

# Homegrown Timber in UK Construction Case Studies, Volume. 1



# Foreword

Over the last 3 years I have worked closely with the Wales Forest Business Partnership as chair of a cross departmental group for Welsh Government tasked to increase the use of homegrown timber in construction. I am therefore delighted to have the opportunity to write some introductory words for this inspiring collection of case studies.

The case studies provide the practical evidence of the multiple benefits of using homegrown timber in strengthening the local economy, making a real contribution to tackling climate change and delivering the community benefits of warm and beautiful buildings. They provide the practical examples of what we hope will be commonplace through the implementation of the Wellbeing of Future Generations Act.

This is not just about top down policy as increasingly people care where stuff comes from. The food and drink industries have led the way in developing markets for regional produce, and now the wood industry is catching up. People are going to great lengths to use homegrown, or better still, local wood.

Customer motivations are many and varied - maybe to be certain of provenance, to reduce transport miles (and carbon emissions) or to support a local sawmiller or grower, or maybe because it just feels right. Sometimes homegrown timber may be used without the customer's knowledge simply because it represents the best value solution - and in fact being the first choice on merit should be the aspiration for our forest industries.

Fortunately, there are an ever expanding number of highly skilled architects, builders, joiners and timber framers in Wales that are passionate about building beautiful, high performance and sustainable homes with homegrown and local wood.

The projects showcased here represent a snap-shot of what's happening throughout the whole of the UK, but with an emphasis on projects in Wales - from housing to retail, simple homes and social housing to high end self-build, as well as offices and schools. Every type of building is possible. But building with homegrown timber is more than a feel good thing, and demonstrates what we mean by green growth as a means of creating a modern sustainable economy in Wales.



**Peter Davies**

*Sustainable Futures Commissioner and  
Chair, Climate Change Commission for Wales*

*The purpose of the Wales Forest Business Partnership is to support the development of our forests and our forest industries. Increasing the demand for homegrown timber is a key feature of this mission. It is hoped that these case studies will help to inspire the use of homegrown timber wherever possible.*

*If you would like help with specifying, sourcing or using homegrown timber, or to simply find out more about what we do, we would love to hear from you.*

**Email: [timber.info@wfbp.co.uk](mailto:timber.info@wfbp.co.uk)**

**Our thanks to author Kate de Selincourt who led this project for us and compiled the case studies, and especially to all the owners and designers, who shared their projects with us and so generously provided the essential information and images.**



# Beacon Stoves Showroom

The building is designed entirely around the timber available from the client's adjoining woodland.



Beacon Stoves Showroom,  
Newcastle Emlyn, Carmarthenshire

## The project

A new 98m<sup>2</sup> showroom for an expanding woodfuel stove business, including a canopied outdoor space, toilets and an office area.

The building is designed to showcase various uses of renewable energy, as well as to demonstrate the potential of timber as architecture, furniture and fuel.

Using local materials and local suppliers was important, as the business is well-established with a loyal local clientele.

*“Architecture is not often described through smell, but this is frequently remarked upon by visitors to the new building.”*

*A living breathing structure giving off its perfume as it slowly dries and settles.”*

- Architect



## Construction method

Post and beam: large, solid timbers were used to span the 6m space - they are exposed inside, clearly demonstrating how the building is constructed.

The showroom is heated by a small pellet stove (which is a display item). The stove feeds a buffer tank, which takes the solar hot water supply as well.

## The timber story

Trees were client's own, selected for use based on length and girth. The timbers for the frame were processed at a local sawmill in Llanboidy. Surplus timber was used for wall cladding or furniture.

Timbers equivalent to C24 used for the ridge beam, rafters, columns and eaves beam; equivalent to C16 for the purlins and studwork - determined by sizing, based on species specific calculations made by engineer.

## The team

**Client:** *Beacon Stoves*

**Architect:** *Rural Office for Architecture*

**Contractor:** *Firth & Son plus local sub-contractors*

**Engineer:** *Dr Aled Davies, Atebglas Cyf*

## Date of completion & cost

*July 2011; Approx £1900/m²*

[\*Download fact sheet here\*](#)



# Burry Port School

The client's vision was to showcase homegrown timber and make it part of an inspiring space for pupils.

Burry Port School, Pembrey,  
Carmarthenshire



## The project

The amalgamation of an infant and junior school, accommodating a total of 210 pupils and a 30-place nursery class.

A separate 100m<sup>2</sup> elliptical 'pod' building will act as an inspiring multifunctional space for pupils, encouraging recreation and team play.

*"I am proud that it will be the first Passivhaus school in Wales, providing a top quality sustainable building for the children of Burry Port."*

*- Cllr Keith Davies*



## Construction method

The main block is constructed with a traditional timber frame. On-site manufactured Larsen trusses form a void for blown cellulose insulation. Outside is Bitroc external sheathing board and timber cladding, inside is OSB.

The elliptical pod is a Brettstapel structure, made up of multiple strips of softwood securely bonded together with hardwood dowels for strength and rigidity. The Brettstapel is insulated externally and clad as main block.

## The timber story

The client's aim was to promote the use of Welsh/homegrown timber as a renewable and sustainable resource. Brettstapel uses low grade homegrown timber as a load-bearing structure, exposed on the interior. In combination with external insulation, Brettstapel provides an attractive, warm and durable finish.

**Timber frame (main block):** Welsh/borders larch

**Brettstapel:** sourced largely from Welsh woodland, 90% Sitka spruce and 10% Douglas fir, with beech specified for the hardwood dowels

**Cladding:** untreated Welsh/UK grown larch

## The team

**Client:** Carmarthenshire County Council

**Architect:** Architype

**Contractor:** WRW Group

## Date of completion:

August 2015

## Supplier

Welsh/borders larch for frame;  
sawn Welsh Sitka spruce and  
Douglas fir for Brettstapel:  
Pontrilas Timber, Herefordshire.

[\*Download fact sheet here\*](#)



# Canolfan Hyddgen

Built with Welsh softwood, Canolfan Hyddgen was the first building in the world to simultaneously achieve Passivhaus and BREEAM excellent.

Canolfan Hyddgen Offices and Teaching Centre, Machynlleth



## The project

A multi-use building that serves as both a learning centre and offices for Powys County Council. The client's main aims were to reduce energy consumption, fuel bills and overheads.

They wanted to maximise revenue with a building suitable for multiple tenancy and community use; this has been achieved, with over 15 tenants in the building.

*"The most comfortable building I have ever worked in - and comfortable students are much easier to teach!"*

*- Eleri Jones, Training & Learning Coach, & Building Manager*



## Construction method

The building has a hybrid construction, with an external timber post-and-beam frame supporting offsite-manufactured closed panels, and an internal masonry core.

All wall & roof timber cassettes in manageable sizes for a standard crane.

The team devised unique thermal-bridge-free construction details which the frame supplier and structural engineer could guarantee, and that were acceptable to the Passivhaus Institute.

## The timber story

JPW's policy is to source local and Welsh timber where possible, this was also desirable to the client; the design focused on local natural aesthetics and materials. Insulation was also locally sourced, and a local frame manufacturer and installers were used. The requirement for BREEAM excellent meant all timber was FSC certified.

**External/internal CLS studs, roofing, counter battens:**

Douglas fir, some larch & spruce (Welsh & imported)

**External cladding:** Welsh larch

**Internal joinery:** spruce & ash (Welsh & imported) including bespoke ash stairs, made in Welshpool

## The team

**Client:** Powys County Council

**Architect:** JPW

**Contractor:** C Sneade

## Date of completion & cost

Jan 2009; £1537/m<sup>2</sup>

[Download fact sheet here](#)

Images: courtesy of JPW



# Canolfan Tyfu

The Ty Unnos system was developed by Coed Cymru and partners to accommodate the characteristics of fast growing, low density homegrown Sitka spruce.



