Project

Gamlingay Eco Hub community centre

Architect
Civic Architects
Location Stocks Lane, Gamlingay, South Cambridgeshire
Completion date
Autumn 2011

By Amanda Birch

The remodelling of the Gamlingay community centre presents a catalogue of eco-friendly techniques. Not only does it make extensive use of sustainable and locally sourced materials, but it incorporates three different passive heat and power technologies without any fossil-fuel backup.

The project has been designed for Gamlingay Parish Council by London-based practice Civic Architects.

The renamed Gamlingay Eco Hub will include photovoltaics to produce electricity and solar water heaters and ground source heat pumps to provide heating and hot water. Civic Architects director Dan Jones says the council "is not only doing it to be dark green, it has specified these technologies out of necessity".

The original building relied on wall-mounted electrical heaters which were expensive to use and so were rarely switched on.

"Powering the building by renewables helps the council sidestep rising fuel costs," adds Jones.

In addition to incorporating the environmental features, the existing, rather severe looking 1976 structure is being transformed with a £1.2 million Scandinavian inspired revamp and extension.

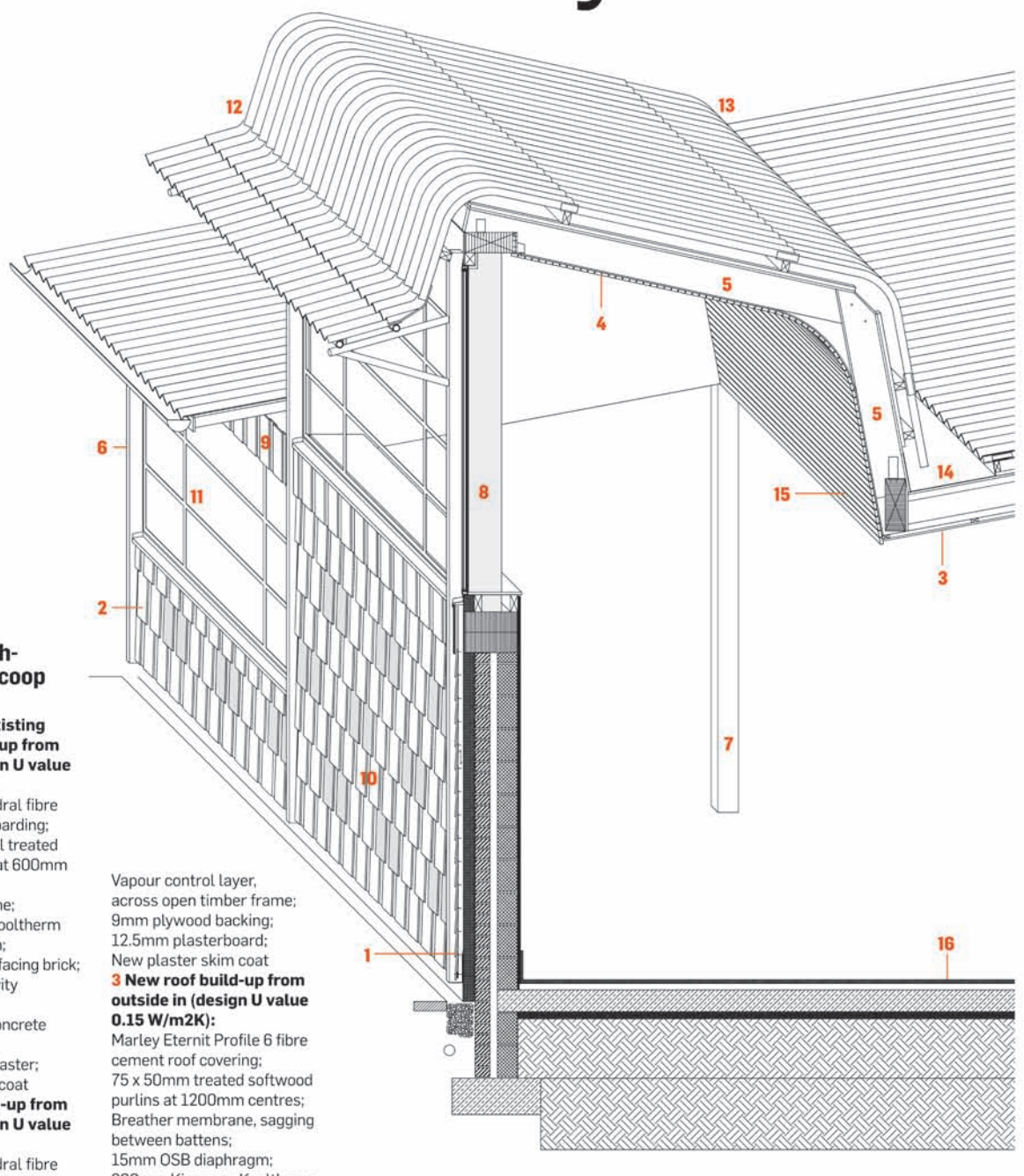
Civic has drawn inspiration from favourite Scandinavian modernist buildings, in particular Alvar Aalto's town hall in Säynätsalo, Finland.

