

17-21 Wenlock Road – Building a 10 Storey Hybrid Structure in London

17-21 Wenlock Road – Bâtir un ouvrage mixte
à 10 niveaux à Londres

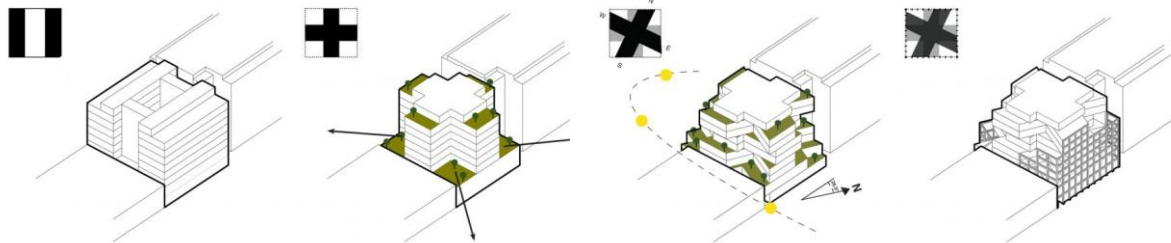
Alex Smith
Hawkins\Brown
+ Canterbury School of Architecture
UK-London



17-21 Wenlock Road

1. Introduction

Hawkins\Brown's proposal was generated from the desire to maximize the amount of daylight and ventilation available into each flat and to avoid a 'dead' light well that is shared by too many people to make it useful as a shared amenity space. When complete the building will become one of the tallest Cross Laminated Timber Hybrid buildings in Europe.



The 'cruciform' plan provides four courtyards with better visual connections to the city fostering an intimate community experience for residents. A series of twists ensures all flats to have 2 or 3 aspects with generous terraces. The 'skewed form' faces the views up and down the Basin rather than directly across the narrow waterway and offers a more dynamic form when seen in long view from the Canal.

To reinforce the streetscape in a conservation area the timber clad "cross" is protected by a dark brick grid, providing a sense of defensible space to residents inside and giving much needed definition to Wenlock Road.



Image 1: CGI representing how the scheme will look when completed in 2015.



Image 2: First, Second and ninth floor plans. Not to scale.

2. Choosing CLT/Hybrid

Hackney moots 'timber-first' planning policy

17 May 2012 | By Will Hurst

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Council may support use of wood, where feasible, as 'primary construction material'



Hackney council looks set to become the first local authority in the country to adopt a planning policy promoting timber construction.

The east London borough - which already boasts the tallest timber tower in Europe - said it wanted to create a "presumption in favour" of using wood because of its advantages in terms of embodied energy.

It is responding to a new "wood first" policy promoted by national campaign group Wood For Good.

Graham Loveland, assistant director of planning at Hackney, said the council was actively considering "detailed management policies" to promote timber through the planning system and that this approach was in line with the government's National Planning Policy Framework (NPPF).

"The NPPF makes it clear that there needs to be a focus on sustainable development. The Code for Sustainable Homes does not look at embodied energy and we think that, looking holistically at development proposals, that is important," he said.

But he added: "We don't envisage saying 'you are only allowed to build timber buildings in Hackney' though."

Architect Andrew Waugh, whose firm Waugh Thistleton designed Hackney's nine-storey Stadthaus residential tower made out of timber, said that a tonne of concrete used around a tonne of carbon dioxide in its production, compared to the one tonne of CO2 stored in the same amount of timber. He also pointed out that the risk of fire was actually low when using solid timber.

"Solid timber panels are 100-150mm thick so the charring of these panels is very predictable," he said.

Wood for Good's campaign, which is backed by other organisations, including the Forest Stewardship Council, says planning guidance should demand that sustainably sourced wood is considered, where feasible, as the "primary construction material" in new-build and refurbishment projects.

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2 comments

Hackney clarifies: wood first equal

Hackney Council has reiterated that it is set to be the first local authority in England to promote timber construction in its planning policy - but has issued a statement making clear that it will not exclude alternative materials.

The clarification comes after lawyers told *Building* magazine that Hackney could be opening itself up to legal challenges from the brick, steel and concrete industries if it made planning decisions based on a pro-timber policy.

Hackney declared last week that it was considering a 'wood first' policy that would see a presumption in favour of using sustainable timber in all new build projects.

