Baled out

The conversion of two redundant barns in Norfolk is a model of sustainable, environmentally friendly development

by susan dawson. photographs by mark luscombe-whyte

A conversion of a redundant barn raises a question familiar to architects working in the countryside – how do you retain the character of the barn while creating a viable domestic interior?

Hudson Featherstone Architects, which converted two barns in Norfolk, has a novel approach to the problem, using straw bales and translucent glass fibre sheet as building materials. The barns are designed with sustainable principles and with the minimum of intervention. As Anthony Hudson explains: 'We wanted to keep the structure as it was, incorporating just a few modern insertions.'

The barns are part of a former farm in Haveringland, just north of Norwich. Like many such properties it was broken up into smaller units in the 1980s, when most of the buildings were converted into dwellings. The two remaining, a cart shed and a grain storage barn, have now been converted by Hudson Featherstone into two dwellings for holiday letting. The grain storage barn, now known as Hall Barn, was a two-storey brick building roofed with Norfolk red clay pantiles and with open bays formed by sturdy oak posts on the north side. The cart shed, now called Quaker Barn, was a similar but smaller single-storey building. Together with a small linked shed they form two sides of a courtyard.

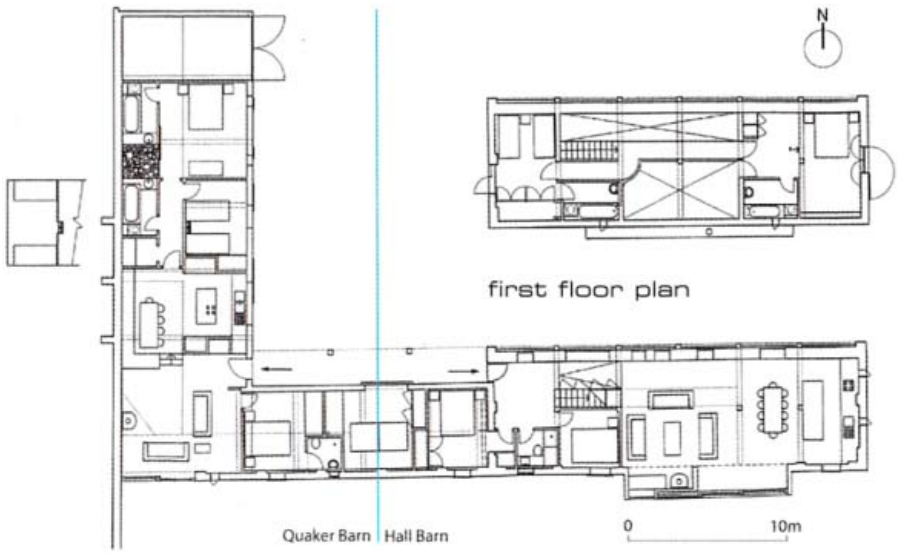
The two newly converted barns, which are designed to be let together or separately, share a common entrance porch with a covered overhanging roof at the corner of the courtyard. The new elevations have been kept simple to maintain their barn-like qualities.

The new north wall of Hall Barn, which overlooks the courtyard, is made of straw bales, stacked up as if the barn were still used for storage, yet creating a wall which gives high levels of thermal insulation. The bales are faced with a rainscreen of translucent glass fibre panels, fixed to steel frames which span between the original oak posts.

The window openings in this wall are not immediately apparent; they are set into the depth of the straw bales and screened by the glass fibre panels. Sandblasted glass was used to ensure privacy. At eaves level, the straw bales are screened with horizontal green oak boards, echoing the original eaves cladding.

The windows on the south side of Hall Barn and on Quaker Barn are either double-glazed units framed in oak or frameless double-glazed sliding units in simple steel tracks, draught-proofed with car window seals (see Working Detail overleaf). The roofs of both barns were laid with re-used Norfolk clay pantiles, with traditional glass pantiles used in places to bring high-level light into the interior.