Canolfan Tyfu, Classroom for Growing the Future, National Botanic Garden of Wales

## The project

A single storey multi-use building for educational and social uses built for the Growing the Future educational project.

The building has two large classrooms with walk in storage, a large foyer and two wet rooms.

*“Ty Unnos, ‘a house in one night’ owes its origins to the Welsh tradition of erecting a house overnight on vacant land and claiming it as a home. The name was chosen to convey a fast and adaptable building system making use of local material and local labour.”*



## Construction method

Ty Unnos offsite construction system. Box beams were factory assembled into portal frames and fitted with metal feet and waterproof membrane, then transported to site and craned into position, enabling fast and weather-proof construction onsite.

The hollow section beams and panels maximise insulation and minimise thermal bridging - fully insulated with Warmcel ® 500. Cladding in larch, with natural and scorched finishes.

## The timber story

Sitka spruce is the most readily available softwood resource in Wales, but until recently has been most widely used for pallets, fencing and carcassing.

By engineering standard sizes into strong, stable components - a hollow box section beam and a small section ladder beam - the Ty Unnos components have been able to demonstrate higher value uses for Welsh spruce, proving adaptable in both domestic and non-domestic buildings.

**Structure:** (box beams, ladder beams and floor joists): home-grown C16 Sitka spruce

**Cladding:** Welsh larch

## The team

**Client:** *The National Botanic Garden of Wales*

**Architect:** *Hughes Architects*

**Contractor:** *Elements Europe Ltd*

**Offsite manufacturer:** *Kenton Jones Ltd*

**On site build:** *G Adams Construction*

## Date of completion & cost

December 2013; £1120/m<sup>2</sup>

## Supplier

*Homegrown C16 Sitka spruce: Pontrilas Timber, Hereford*  
*Welsh larch cladding: Broadoak, Welshpool,*

[\*Download fact sheet here\*](#)

**Images:** courtesy of Hughes Architects



# Caretaker's House

This student project was to design a prototype low cost timber building, using only timber grown and felled on site.



Caretaker's House, Architectural Association, Hooke Park, Dorset

## The project

A family home for the Hooke Park site managers, entirely constructed and fitted out in wood from the Hooke Park woodland surrounding the house.

The schematic design was by students at the Architectural Association (the client); the design was finalised by architects Invisible Studio, keeping faithful to the students' intent.

*"Usually wood is dried and treated before construction, but by felling the wood on site and putting it to use immediately, the team has constructed a low cost home in a very short amount of time."*

*- Inhabitat*



## Construction method

Post and beam timber frame, fully insulated, timber clad and timber-lined. The construction process was super-efficient of resources, and there were no wet trades involved at all. Steel mini-piles are the only non-timber structural item.

While the use of green timber resulted in a fair amount of movement within the construction over the first six months, the use of tongue and grooved and lapped joints, and careful detailing with airtightness tape throughout, limited the impact of this.

## The timber story

The build took place in a very wet summer so the team could only access timber from the edge of the woodland on site. This led to the use of a mixture of larch, Douglas fir, cedar, poplar and spruce.

The limited stock of each species was deployed to its most appropriate use.

**Exposed ground beams/posts:** Douglas fir

**Studwork/protected cladding:** spruce

**Exposed cladding:** cedar

**Internal joinery:** poplar

## The team

**Client:** Architectural Association

**Designer:** AA students, Invisible Studio

**Contractor:** Greenheart Sustainable Construction

**Structural engineer:** Buro Happold

## Date of completion & cost

December 2012; £1400/m<sup>2</sup>

[Download fact sheet here](#)

**Images:** courtesy of ©Valerie Bennett 2012, and Invisible Studio



# Flats and apartments for Catalyst Housing

Conventionally constructed development of 208 homes for a social landlord, maximising the use of homegrown timber.



Flats and apartments for Catalyst Housing, Kilburn

## The project

208 new homes in several blocks of villas, maisonettes and apartments

*“The use of homegrown timber on this development has been commercially competitive, fit for purpose and the material is readily available. Willmott Dixon has been able to demonstrate added social value through the increased use of timber which is grown in Britain.”*

*- Steve Cook, Willmott Dixon*



## Construction method

Mixture of apartments built with masonry core/highly glazed elevations, and terraces having traditional loadbearing masonry construction in lower storeys, and timber upper floors.

## The timber story

Wilmott Dixon are signed up to the UK Contractors' Group policy which gives preference to the use of timber and timber products which are assured as 'Grown in Britain', to support UK employment and to create a more sustainable future for our forests and woodlands.

Steve Cook, Principal Development Manager for Willmott Dixon points out that specifying homegrown timber is not necessarily as difficult as people think: "We used C16 spruce for general carcassing, roof firrings and rooflight upstands. We substituted imported plywood with OSB made in Scotland from British timber, and used English particle board for floating floors; by default, the majority of external landscaping and fencing materials are home grown.

## The team

Client:	Catalyst Housing Group
Designer:	Hester Architects
Structural engineer:	Tully De'Ath
Contractor:	Willmott Dixon Housing

## Date of completion

Due 2015

## Suppliers

Suppliers included James Jones & Sons, BSW, Egger, Norbord, and Lawsons Group

[Download fact sheet here](#)



# Clehonger Passivhaus

Simple form and careful construction have delivered a high quality Passivhaus below the cost of most custom self builds.



Clehonger Passivhaus, Clehonger, Hereford

## The project

A 4-bedroom timber frame Passivhaus with high levels of insulation under the floor and in the walls and roof, and triple glazing. The structure is airtight to 0.24ach @50Pa, and is ventilated via MVHR.

The occupants report steady indoor temperatures around 20-21 degrees C, even early on winter mornings, and low energy bills.

*"The Larsen truss method allows the use of timber available off the shelf. It means you don't need to order specialist products like I-beams, and also gives more versatility with wall thickness - you can do whatever you want."*

*- Mike Whitfield*



## Construction method

The house is built on an insulated concrete raft. The timber frame, constructed in situ, comprises a 100mm stud wall with Larsen truss extensions, which allow for a deep layer of blown cellulose insulation. The house is clad in a mix of Douglas fir and lime render.

## The timber story

Mike Whitfield's company policy is to use homegrown and local timber wherever possible, to minimize environmental impact and support the local timber industry. Homegrown timber used included mixed C16 softwood, Hereford oak, and Scottish softwood I-beams.

Timber frame: mixed local softwood, mainly Sitka spruce but also some Douglas fir from Wales/borders; chosen as it is readily available locally from nearby Pontrilas sawmill. Floors, balustrades and other joinery in oak and external cladding in Douglas fir - both chosen for durability and attractiveness.

## The team

Architect: *Howard Meadowcroft*

Contractor and client: *Mike Whitfield*

## Cost

£1390/m<sup>2</sup>

[\*Download fact sheet here\*](#)



# Coed-y-Brenin Visitor Centre extension

Britain's first building constructed using Brettstapel from homegrown softwoods.

Coed-y-Brenin Visitor Centre extension, Snowdonia National Park



## The project

New extension including bike hire facility, shop, extra WCs, conference room and cafe overflow area.

The brief was to design an exemplar building using Welsh grown softwoods, and to be cost effective but not 'cheap'. Durability externally and internally were very important as it needs to withstand heavy (and muddy!) use.