Similar policies are apparently in place in other European countries. The campaign organisation Wood for Good is calling for all local authorities to introduce a 'wood first' rule in local authority planning guidance as a step towards meeting national carbon reduction targets.

But in a statement released today, Hackney said: "Although the Council is keen to promote the benefits of building with wood, it is not considering a policy that would exclude locally sourced building materials or prevent the use of other sustainable



Image 3: Web articles from building and construction manager about hackney's emerging policy

The buildings situated in the London Borough of Hackney which has been a positive supporter of CLT and timber construction for some years. In 2012 the borough even considered wood first policy where by applicants who wished to gain planning approval would have to demonstrate that timber structures had been considered and sufficient justification provided if timber was not chosen. This policy has not yet to materialise but the emerging planning context proved crucial to the way that this scheme was considered and the structure procured.

Hawkins\Brown have previous experience of cross laminated timber having recently completed a large school building in Kent at Hilden Grange Preparatory school. As a result of this throughout early discussions with the planners we had talked about the possibility of building the scheme in CLT.



Image 4: Hawkins\Brown's recently completed Hilden Grange School was constructed from CLT. Image copyright Tim Crocker

The scheme at 17-21 Wenlock Road was awarded planning in 2012 and unusually one of the conditions of the approval was that the scheme be constructed in Cross Laminated Timber. To our knowledge this is the first time that the structural material of a building has been conditioned in such a way.

It is relatively common for housing schemes in the UK to have an undefined structural system at planning stage as it allows the developer flexibility to choose the most efficient solution at a later date. By conditioning timber the planners in Hackney were removing the element of choice from the developer which ultimately could have put the whole project at risk. Whilst we as architects understood the potentials of the material and are strong advocates we knew that the challenges faced in constructing such a complex scheme would mean that innovation and significant further collaborative research would be required.

3. Possible Design solutions

During the detailed design development stage of the project the team considered 3 structural options and engaged with various subcontractors and specialists to develop high level strategies to test costs, efficiency and aesthetics. The 3 solutions considered were as follows:

1. Waffle-like structurals labs

Giant waffle like floor structures formed from glulam beam and CLTs labs which would occur every 2 floors to take the strain of the cantilevers. All walls and floor in between would be solid CLT.

Floors became too thick and efficiencies and aesthetics would have suffered dramatically.

2. Pure CLT.

All internal walls of the structure would be formed in CLT to create a giant core like structure. All walls become progressively thicker the further down the structure they are located. All timber would need to be lined with multiple layers of plasterboard ensure it is protected from fire for 90 mins.

Expensive, heavy, extremely thick labs to allow cantilevers. Good for small buildings, less suitable for building towers.

3. CLT/steel hybrid.

In the hybrid solution timber and steel are used in unison to increase efficiency and stiffen the structure. Only the floors and external structure are made from timber/steel meaning that alterations to flat layouts are possible in the future. Timber is still the primary material by volume and its prefabrication allows a quicker construction time on-site.

Uses the best attributes of timber steel and concrete make an efficient quick structure that can be built 10 Stories high and is more adaptive to future reconfiguration and re-use.

The hybrid CLT/steel solution was the most viable option for the building as it allowed the developer (Regal Homes) to also extend the concrete core to level 10 leading to a greater overlap of subcontractors on-site and a reduction in overall programme.

Of particular note are the fire requirements for the structure which state that it must retain structural integrity for 90 minutes in the event of fire. Significant costs were saved by choosing option 3 as it meant that the rewerless structural elements and the reforeless structural material to protect.

4. Detailed Design

Ultimately B+K Structures won the contract for the CLT/Steel hybrid and the design was developed with their engineers using a series of 3d models and 2d drawings. Of all the subcontractors considered for the project B+K structures are the best suited to hybrid construction as their parent company Bowmer and Kirkland have significant experience in the steel and concrete in dustres meaning that they do not suffer commercially by utilising other structural materials in unison with timber.