The new north wall of Hall Barn is made of straw bales, faced with a rainscreen of translucent glass fibre panels fixed to steel frames which span between the original oak posts



first floor plan

ground floor plan

Internally, the two barns have been treated in very different ways. Hall Barn is relatively long and narrow in plan, yet accommodates four double bedrooms. Its domestic layout fits neatly into the original structural timber bays which, with the oak trusses, have been retained and exposed. An open-plan kitchen, screened by a tall cupboard, fills the end bay on the east side, with a double-height living/dining room in the next three bays and a bedroom, WC and hall space in the remaining two bays.

The south wall of the living/dining space, which looks out onto fields and garden, has been opened up with a glazed extension incorporating an inglenook fireplace, to create a delightfully light and spacious interior. Above it, at first-floor level, runs a bridge which links the staircase to a double bed-

Top: Hall Barn has a first floor bridge which links the staircase to a double bedroom and bathroom over the kitchen. Above: the dining area in Hall Barn – the window opening is set into the thickness of the straw bale wall.

Top: the living area in Quaker Barn. Above: Quaker Barn's kitchen/dining area is separated from the bedrooms by a knapped flint wall that reaches to the ridge and is lit from above with traditional glass pantiles set in the roof.

Top: bathrooms in Quaker Barn receive indirect light from internal glazed walls. Above: Quaker Barn's internal courtyard has a cobbled floor and exposed brick wall with flint base. It is roofed with glazed pantiles.

room and bathroom over the kitchen. Another first floor bedroom, also en-suite, is at the other end of the bridge. Two further double bedrooms are on the ground floor.

Quaker Barn is a more hybrid structure, formed of two originally separate buildings. Its west wall is of solid brickwork, so that all windows look out onto the courtyard. The entrance leads into a spacious living room with a south-facing window; the west wall is panelled to improve the insulation qualities of the original solid brick wall. A short flight of steps leads up to the kitchen/dining room; it is separated from the two bedrooms beyond by a knapped flint wall that reaches to the ridge and is lit from above with glass pantiles set in the roof.

The bedrooms have windows onto the courtyard; the two bathrooms that serve them flank the solid west brick wall. Each bathroom has a glazed wall that receives indirect light from an internal courtyard, set between them and roofed with glazed pantiles. The courtyard is floored with cobbles, and the brick wall is exposed and reveals its flint base which was used to reduce rising damp.

Underfloor heating has been used throughout the two barns, with a floor finish of Perstop marble chips laid in resin.

The barns have been designed with the aims of using sustainable, local resources, achieving high levels of insulation and maximising solar gain by careful orientation, minimising building and energy costs. The straw bales, oak joinery and flint walls, like most of the materials and suppliers used in the contract, were sourced within a five-mile radius of the site.

CREDITS

CONTRACT TYPE
Direct labour
GROSS FLOOR AREA
300m²
CLIENT & PROJECT MANAGERS
Jenny & Anthony Hudson
ARCHITECT
Hudson Featherstone Architects
Anthony Hudson
STRUCTURAL ENGINEER
Alcock Lees Partnership
STRAW BALE CONSULTANT
Sarah Wigglesworth Architects
SITE MANAGER
Brian Buck
SUBCONTRACTORS & SUPPLIERS
marble chip floor finish Perstorp Construction Chemical; *metal fabricators* Stanley Welding Services; *structural silicone* Dow Corning; *window channels* Edgware Motors; *fibreglass cladding* Filon; *oak windows* Tradspec; *glazing* Contract Glass; *granite* Perfitt

A straw bale wall and a frameless sliding window

Barn conversion, Norfolk
Hudson Featherstone

working details

The north wall of the two-storey barn comprises a series of straw bales, sprayed with borax to prevent infestation and laid on an insulated plywood platform to avoid thermal bridging.