The building is well insulated with good natural light, and the high thermal mass and the moisture-buffering properties of the Brettstapel structure contribute to stable indoor conditions.

*"Brettstapel is an ecological choice, making best use of low grade timbers usually dismissed in construction."*

*- Architype*



## Construction method

Brettstapel structure with an exterior insulated envelope filled with cellulose fibre insulation.

Brettstapel is made up of short leaves of softwood held together with super-dried hardwood dowels. The dowels are knocked into the stacked leaves where they swell and tighten the assembly into a rigid load-bearing panel. The Brettstapel was constructed offsite, contributing to high building quality and reduced time on site.

## The timber story

The Forestry Commission wanted the special character of the location to be preserved, and acknowledged in choice of materials, which drove the decision to use Brettstapel. Main load-bearing structure: Sitka spruce and Douglas fir  
External Cladding: larch (including trees from the site itself) and untreated local Douglas fir decking and handrails: untreated local Douglas fir floor and skirting: oak and ash respectively, sourced and processed locally  
Balcony: Western red cedar from Welsh forests - having silvered with age, this timber is ideal for outdoors decking as it is highly resilient to decay.

## The team

Client and supplier: *Forestry Commission Wales (now Natural Resources Wales)*

Architect: *Architype*

Contractor: *Pochin Construction Limited (on-site)*  
*Williams Homes Bala (off-site)*

## Date of completion & cost

June 2013; £3000/m<sup>2</sup>

[\*Download fact sheet here\*](#)



# Di Rollo House

MAKAR design and deliver high performance buildings around the properties of the Scottish timber resource.



Di Rollo House, Ullapool, Scottish Highlands

## The project

This 110m<sup>2</sup> private house forms three terraces, stepping back to allow direct solar gain and views, under a single sloping roof finished with turf. Untreated larch cladding was employed to the external walls, which will weather to a silver-grey colour over time.

*“Drawing inspiration from the strong and highly developed timber construction culture of Alpine Europe, MAKAR have honed their knowledge of modern construction methods to get the optimum performance from home grown timber”*



## Construction method

Superstructure and timber panels were manufactured off-site then craned into position on site. Working off-site enables construction to progress in a controlled environment. This reduces the risk of delays caused by adverse weather conditions and improves the quality control of assembled components.

## The timber story

Scottish timber is an abundant yet under-utilised resource that covers much of the Scottish Highlands, and MAKAR aims to deliver a progressive timber-based design and build system that is rooted in these resources. This reduces the carbon footprint of MAKAR's buildings, and stimulates a regional industry that feeds local investment. Locally sourced timber, used to a non-chemically treated specification.

**Post and beam frame:** Douglas fir

**Cladding:** larch

**Carcassing:** spruce

## The team

Designer and Contractor:  
MAKAR

## Date of completion

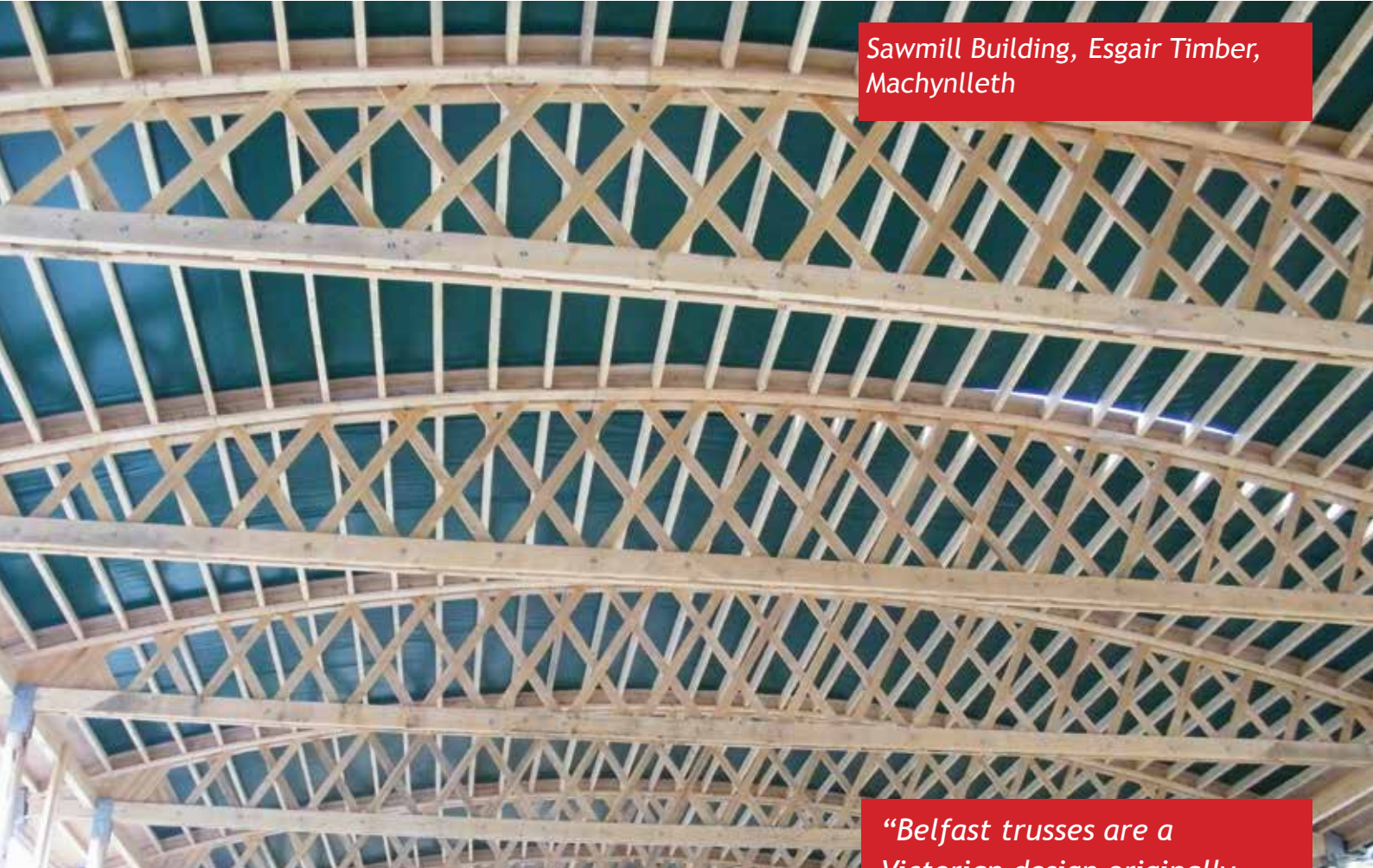
2009

*[Download fact sheet here](#)*



# Esgair Sawmill

A large single span building for Esgair Timber's expanding sawmill operation - as far as the clients know, the biggest timber single span in Wales.



Sawmill Building, Esgair Timber, Machynlleth

## The project

A large single span building for Esgair Timber's expanding sawmill operation, 50m long with a 20m span. The main purpose is sheltering workers and equipment, but the building also serves as a demonstration to customers that a large single span building can be made from local timber.

The exterior showcases a range of cladding materials and styles.

*"Belfast trusses are a Victorian design originally devised by the Harland and Woolf shipyard to create the huge spans needed, in a way that can be nailed together by unskilled labour, from ungraded timber*

*- and this is what we did too."*



## Construction method

Post and beam frame with Belfast truss roof, timber clad. The Belfast truss roof was constructed in the same way as the Victorian originals, using unskilled labour and ungraded timber, though with modern fixings.

Although the span is so large, an entire building of this kind can be transported to site in pieces, none of which are longer than 6.5m.

