

# TECHNICAL: TIMBER STRUCTURES

## Project

# Bridport House

### Location

Colville Estate,  
Bridport Place,  
Hackney N1

### Architect

Karakusevic Carson  
Architects

### Completion date

July 2011

### By Amanda Birch

The discovery of a vast sewer running beneath the site of Bridport House prompted Karakusevic Carson Architects to adopt cross-laminated timber as the main material for the residential building's structure.

The 3m-diameter storm relief sewer runs directly under the northern part of the site, which is on the Colville Estate just south of the Regent's Canal in Hackney, east London, and there was concern that it might be damaged by excessive loads. Cross-laminated timber is not only lighter

than reinforced concrete or structural steel, it also meant loads could be spread over the whole building.

Another key benefit of the material was its speed of construction. The Homes & Communities Agency was contributing £3.4 million to the £6 million project, but only on completion to a specified deadline, so a fast-track schedule was essential. The structure was built in 10 weeks, while it is estimated that a concrete structure would have taken 21 weeks.

Karakusevic Carson Architects won a limited competition in September 2009 to design a replace-



The Bridport House design steps down from eight to five storeys.

ment for an original 1950s four-storey residential block.

Its design, which started on site a year later, is for a stepped build-

ing ranging from five to eight storeys, with a long and thin form that uses cross-laminated timber for the floors, walls and ceilings. It

will be clad with manually laid, semi-engineered brick, to create a robust and solid looking building.

The lightness of the structure has enabled the building to be double the height of its predecessor, with 41 units replacing 21, while weighing only 10% more than the original — the maximum increase considered possible without damaging the sewer.

The new Bridport House has a floor area of 4,220sq m, and is the first phase of a 5ha masterplan, also won by Karakusevic Carson, for the regeneration of the whole estate, replacing 438 existing homes with 900 new ones.

## CROSS-LAMINATED TIMBER



Cross-laminated timber has been used for the floor, walls and ceiling at Bridport House.

Cross-laminated timber is built up from layers, each one oriented in the opposite direction to the layer below it. These form a flat panel with strength in both directions, making it more dimensionally stable than raw timber.

As wood is a renewable resource, a timber construction acts as a carbon store. It is calculated that at Bridport House, each unit will comprise 30-40cu m of timber — equivalent to more than 30 tonnes of carbon dioxide.

The architect selected a cross-laminated timber system using PEFC (Programme for the Endorsement of Forest Certification) certified spruce manufactured in Austria by Stora Enso and engineered by Hackney-based Eurban. It had used the same system for its Blythe and Canrobert Street housing scheme in Bethnal Green, which won the London Evening Standard New Homes award in 2010 for Best New Family Home.

The accuracy of construction with cross-laminated timber also aids airtightness as elements such as the double glazed timber/aluminium composite windows specified for Bridport House will fit exactly.

The cross-laminated timber boards are edge-glued using specialist technology, which further increases airtightness. Three different wall thicknesses — 100mm, 140mm and 160mm — have been used, floors are 160mm thick, while the roof is 220mm.

The average size of the boards is 2.95m wide x 16m long, assembled using long screws and metal angles. The breather membrane and 100mm-thick foamboard insulation are fixed to the cross-laminated timber panel, followed by the manually laid brick.

Airtightness, at 3cu m per hour, is 60% better than that demanded by the building regulations.