The bales are laid in English bond pattern and spiked together with 10mm steel bars. They are additionally secured to the original oak posts with galvanised steel wires, which were wrapped round the bars. At the top they are held in place by a ply bulkhead. Window openings were designed to suit the straw bale module.

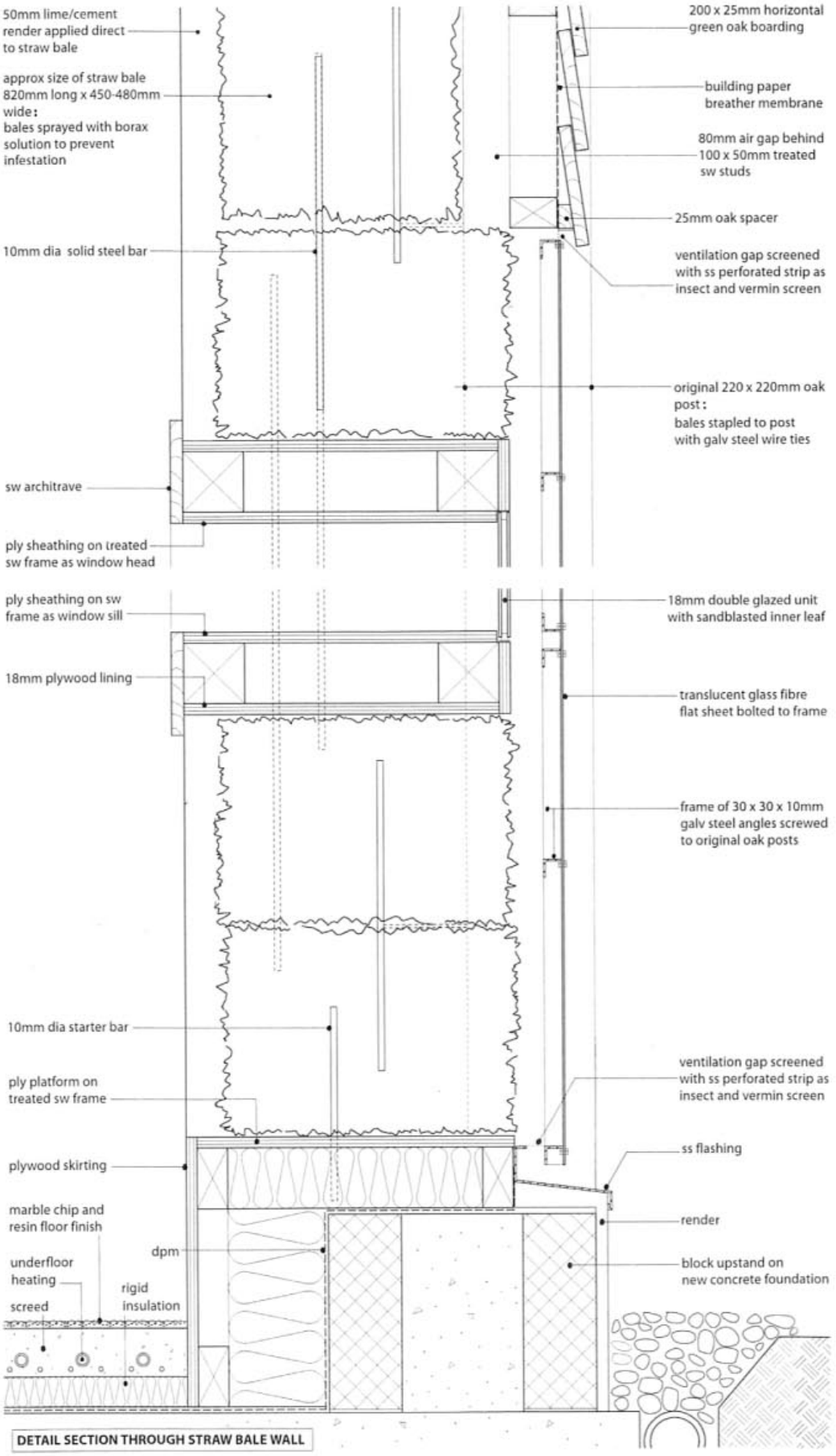
The bales are faced on the outside with a rainscreen of translucent glass fibre panels bolted to a frame of 30 x 30mm steel angles. Perforated stainless steel strips run at the head and foot of the frame to allow a flow of air for ventilation while preventing mice and insects from infesting the bales.