## The timber story

As a forest owner, the client wished to use their own timber to create a demonstration building for their business - all timber was sourced from within 200m of the site.

**Trusses:** Sitka spruce and western hemlock

**Purlins and cladding:** Sitka spruce

**Posts:** Douglas fir, 300mm+ poles (whole trunks)

## The team

Client, designer, contractor and supplier: *Esgair Timber*

## Date of completion & cost

2009; Materials and labour client's own, but Esgair Timber calculate that an equivalent build for another client would cost ~ £1,000/m<sup>2</sup>

[\*Download fact sheet here\*](#)



# Fforest Lodge

Japanese larch felt an appropriate, almost poetic choice for the construction of this Japanese-inspired home.



Fforest Lodge, Wye Valley

## The project

Contemporary remodelling of former brick-built forester's cottage, retaining the original footprint and ground floor exterior walls, with a two-storey timber frame extension above, resembling a set of intersecting cubes.

Built as the clients' home (though currently a holiday let while owners are overseas).

*"We have created a lovely, light airy home - which also features a Japanese room complete with sliding walls and tatami matting, and a large roof terrace at the height of the surrounding tree canopy."*





## Construction method

Timber frame using combination of Welsh-grown Japanese larch (for roof and floor joists and internal stud walls) and imported spruce (for external panels). Single-ply membrane roof.

## The timber story

Having learned of the plight of homegrown Japanese larch from Woodknowledge Wales, the clients decided to use the project to showcase its suitability as a structural timber, using the TV programme *Grand Designs* as the platform. All roof joists and internal walls were made using local Japanese larch, and the house is also clad in the same timber.

The original intention was for the frame to be all Japanese larch too, but for reasons of economy, the final construction used mixed species with sufficient Japanese larch to demonstrate its suitability as a structural timber.

## The team

Client: *Nigel & Tamayo Hussey*

Contractor: *Brett Wildin*

Structural Engineer: *Brian Spencer*

Timber frame: *Fforest Timber Engineering Ltd*

## Date of completion & cost

*August 2013; £800/m<sup>2</sup> (remodelling)*

[\*Download fact sheet here\*](#)



# Future Affordable

Scottish C16 timber is abundant, but often overlooked for structural use in favour of wood from northern European sources.



*Future Affordable Low Carbon Demonstration Homes, Dunfermline, Fife*

## The project

Terrace of three two-bedroom social homes demonstrating a way to achieve low carbon targets using offsite construction, combining two complementary systems.

An integral part of both systems is the optimised use of Scottish C16 timber, as a carbon-efficient building material.

*The designers wanted to demonstrate that C16 Sitka spruce has the required structural strength for use in all the components of two storey housing, and that it has significant local economic and carbon emission benefits.*



## Construction method

Off-site manufactured closed panel system (K2) incorporating e.Core pods. The K2 System is optimised for the use of C16 Scottish timber, minimising thermal bridging to achieve 2013 / 2016 fabric first standards. The e.Core pods are manufactured off-site from NailLam (nailed, stacked plank timber panels) using 100% Scottish C16 timber. They contain the bathroom, kitchen and all the electrical, heating and ventilation services, greatly reducing site work by service trades.

## The timber story

Homegrown timber was used for the outer shell, for the intermediate floors and roof trusses and in the serviced e.Core, to demonstrate that it has the required structural strength for all components of two storey housing, and that the resulting dwellings can be comfortable and energy efficient.

K2 is a breathable system, and the massive NailLam core acts as a water vapour buffer for the living spaces. It contains 1 ton of timber which evens out the heating and cooling cycle of the house.

## The team

Client:	Kingdom Housing Association
Architect:	Kraft Architecture /David Blaikie Architects
Contractor:	Springfield Properties PLC
Engineering:	Hannah Reed Associates
Additional consultancy and research: Edinburgh Napier University	

## Date of completion

February 2013

## Suppliers

Scottish Sitka spruce: BSW, Boat of Garten, Inverness-shire.  
Joinery: BSW Timber, CCG (OSM) Ltd & Ochil Timber Products Ltd

[Download fact sheet here](#)



# Glan Gors

Houses constructed in Welsh grown softwood and assembled in a matter of hours, with external finishes, service connections and landscaping completed in under eight weeks.



Glan Gors development,  
Dolwyddelan, Conwy

## The project

Much-needed development of four semi-detached properties in a Snowdonia village, built for social housing landlord Cymdeithas Tai Clwyd in the Ty Unnos system, on land specially released for the purpose by the Forestry Commission (now Natural Resources Wales).

*"It was exciting to see a semi-detached house formed on the site within daylight hours. It's a far cry from conventional building work, with all the planning and construction work having taken place within the compound of a clean factory space."*

*- client development manager*



## Construction method

Ty Unnos Modular™ developed by Elements Europe: offsite manufacture of homegrown timber frame single-storey modules, highly insulated with Warmcel ® 500.

The modules were fully fitted and finished internally offsite, with bathroom, kitchen, windows and doors assembled, wired and plumbed in the factory, then transported to site. They were then craned into their combined position, and finished externally with a rain screen of render, slate and cladding, giving a conventional appearance.

## The timber story

The Ty Unnos system was developed by Coed Cymru and partners taking into account the characteristics of fast growing, low density homegrown Sitka spruce, by engineering standard sizes into strong, stable components: a hollow box section beam and a small section ladder beam. The box beam can be used as a load bearing element and a 210mm x 210mm beam can span up to 4.8 metres; the ladder beam can be used as a floor joist with spans of up to 3 metres, and as a non-load bearing wall stud.

## The team

Client:	<i>Cymdeithas Tai Clwyd</i>
Designer:	<i>J Ross Developments, Oswestry</i>
Contractor:	<i>J R Pickstock Ltd, Oswestry Timber</i>
Offsite Manufacturer:	<i>Elements Europe Ltd, Oswestry</i>

## Date of completion & cost

*January 2011; £1096 / m<sup>2</sup>*

[\*Download fact sheet here\*](#)



# Glulam retail structure

An indoor retail structure made up of 60 individually shaped beams, entirely from Cornish-grown larch.



Larch glulam structure for Harris & Hoole coffee shop, Stansted Airport

## The project

Decorative indoor glulam structure to create an attractive space for customers to linger while waiting at the airport. Made from UK grown larch, manufactured by Buckland Timber.

*“The designers were presented with UK larch, Siberian larch and spruce samples: UK larch was chosen for the interesting grain features and colour.”*

*- Robin Nicholson*



## Construction method

There are about 60 beams, each one individual, and tapered at random angles. The beams are connected by fully recessed / invisible brackets.

The whole structure was cut and then assembled for checking in the Buckland Timber factory, before being disassembled and transported to site to be re-erected.

## The timber story

Buckland Timber are keen on using homegrown timber in glulam manufacture, and are now using homegrown larch glulam in structural applications.

The designers of the coffee shop were presented with UK larch, Siberian larch and spruce samples: UK larch (from Duchy Timber in Cornwall) was chosen for the interesting grain features and colour.

### The team

Client:	<i>Harris and Hoole coffee shop</i>
Designer:	<i>Path Design</i>
Contractor:	<i>LPL Construction Services, Buckland Timber</i>
Project managers:	<i>Cube LLP</i>

## Supplier

Glulam manufactured by Buckland Timber

[\*Download fact sheet here\*](#)



# The Greenway

Catalyst Housing's flagship zero carbon development achieved numerous sustainability standards and awards, and makes integral use of homegrown timber.