It has also considered the vernacular of the local region, pitching the new centre between the scale of the domestic house and the cowshed. "We've aligned the Eco Hub with the scale and material pallet of an agricultural building, but wherever possible, details are made domestic such as the off-cut frieze, the use of shingles and the canopies," says Jones.

The original two-storey concrete and brick shoebox and its single-storey L-shaped addition were ripe for improvement. Providing only rudimentary facilities, the original centre was crumbling — the roof was dilapidated and the rooflight was in poor condition — and had to be closed late last year because it was considered unsafe.

When the community centre reopens, it will provide a library, a large hall for sport and functions, a kitchen, a café, changing rooms, a dance studio and a parish council office. With additions to the front entrance and a timber-framed dance hall at the east end, the centre will have increased its floor area by 60%.

The centre's sustainability credentials have been enhanced by re-using the existing building rather than replacing it.



Axo-section through south-facing light scoop

1 Refurbished existing brick wall build-up from outside in (design U value 0.21 kW/m2K):
Marley Eternit Cedral fibre cement weatherboarding;
50 x 38mm vertical treated softwood battens at 600mm centres;
Breather membrane;
75mm Kingspan Kooltherm K12 rigid insulation;
102.5mm existing facing brick;
50mm existing cavity (uninsulated);
140mm existing concrete blockwork;
Existing internal plaster;
New plaster skim coat

2 New wall build-up from outside in (design U value 0.21 kW/m2K):
Marley Eternit Cedral fibre cement weatherboarding;
50 x 38mm vertical treated softwood battens at 600mm centres;
Breather membrane;
9mm OSB outer layer of Kingspan open panel timber frame system;
120mm Kingspan rigid insulation TW55 clipped between;
140mm timber studs, leaving 20mm inner cavity;
Vapour control layer, across open timber frame;
9mm plywood backing;
12.5mm plasterboard;
New plaster skim coat

3 New roof build-up from outside in (design U value 0.15 W/m2K):
Marley Eternit Profile 6 fibre cement roof covering;
75 x 50mm treated softwood purlins at 1200mm centres;
Breather membrane, sagging between battens;
15mm OSB diaphragm;
200mm Kingspan Kooltherm K7 rigid insulation clipped in between rafters;
245 I-joist rafters (new roof) at 400mm centres;
Vapour control layer;
25 x 38mm timber battens at 400mm centres;
12.5mm perforated plasterboard (acoustic)

4 47x222 timber rafters birdsmouthed over Glulam beams top and bottom, fixed with expamet angle brackets, joist hangers and bolted at the elbow
5 200mm Kingspan Kooltherm K7 rigid insulation clipped in between rafters
6 60x100mm oak vertical feature batten-fixed back to glulam posts
7 140x140mm glulam post
8 90x225mm glulam posts
9 Off-cut frieze: Vertical fibre cement frieze from 3.3m bay off-cuts
10 Vertical fibre cement shingles
11 Clements EB24 recycled steel windows with 24mm double glazed units
12 Marley Eternit standard fibre cement 5 degree eaves bend sheet and apron flashing
13 Marley Eternit standard fibre cement 22.5 degree eaves bend sheet
14 Trocol valley gutter
15 40x25 nailed softwood battens at 50mm centres to form sloping and curved light scoop soffit
16 New timber floor on existing concrete slab

SUSTAINABLE MATERIALS

The remodelling of the centre has involved scooping out the interior of an existing south-facing L-shaped section while retaining the existing concrete and brick external wall.

Nearly all the existing masonry walls have been kept to provide thermal mass. Combined with deep plan cross ventilation paths and manual control of high level double glazed, recycled steel windows, peak summer temperatures are moderated.

The new structures — which include a remodelled and extended main entrance, a new dance hall and an external store with plant room on the north side together with the south elevation — will be built using a mixture of glulam timber and standard softwood sections to allow for a more open and flexible interior and to avoid the use of materials with high embodied energy.

A "light scoop" will be built on the south elevation creating a double height space and drawing in daylight to the library and entrance. The light scoop is 9.9m wide and 5m tall and clad in a dark laurel-green fibre cement profiled sheet .

The existing building will be over-clad with red fibre cement planks and 75mm Kooltherm K12 rigid insulation to eliminate cold-bridging.

The building features a cantilevered roof which provides weather protection but also picks up on the agricultural aesthetic that influenced the design. The new wall is designed to achieve a U-value of 0.21 kW/m sq K.

The library resource centre with the light scoop above.

The timber-framed dance hall at the east end of the building.