At eaves level the bales are clad with horizontal oak boarding which recalls the elevation pattern of the original building.

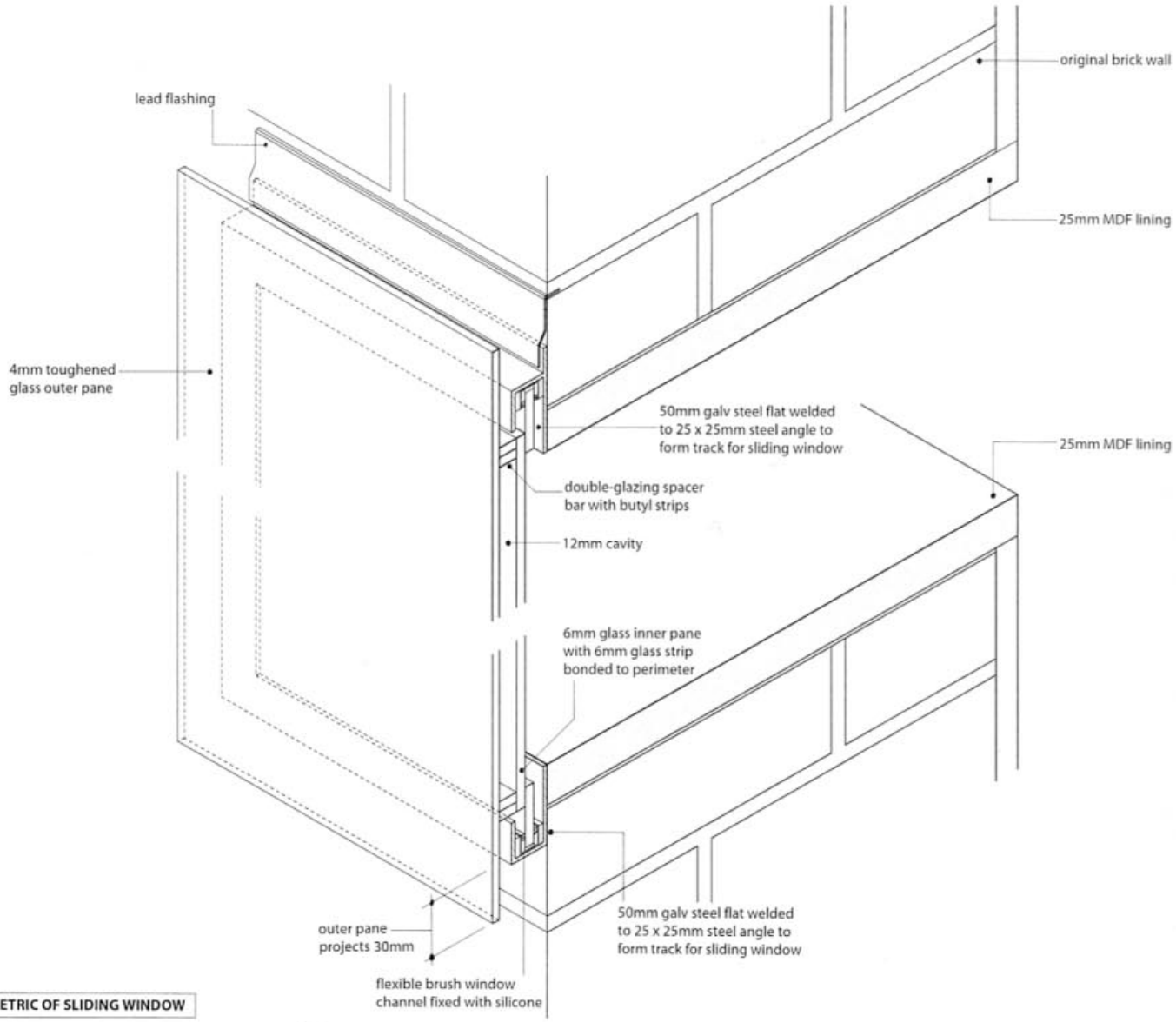
On the inside a 50mm lime/cement render was applied directly to the straw bales as wall finish.