The Greenway, Staines Road,  
Hounslow, London

## The project

Catalyst Housing's flagship sustainable development provides 18 new homes; 14 apartments and four houses. Through carefully planned energy saving and other innovative measures, The Greenway was the first small-scale development in London to simultaneously meet the highest standards in three key sustainability measures:

- The Mayor of London's Housing Design Guidelines
- Latest Lifetime Homes Standard
- Code for Sustainable Homes level 5

### Awards include:

*'Best Sustainable Scheme',  
2013 National Housing Awards*

*'Best Sustainable Smaller New  
Housing Project', Sustainable  
Housing Awards.*

*Highly commended, 2013  
Sustainable City Awards.*

*Voted 'Best Small  
Development' by readers of  
First Time Buyer magazine*

*Silver, Green Apple Award*



## Construction method

The specific location of the site required a heavyweight construction, however the highly insulated external walls to the front and rear were formed with homegrown softwood studs, and clad with OSB, before being insulated.

## The timber story

Willmott Dixon is a supporter of Grown in Britain, and its procurement policy gives preference to the use of timber and timber products which are assured as 'Grown in Britain', to create a more sustainable future for our forests and woodlands.

Client Catalyst Housing was also keen to use homegrown timber to support jobs, the rural economy and social value.

**Studwork for external frame:** 47 x 150mm C16 FSC

Certified Spruce from James Jones, Scotland

**Internal cladding:** Norbord Sterling OSB from Scotland

## The team

**Client:** Catalyst Housing Group

**Architect:** MEPK Architects

**Contractor:** Willmott Dixon Housing

**Building services:** EngDesign Ltd

## Date of completion

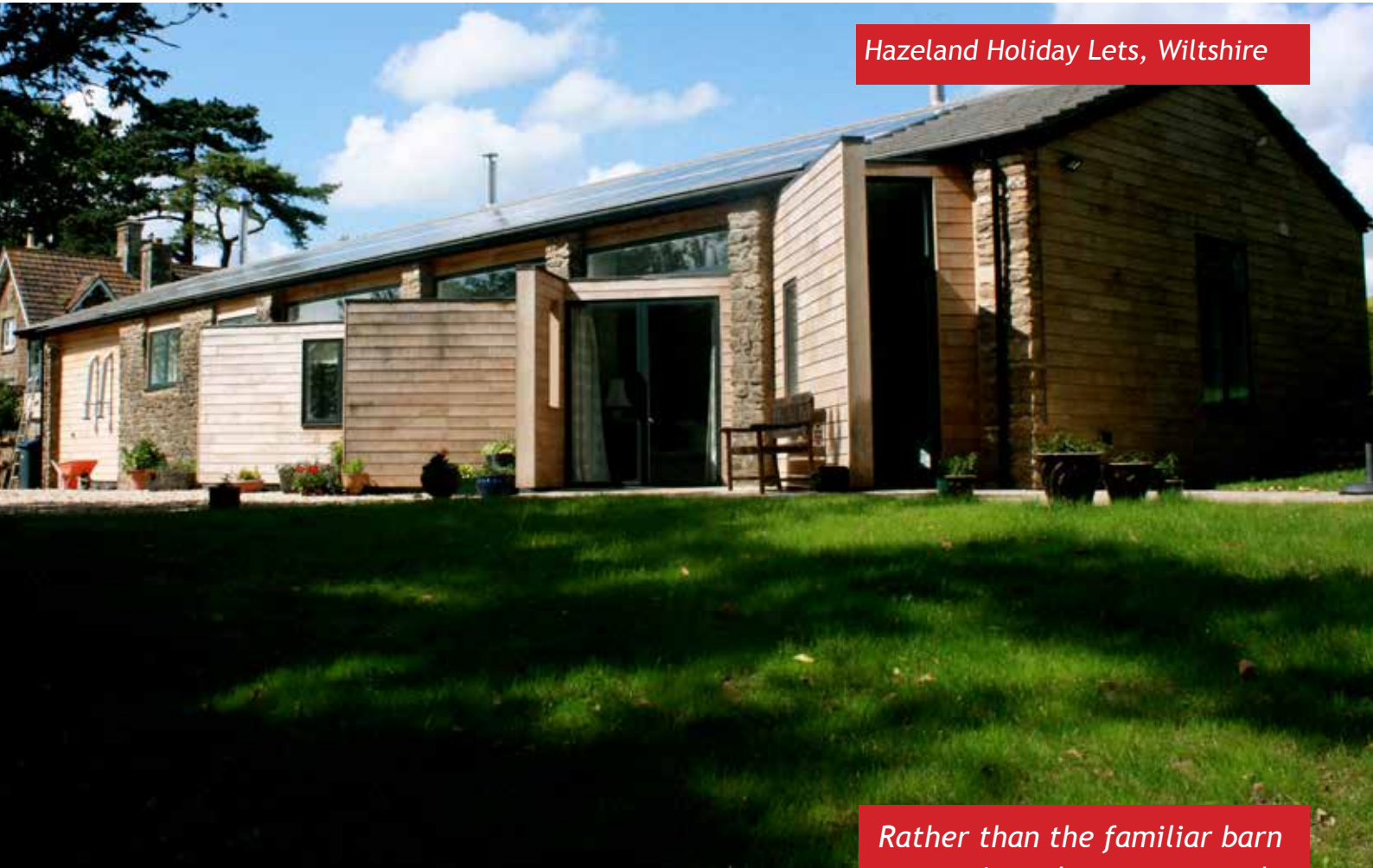
November 2012

[Download fact sheet here](#)



# Hazeland Holiday Lets

Locally sourced oak seemed the ideal material for an eco tourism location.



Hazeland Holiday Lets, Wiltshire

## The project

Conversion of a steel portal frame barn to form three self catering holiday lets opening out into the garden and nearby woodland. A district biomass system has been installed in the converted barn to heat both the holiday lets and the main house, while solar PV cells on the south facing roof, produce the electricity.

Wood burners allow localised heating to the main living spaces.

*Rather than the familiar barn conversions that restore and reuse an already beautiful structure, this scheme started from a rather less elegant steel barn, so it had to create an aesthetic of its own, creating an entirely new feel with expressive natural materials.*



## Construction method

Retrofit to steel framed structure with part masonry cavity wall and part structural timberwork

## The timber story

Sitting on the edge of a wood owned by the clients it was decided very early on that the scheme would seek to connect the new holiday dwellings to the forest. Locally sourced oak seemed the ideal material for an eco tourism location, and also for longevity and resilience.

The jointed English oak profiled cladding, sourced from local woodlands, was supplied by Vastern Timber.

