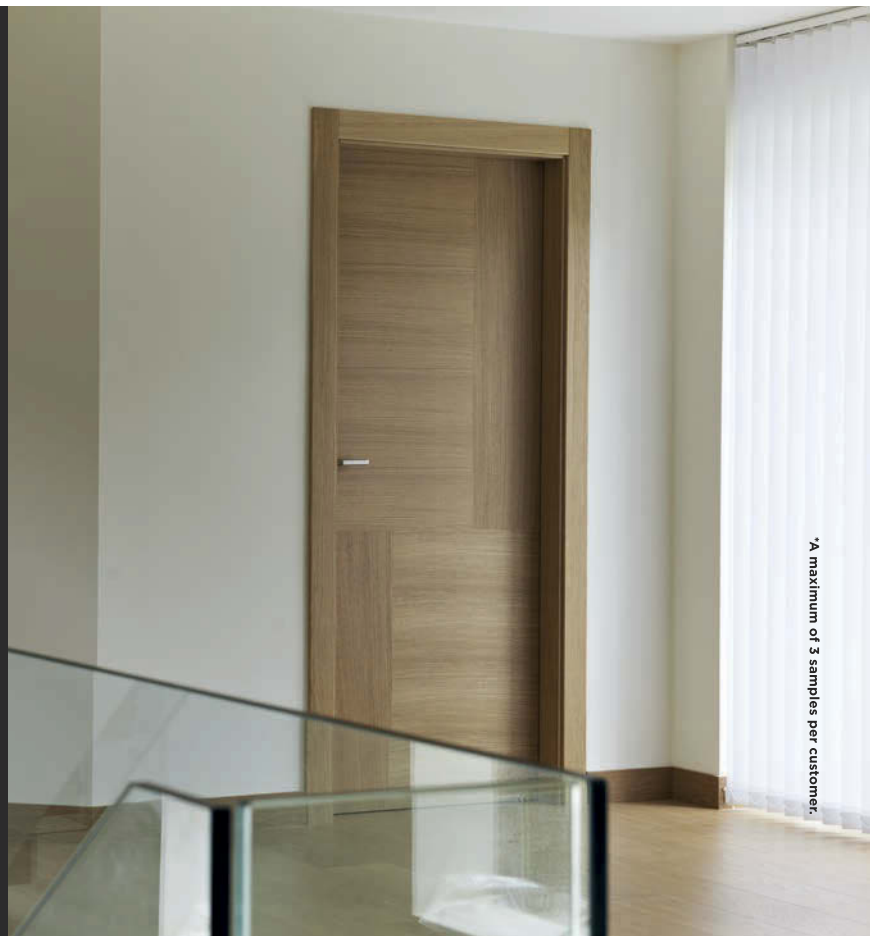


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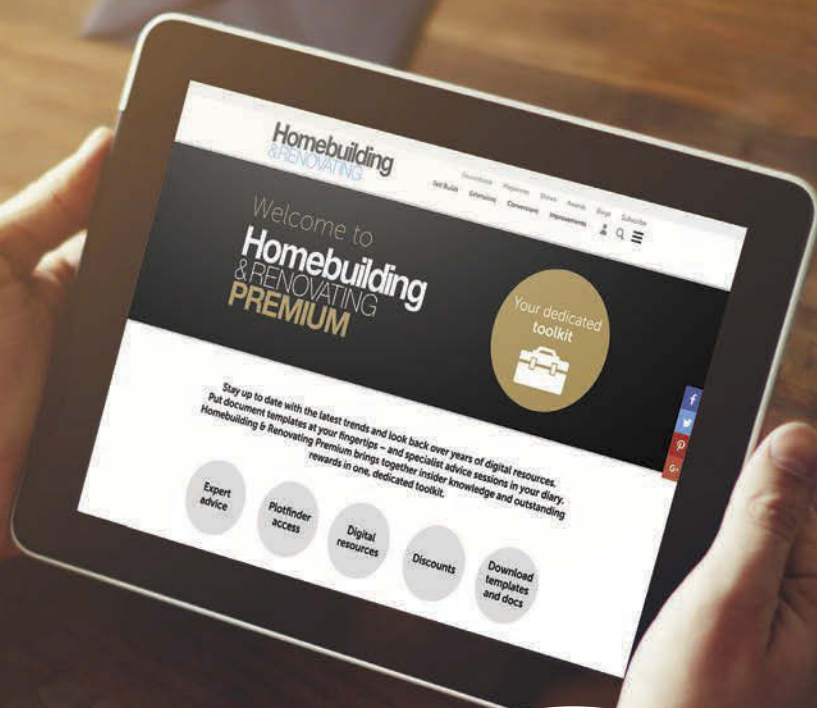
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The Folded Metal Staircase

Architect Phil Waind shares one of his favourite design ideas



Phil Waind

Phil Waind is director at WG+P Architects (wgpa.co.uk).

Here at WG+P, we have always been intrigued by fabrication. With this in mind, stairs are a particularly important structural building element that forms an important relationship with the buildings they sit in and the people using them. The practice has carried out a number of studies on the fabrication of bespoke staircases.

The 'Ardilaun stair' (seen here) is one of those that demonstrates our meticulous approach to their design. This staircase was part of a reconfiguration of a Victorian terrace house in north London, where our brief was to explore the interplay between period features and new contemporary spaces.

We embraced this approach through the unique detailing of individual elements, such

as this elegant folded metal staircase. Working closely with Webb Yates Engineers, the design evolved. The result: identical, laser-cut, folded steel pieces that form the handrail, balustrade and treads. They appear to cantilever but each piece interconnects.

The repetition of identical components and the visual trick of connecting them provides a rhythm akin to that of the adjacent timber Victorian newel and balusters and a sense of lightness. The use of a natural material – waxed raw steel – is in keeping with the honest use of finishes elsewhere, and the cost was comparable with that of a timber stair.

The result is a unique metal staircase that not only adds a contemporary feel to the remodelled house but also acts as a unique stand-alone object in itself. **H**



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