PROJECT TEAM **Architect** Civic Architects, **Client** Gamlingay Parish Council, **Structural engineer** Bidwells, **Services engineer** Building Services Design, **Quantity surveyor** NTN Partnership, **Prefabricated timber** Kingspan Potton, **Roof and wall covering** Marley Eternit, **Block paving** Marshalls

A perspective showing the main entrance to the remodelled Gamlingay Eco Hub.

LOCALISM AND RE-USE OF MATERIALS

Three of the Eco Hub's main materials have been sourced locally: the pre-assembled open panel timber frame system for both the external and internal walls with rigid insulation already clipped in, is manufactured by Kingspan Potton located only 2.4 miles from Gamlingay; the fibre cement profiled sheet and weatherboard used on the roof and external walls is made by Marley Eternit, based 10 miles away; and the block paving to be used near the main entrance is made by Marshalls, whose factory is only 5.4 miles away.

Civic Architects has also considered its commitment to green design by minimising waste and considering the longevity of materials and their potential for re-use.

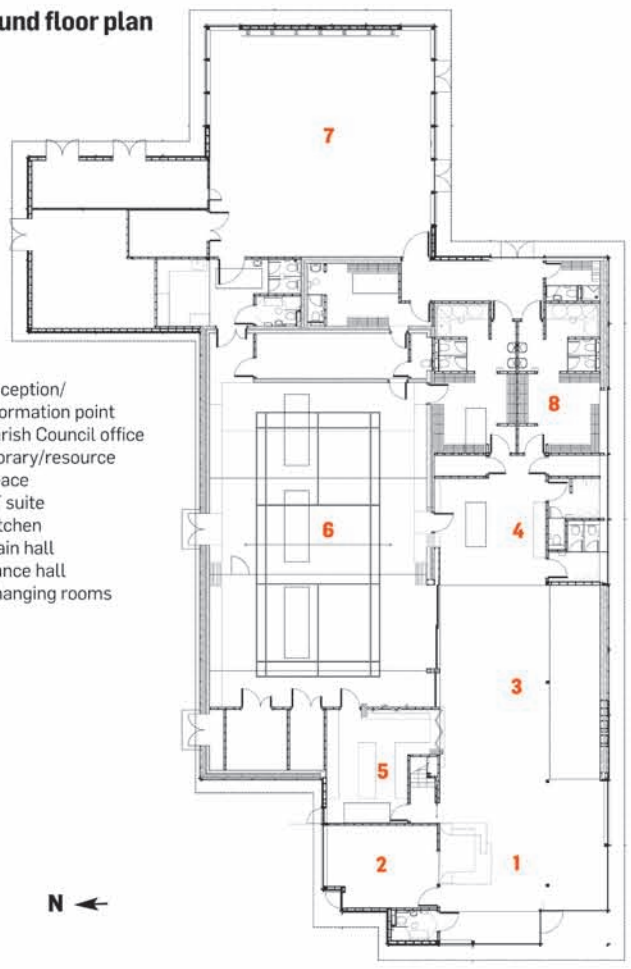
The building's off-cut frieze demonstrates this. The 3.6m standard size fibre cement plank used for the walls is cut by 340mm to suit the 3.3m structural bay.

The 340mm offcut is turned on its end to create the frieze that runs along the top of each bay.

Other 670mm offcuts from unused boards elsewhere, some of which are blue in colour will be concentrated around the main entrance of the building and used as shingles to attract the eye to the main entrance.

FOR MORE ON SUSTAINABILITY, see next week's BD Reviews section

Ground floor plan



1 Reception/ information point
2 Parish Council office
3 Library/resource space
4 IT suite
5 Kitchen
6 Main hall
7 Dance hall
8 Changing rooms

HEATING, ELECTRICITY AND HOT WATER

The bulk of the building's heating requirements will be provided by ground source heat pumps laid under a nearby football pitch. Heat will be distributed throughout the existing parts of the building via fan coil units and wall-mounted thin-tube Jaga radiators, which work more efficiently at lower temperatures. The new-build sections will have underfloor heating.

The hot water for the changing-room showers and the kitchen will be produced by solar thermal panels on the lower south-facing roof.

The water will be stored in an "intelligent buffer cylinder", which was recommended by Jamie Saunders, associate director at services engineer Building Services Design. The cylinder stores both the water heated by the solar panels and by the ground source heat pump, but uses a layered thermal store to prevent the hotter water from the panels cooling as it mixes with that from the heat pump.

Saunders says the use of one large cylinder to store all the warmed water, rather than separate cylinders for the two sources, is appropriate for a community centre where the demands on hot water and heating are erratic. The Radiotherm Oskar cylinder is made in Germany and distributed through UK supplier Energyworx. It has been calculated that at peak use it will produce 62kW per hour of heating and hot water.

Electricity will be produced by the 100sq m of photo-voltaics laid on the south-facing roof and it is expected to generate a total of 13.5kW hours per year. Dan Jones anticipates that this will be more than is needed, and that the surplus can be put back into the national grid and generate revenue.