## The team

Architect: *Elkins Architects*

Contractor: *Elkins Architects*

Structural  
engineer: *Hambleton  
Partnership*

M&E: *IDDEA*

## Date of completion & cost

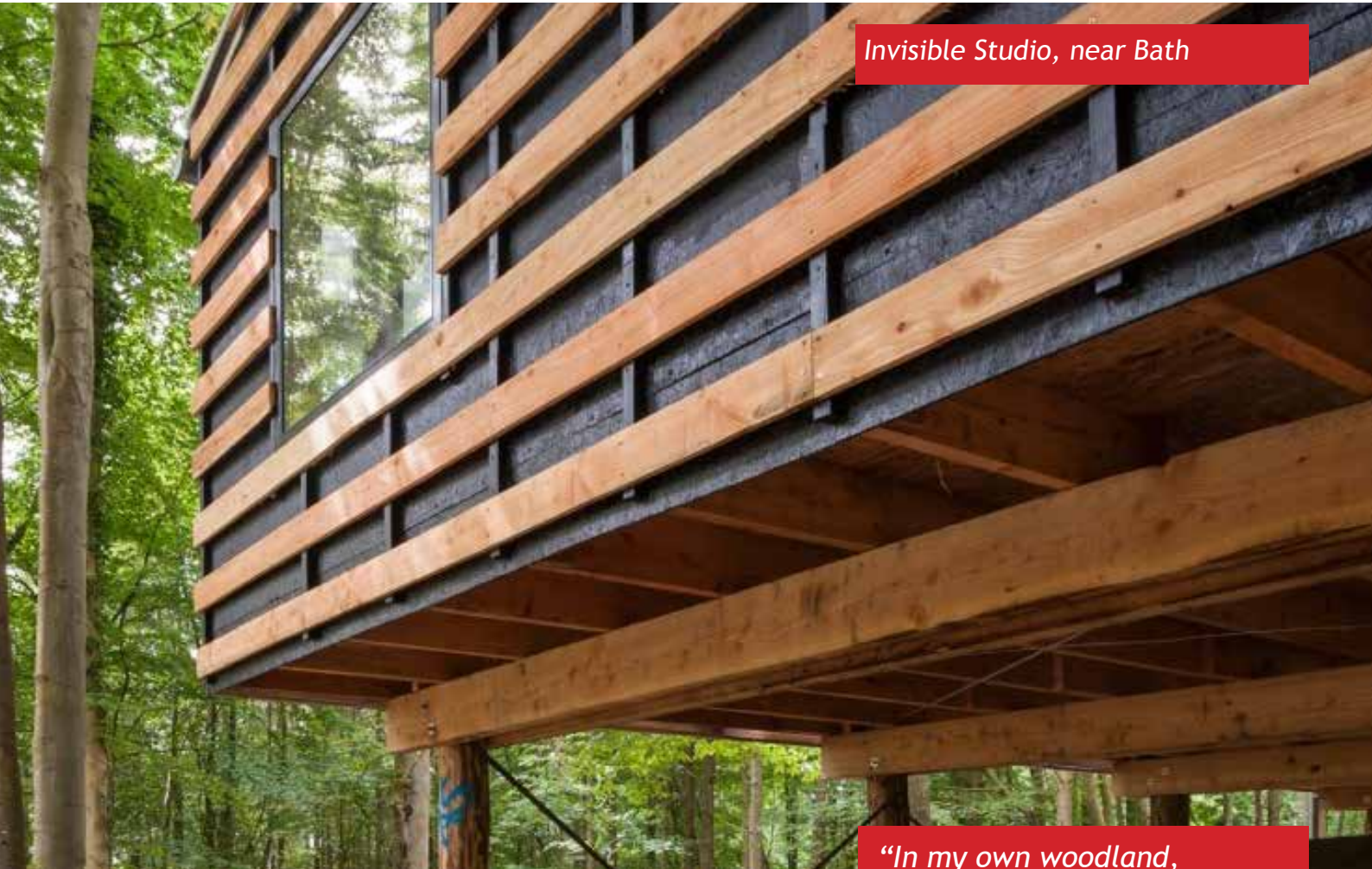
*Summer 2014; £1100/m<sup>2</sup> not  
including renewables*

*[Download fact sheet here](#)*



# Invisible Studio

An exercise in economy - “of all the buildings I’ve done, this is the most frugal.”



Invisible Studio, near Bath

## The project

New studio for architecture and design practice. The project was an exercise in building with minimal cost and minimal design, by unskilled labour, allowing for improvisation.

The building is lightweight and well insulated and draughtproofed, so well suited to its sporadic occupation; it can be heated quickly (within 15 minutes) even after standing empty.

*“In my own woodland, I wanted to build in an informal, loose fit way, just using materials and people to hand.”*

*- Piers Taylor*



## Construction method

Post and beam: the construction system avoids any complex carpentry, and attempts to achieve a relative precision with rough hewn materials and unskilled labour: no one who worked on the project had constructed a building before.

## The timber story

The designer particularly enjoys working with constraints of thinnings and sometimes lower grade timber, to make best use of this underutilised resource. The timber, untreated and unseasoned larch, came entirely from the woodland site of the studio itself. It was all milled over the two days that a mobile saw was booked.

This constraint informed the building design, and was embraced - for example, the cladding that was milled after the structural timbers was just enough to partially clad the studio - hence the stripes.

The project was self-scaffolded by timber that was ultimately part of the building, so expensive scaffold hire was avoided.

## The team

Client:	<i>Invisible Studio</i>
Designer:	<i>Invisible Studio/the construction team</i>
Construction:	<i>Invisible Studio team with the help of neighbours and friends (all paid an equal rate)</i>

## Date of completion & cost

*June 2014; < £275/m<sup>2</sup>*

[\*Download fact sheet here\*](#)



# The Larch House & The Lime House

Two social homes built and certified as Passivhaus, using Welsh timber throughout - for structure, cladding and joinery.



Larch House & Lime House, The Works, Ebbw Vale

## The project

One 3-bedroom and one 2-bedroom Passivhaus built for the United Welsh Housing Association. The designs were winners of the BRE's Welsh Passivhaus competition for show homes for the 2010 Eisteddfodd.

*"We can't believe how lucky we are. This house is everything we could wish for and more. We look around the rooms, how warm it is, it's amazing, so well built, so well thought out, the kids love it; it's a dream come true."*

*- occupant*



## Construction method

Closed panel softwood frame: in order to use Welsh timber, the depth of the studs was limited to 225mm, which is the largest available section of Welsh C16 softwood. Although more than double the normal thickness for closed panels, further insulation was added inside and outside thus achieving the very low u-values required by the Passivhaus standard. The insulated envelope forms a simple box, with a conventional timber roof above.

## The timber story

A key part of the competition brief was to use local materials and products where possible, to minimise embodied energy from transport and to encourage the development of the Welsh sustainable construction sector.

**Structure/internal joinery:** Welsh Sitka spruce

**Cladding/external joinery:** Welsh larch, supplied by Pembrokeshire Timber Store

**Passivhaus certified windows and door of Lime House:** Welsh larch, thermally modified in Anglesey

## The team

**Client:** United Welsh Housing Association

**Architect:** Bere:architects

**Contractor:** Pendragon Design and Build Ltd

**Timber Frame:** Holbrook Timber Frame

## Date of completion

July 2010

[Download fact sheet here](#)



# New Welsh House live/work units

A building system designed to use Welsh materials throughout, to add value to local raw materials and create local employment, “benefiting local people rather than company shareholders from outside the community.”



## The project

Two adjoining multi-functional live/work office/studios in the Presteigne Enterprise Park, constructed to test and showcase the New Welsh House (NWH) panel system. The object was to show it is possible to build efficient, sustainable buildings using well managed local semi-skilled site labour, and materials readily available locally.

*“Since there is such an abundance of graded C16 Welsh spruce, why would any sensible person use anything else if they wanted to build sustainable, local, low cost buildings?”*

*- David Bamford*



## Construction method

Hollow structural panels for walls and floors based on ladder frames, using standard size C16 graded Welsh spruce with steel webs. The panels are diagonally clad with tongue-and-groove boards to produce a light, rigid panel.

The panels with window and door voids were factory constructed, screwed together on site, filled with densely-blown Warmcel insulation, then clad with a rainscreen. The New Welsh House system is LABC certified.

## The timber story

The system was designed specifically to use Welsh materials throughout: about 80% of the total materials were sourced locally.