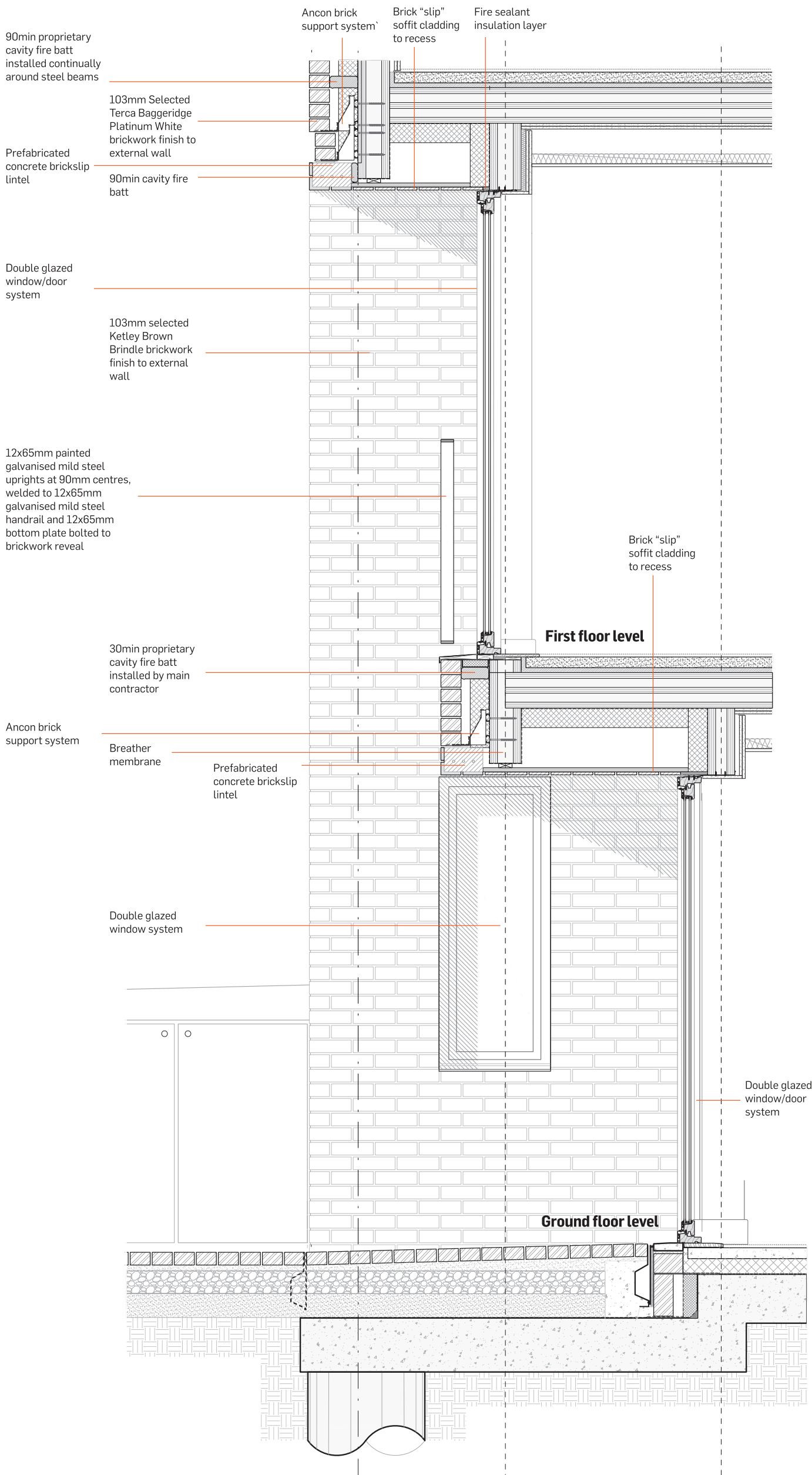
Edge gluing also increases the acoustic and fire performance of the cross-laminated timber boards as well as making them watertight. Specifications for acoustic separation are high — the acoustic resistance of the building is 5dB greater than that required by building regulations.

The development, which also includes a brown roof and photovoltaic panels, is aiming to achieve level 4 of the Code for Sustainable Homes.



**PROJECT TEAM** Client London Borough of Hackney, **Architect** Karakusevic Carson Architects, **Structural engineer** Peter Brett Associates, **Engineer & timber contractor** Eurban, **Timber supplier** Stora Enso Wood Products, **Main contractor** Willmott Dixon

**Section through recessed maisonette entrance**



**CONSTRUCTION TECHNIQUES**



**Panels with preformed windows are installed on the top floor.**

The ground and first floors of Bridport House comprise two-storey maisonettes with a different wall layout to the one to three bedroom flats above.

"Generally when building with cross-laminated timber," says Naomi Shaw, project coordinator for Eurban, "the aim is to have all the structural walls lining up vertically to transfer the loads down the building to the foundations. However, in Bridport House, we designed the structure so that the load is transferred from one layout to another by using the scale of the panels and the inherent stiffness of the material, which in effect has the walls acting as deep beams."

"We have also designed the building so that the load is

taken by the outside walls of each unit, leaving the internal walls as partitions only," she adds.

This allows a degree of flexibility to the internal layout of each flat and the ability to respond to the changing demands of living over time.

The lift shafts and circulation core are also constructed from cross-laminated timber and provide overall stiffness in the building, in much the same way as does a concrete lift shaft. Constructing both these areas with solid timber eliminates the problem of movement joints, which can occur between a structure made of different materials and with different expansion properties.



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