The sliding windows are face-fixed to the original brick walls of the barns. Each window consists of a frameless double-glazed unit with an inner pane of 6mm glass and an outer pane of 4mm toughened glass. 6mm glass strips were bonded to the perimeter of the inner pane; the top and bottom edges slide in channels fixed back to the brickwork. They are formed of a 50mm steel flat welded to a 25 x 25mm steel angle, and are lined with flexible brush strips sourced from the car industry. The perimeter of the outer pane projects beyond the channels to screen them.

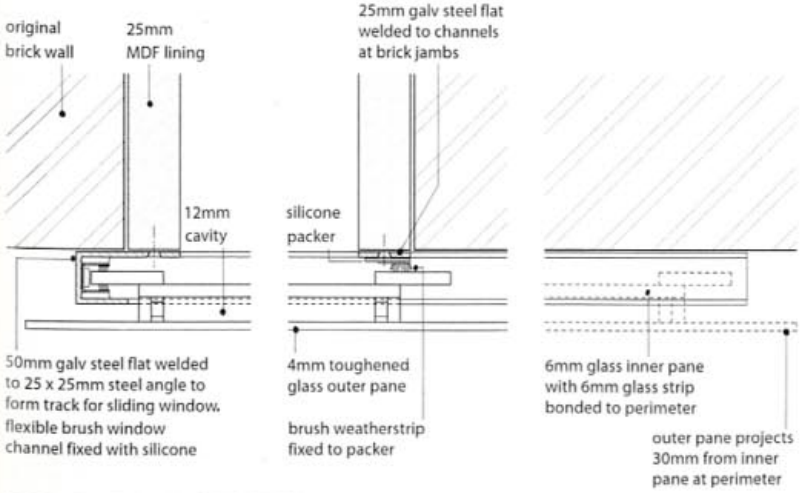
Susan Dawson



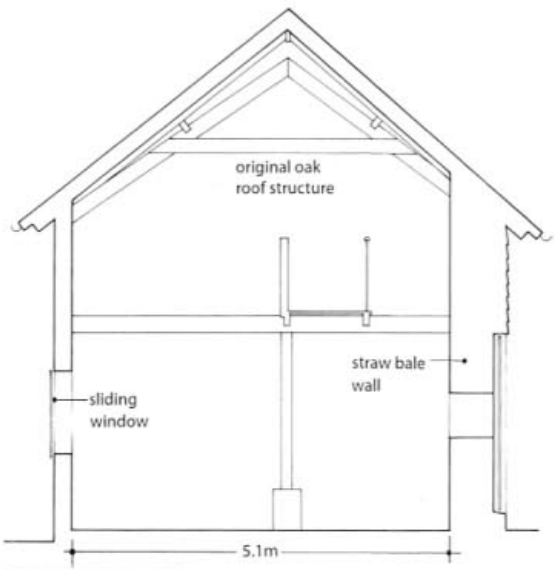
DETAIL SECTION THROUGH STRAW BALE WALL



ISOMETRIC OF SLIDING WINDOW



DETAIL PLAN OF SLIDING WINDOW



KEY CROSS SECTION