**Frames:** C16 spruce chosen as it is local, inexpensive and readily available.

**Panels:** tongue-and-groove spruce boards - readily available locally.

**Cladding:** Douglas fir and larch from local suppliers.

## The team

**Client:** *New Welsh House*

**Project Designer and Manager:** *John Copsey*

**Contractors:** *Tony Griffiths and Sons, Groundworks*

**Offsite fabrication of panels:** *Fforest Timber Engineering*

**Structural Engineer:** *Luke Whale, C4CI*

## Date of completion & cost

*Summer 2014; £872/m<sup>2</sup>  
(Calculated build cost)*

## Suppliers

*Spruce for panels: BSW,  
Newbridge-On-Wye  
Douglas fir and larch for cladding:  
Llandre Saw Mills, Hundred House*

*[Download fact sheet here](#)*



# Orchard House

Timber and other natural finishes are an important part of the appearance, inside and out, of this elegant modern house.



## The project

Orchard House is elegant modern two-storey courtyard house in an historic village, commissioned as a place for the client to live, work and pursue her hobbies. It includes flush thresholds and a discreet lift for full accessibility.

The client specifically wanted to create a lasting piece of architecture that interacted effortlessly with the landscape.

*Client and architect were focused on the simplicity of a high performing fabric and sustainable materials choices, rather than expensive add-ons that could go wrong.*



## Construction method

On-site construction (limited access): timber frame with second structure outside to contain the insulation with minimal thermal bridging. Glulam trusses (trusses also assembled on site), super-insulated with sheep's wool.

## The timber story

Local timber was chosen as client and architect wanted to build sustainably. Load bearing columns, trusses and glazing frames: Douglas fir, other timber, or glulam. For the largest span (~10m) the structural engineer initially recommended steel, but this too was spanned by a large truss assembled on site from glulam and timber.

**Cladding:** sweet chestnut slats. Finger jointing reduces waste by increasing the amount of each tree that can be used, and creates boards of a more consistent grade and greater stability. The slats have been left to weather naturally to a soft grey.

**Internal joinery:** sweet chestnut - it is extremely durable, does not need any treatment and is lighter and more stable than oak.

## The team

Architect: *Studio Octopi*

Contractor: *N A Lloyd Builder Ltd*

Structural Engineer & timber frame design: *Milk Structures*

## Supplier

*Sweet chestnut and Douglas fir: Vastern Timber, who source much of their timber from in and around Wiltshire.*

*[Download fact sheet here](#)*



# Pair of semi-detached houses, Bangor

The aim was to create affordable high performance houses in a way that could be based entirely upon locally grown timber.



Pair of semi-detached houses, Bangor

## The project

Affordable high performance dwellings aiming to deliver comfort and energy efficiency via a fabric first approach, using local timber where possible, and also products that could be produced from Welsh spruce if there was sufficient demand.

Built to comply with Code for Sustainable Homes Level 4, warranty provided by LABC.

*"It ticks all the boxes in terms of the thermal and acoustic comfort, air quality as well as plentiful natural daylight."*

*-Occupant*



## Construction method

Modern timber frame. From outside: mostly rendered finish onto Pavatex wood fibre insulated sarking board with a small area of Accoya beech cladding (shown in image). 140mm studs insulated with wood fibre batts, OSB racking board inside taped for airtightness. Internal service void and plasterboard.

Cavity-free construction allows for reduced thickness of walls, which is important in small dwellings. Vapour open wood fibre insulation was used in order to reduce the risk of interstitial condensation, and support good IAQ.

The ventilation is entirely passive - the extract stacks can be seen in the image.

## The timber story

All the softwood products used on the project could be manufactured from Welsh spruce including: spruce fibre insulation, spruce fibre render carrier and spruce fibre sarking board.

The deck and porch were made from locally grown and milled larch. The OSB racking board was Scottish.

Images: courtesy of Gary Newman

## The team

Client:	Gary Newman
Architect:	Rachel Bevan Architects
Contractor:	Williams Homes (Bala) Ltd

## Date of completion & cost

July 2014; £1200/m<sup>2</sup>

[Download fact sheet here](#)



# Private House, Taliesin

Running costs are less than £1 per day for this highly insulated and airtight timber self-build.



Private House, Taliesin, Ceredigion

## The project

A highly-insulated low energy home, comprising a two-storey house and attached one-storey studio (210m<sup>2</sup> in all), timber framed and timber clad. The clients' priorities were good thermal and environmental performance: the house meets Passivhaus levels of airtightness and calculated annual heat demand.

*"The house is a fantastic pleasure to be in. I'm sitting at a window looking out towards the sea. It's been 20.5 degrees or above for the eight months we've been here; we could have designed a much flashier house, but we just wanted it to work well."*



## Construction method

Standard timber frame panel with site-built Larsen trusses to provide the insulation thickness, clad with sarking board and filled with blown cellulose insulation, and finished with Welsh red cedar cladding.

## The timber story

Clients' desire was for a timber framed house, also clad in timber. Cladding is Welsh red cedar weatherboard from Powys. "We used Welsh red cedar because we wanted local timber if possible, one that was very hardy and had enough natural oils to protect it without painting or preservatives - and we loved the smell! That's what clinched it over larch."

## The team

**Architect:** George & Tomos, Machynlleth - working with clients' own design

**Energy & Building Services:** Nick Grant, John Cantor & Alan Clarke

**Contractor:** Tai Dyfi Homes

## Date of completion & cost

March 2013; £1380/m<sup>2</sup>

[Download fact sheet here](#)



# Timber frame and straw bale self-build

Much of the construction of this traditional timber frame extension, fully insulated with straw, was carried out by the client in person.



Timber frame and straw bale self-build extension, private client, Powys

## The project

Two-storey two bedroom extension to a traditional two bedroom Welsh cottage, to add sleeping accommodation and a business base.

The design is open plan to make best use of light and heat for living and working - it is heated by a single logburner.

*"It's a very tactile house - visitors like to touch the natural materials, rather than just look at or comment on them."*

*- client*



## The team

**Designers:** Client's design with architect Philip Humphreys, Montgomery

**Timber frame:** Alan Ritchie, Hewnwood Timber Frame Company, Brecon

**Rest of Build:** client and specialist local subcontractors

## Construction method

Traditionally cut, jointed and pegged post-and-beam timber frame, on pad foundations, with straw bale insulation to outside of frame, plastered outside with hemp lime plaster, then clad with a larch rainscreen. Roof insulated with blown cellulose.

## The timber story

The client wanted to create a house that was cost effective and as sustainable as possible, and to support local businesses. The subcontractors and suppliers were all local. It was important that it had a hand crafted feel, that it was well made and used natural materials such as timber, lime plasters and natural stone.

**Frame:** Welsh Douglas fir & oak - for strength and stability

**Exterior cladding:** larch for durability

## Date of completion & cost

2014; Costs stayed within budget based on average build costs, but some items were recycled or available cheaply or free, as were the bulk of labour costs

## Suppliers

Spruce for panels: BSW, Newbridge-On-Wye

Douglas fir and larch for cladding: Llandre Saw Mills, Hundred House

[Download fact sheet here](#)



# Tree Management Centre, Westonbirt

Two buildings for Westonbirt Arboretum constructed from wood from the site, including some timbers so large they are being hand-hewn, rather than milled.



Tree Management Centre,  
Westonbirt Arboretum,  
Gloucestershire

## The project

The new Tree Management Centre for Westonbirt Arboretum, under construction in 2015, comprises two buildings: a big single-span workshop, and a smaller welfare building for the tree team.

*“What makes the workshop interesting is the size of the sections used - the curved 23m bottom chords, and the chunkyness of all the other timber. It’s like a supersized barn - drawings don’t show how big it is!”*

*- Piers Taylor, Invisible Studio*



## Construction method

The workshop needs to be “sturdy enough to cope with a tractor bumping into it”. It is effectively a simple barn on a larger scale: a series of huge king post trusses, generally with traditional joints with some additional steel bracing.

The welfare building will be built from green timber, through a series of student workshops, using processes that will accommodate the lower skilled participants.

## The timber story

Designer Piers Taylor of Invisible Studio comments : “It would normally be an extravagance to build with so much timber, but there is an abundance on site.” Much of the timber is available from routine tree management, and the aim is to use the timber without having to take it away for milling.

The large workshop span uses 20m long Corsican pine beams which are being hewn by hand. Typically you can’t use timber this size as it is too big to transport but by hand-hewing on site, it can be used full-sized.

**Structures:** Corsican pine

**Cladding:** Wellingtonia, larch & oak

## The team

<b>Client:</b>	Westonbirt Arboretum
<b>Architect:</b>	Invisible Studio
<b>Timber specialist:</b>	Charley Brentnall
<b>Engineers:</b>	Buro Happold
<b>Contractors:</b>	TBA

## Date of completion:

Still under construction

[Download fact sheet here](#)



# Twyford Barn

The timber used in this beautiful barn renovation is 100% locally sourced: some from nearby woodland visible from the building itself.



Architype Offices, Twyford Barn, Hereford

## The project

Renovation of two derelict farm buildings to form a new office for the architect, now a workplace for 28 people. The two buildings were owned by the Duchy of Cornwall, and renovated as part of a Duchy rural regeneration programme aimed at providing workplace opportunities in the countryside.

The designers and occupants of the building, Architype, wanted to use natural materials to ensure their new offices would sit seamlessly in the Herefordshire countryside, despite being a very modern office inside.

*The materials specified inside and out showcase the palette of materials the designers employ in a wide range of their work. Over time, with the silvering and maturity of the cladding, the exterior of the building has become an unassuming addition to the landscape.*



## Construction method

Retrofit - new timber joinery and cladding, plus reconstruction and pointing of stonework: the buildings were effectively ruins before work began.

## The timber story

The desire was to use locally sourced materials with a connection to the rural landscape, so 100% locally sourced timber was specified.

Structure and exterior cladding is Douglas fir from the Duchy of Cornwall Estate, Cornwall; the sweet chestnut for the interior floors and balcony are from the Aconbury Estate woodlands across the valley from the office.

## The team

Client: *The Duchy of Cornwall/ Architype*

Architect: *Architype*

Contractors: *Mike Whitfield*

## Date of completion & costs

2006; £2,027/m<sup>2</sup> (retrofit)

[\*Download fact sheet here\*](#)



# Withyfield Cottage

The unusual roundwood construction was built from local timber, straw bale and cedar shingle.



Withyfield Cottage, Merrion Farm,  
West Sussex

## The project

A small holiday cottage located on a working dairy farm, on the edge of the South Downs National Park. The owners wanted to make Withyfield Cottage as sustainable as possible by using local craftsmen and local materials; equally important were the results - they wanted the cottage to be comfortable, beautifully furnished and well equipped.

*"We love the fact you can sit on the deck and see the wood where the trees that clad the outside were felled and then, of course, replaced."*

*- client*



## Construction method

Roundwood frame, insulated with straw bales, plastered with clay from the site, and timber clad. All other insulation sheep's wool. Foundations are trenches filled with local sandstone, topped with recycled York stone flags. Shingle roof.

## The timber story

The design of a roundwood building starts from the materials that are available locally, so the approach emphasises the importance of local woodland management. Local sourcing also means low material miles and less environmental impact.

All the wood used grew in West Sussex and much of it on the nearby Cowdray Estate.

**Roundwood Poles:** Sweet chestnut, European larch, Western Red cedar, Douglas fir

**Laths:** chestnut

**Sussex Shingles:** Chestnut & Western red cedar locally grown and sawn

**Cladding and deck:** Oak from our farm, sawn onsite

**Interior** (floors, stairs and doors): oak

## The team

**Client:** Merrion Farm

**Designers:** Valerie Hinde, Ben Law

**Contractors:** The Roundwood Timber Framing Co with Dylan Walker, Rudi Mesag

## Date of completion

May 2011

[Download fact sheet here](#)



# Woodland Skills Centre

Teaching centre for Woodland Skills encapsulating the core mission of the client; students were able to develop their skills by participating in the construction.



Woodland Skills Centre, Denbigh

## The project

A new building was needed by the Woodland Skills Centre to provide a meeting room, office and kitchen, plus a resource centre/teaching space for a range of courses in traditional crafts, bushcraft courses, and for youth and community groups.

The building includes WCs and offers full disabled access.

*“Everything that we do is underpinned by concepts of sustainability, so we could not put up a concrete/brick structure. And we wanted the building to be carbon neutral or carbon negative in construction and use.”*

*- client*



## Construction method

Timber frame, timber clad, with sheep's wool insulation within the structure, lime/hemp plastered interior, and a wood-burner for space heating. The building achieved EPC band A.

## The timber story

The brief was to showcase traditional building techniques, and use local renewable materials, local labour, and for the build to be carried out as a learning experience for interested volunteers. Local larch from about 15 miles away in the Elwy Valley, chosen for durability, was used for the main frame and cladding. Local Douglas fir, from about 400m from the building, was used to create the floor.

## The team

**Client and designer:** Warren Woods Ltd  
Woodland Skills Centre

**Contractor:** Adrian Farey and Ron Smith - timber frame. Also: subcontractors for other trades, plus Woodland Skills Centre staff, students and volunteers

## Date of completion & cost

April 2013; approx £1,000/m<sup>2</sup>

[Download fact sheet here](#)



# Ynys Uchaf

Small office of traditional oak-pegged timber frame construction, incorporating curved as well as straight timbers for best use of the resource.

Ynys Uchaf, Mynydd Llandygai, Bangor



## The project

30m<sup>2</sup> office - timber framed and timber clad, with sheep's wool insulation and a slate roof. The brief was for a good quality, durable building that would make a suitable 'public face' for a forest and sustainability based business and be economical to build.

*"As the build progressed we found we could do more and more of the work ourselves, which was very satisfying - as well as cost-effective. Building in timber allows you to do a lot of it yourself - you're just working with a saw and a few nails."*

*- client*



## Construction method

Traditional post and beam frame in green larch with cladding of larch (outside) and Douglas fir (inside). Exterior boarding lined with breathable airtightness membrane, with board and batten rainscreen outside. Inside is lined with Celenit board and lime plaster.

The frame was designed and cut off-site, assembled on site, and fixed with oak pegs.

## The timber story

The clients were committed to the use of homegrown timber for sustainability and to support the local economy.

Adrian Farey of Ty Elwy comments:

“Simple frames constructed using locally grown softwoods can make traditional timber frame a building option that is both aesthetically and financially attractive. Curved and irregular pieces can also be used, cutting costs while increasing the value of the harvest to the landowners, hopefully promoting a greater interest in their long-term sustainable management.”

**Frame:** 225x200mm larch from local woodlands, visually graded to C24 where required.

**Cladding:** scorched larch

## The team

**Client:** Wild Resources Ltd, Bangor

**Designers:** Client & Adrian Farey

**Contractors:** Adrian Farey/Ty Elwy Timber Frame, Conwy Also: local specialist subcontractors (slater, joiner, lime plaster & electrician) and client

## Date of completion and cost

2013; Approx £1,000/m<sup>2</sup>

[Download fact sheet here](#)