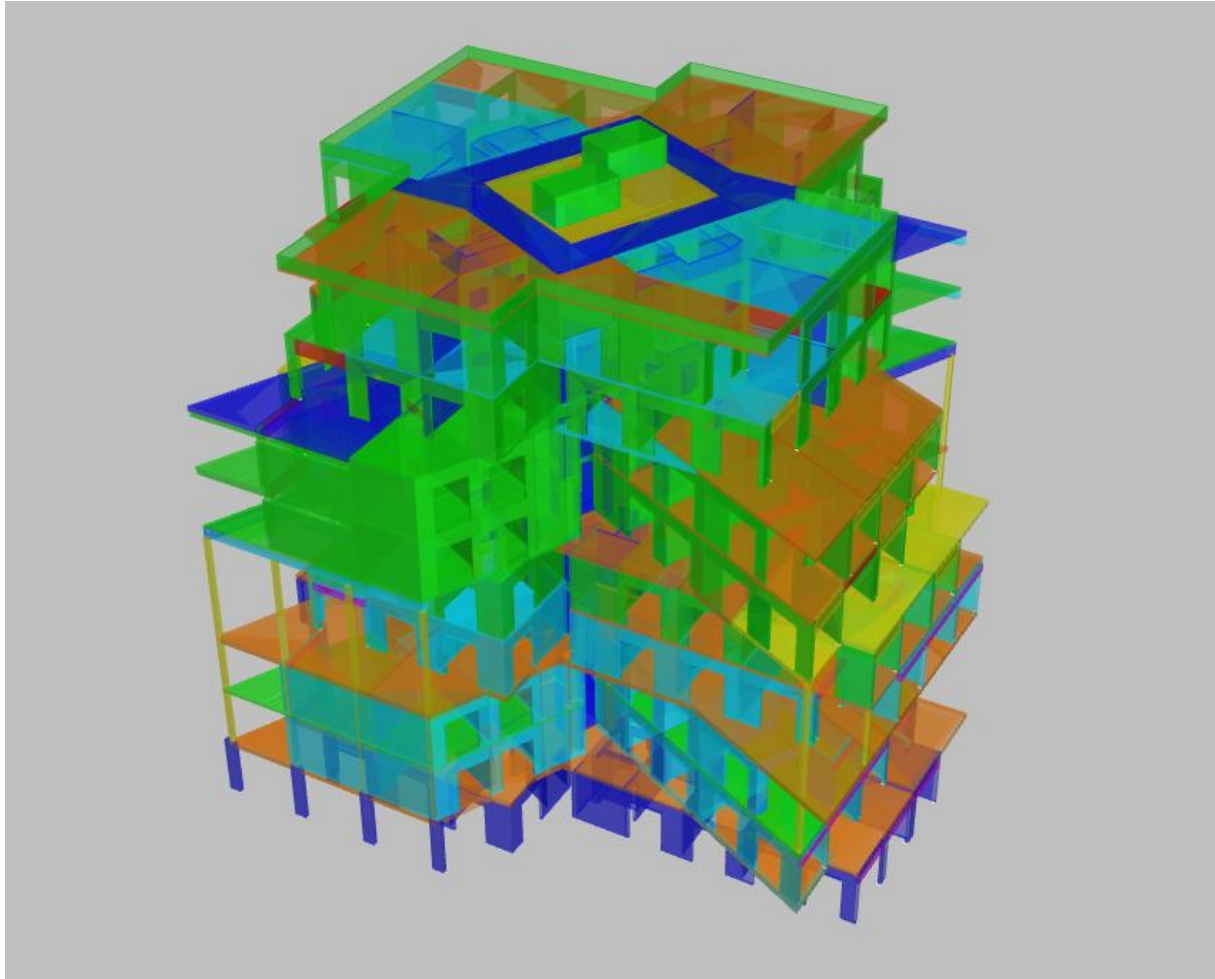


Image 5: 3d modelling techniques were used to review, and refine the CLT detailing.

The architectural detailing around the structure is relatively simple, the building is clad in cedars lats and dark bricks and the interior is lined throughout with plaster board to satisfy acoustic and fire requirements.

A light weight insulation/screed with under floor heating based system was utilised for the floor dealing with acoustic and thermal issues at once.

Whilst the buildings twisting form means that the flat layouts do not stack the services routes through the building are vertical and concealed within the external cladding or internal riser cupboards near the central core. Pre-fabricated service cuts were coordinated with the services engineers to ensure that all pipe work was correctly sized at an early stage.

Unfortunately due to fire constraints which are based on the overall height of the building exposing the timber internally proved difficult. In addition, if we were to expose the CLT it would have been more difficult to achieve the strict air tightness requirements and run the required ventilation ducting in the ceiling. On previous lower rise educational projects Hawkins\Brown have exposed the timber and achieved great finishes but for tall residential buildings the UKs current legislation mean that this is practically not possible.

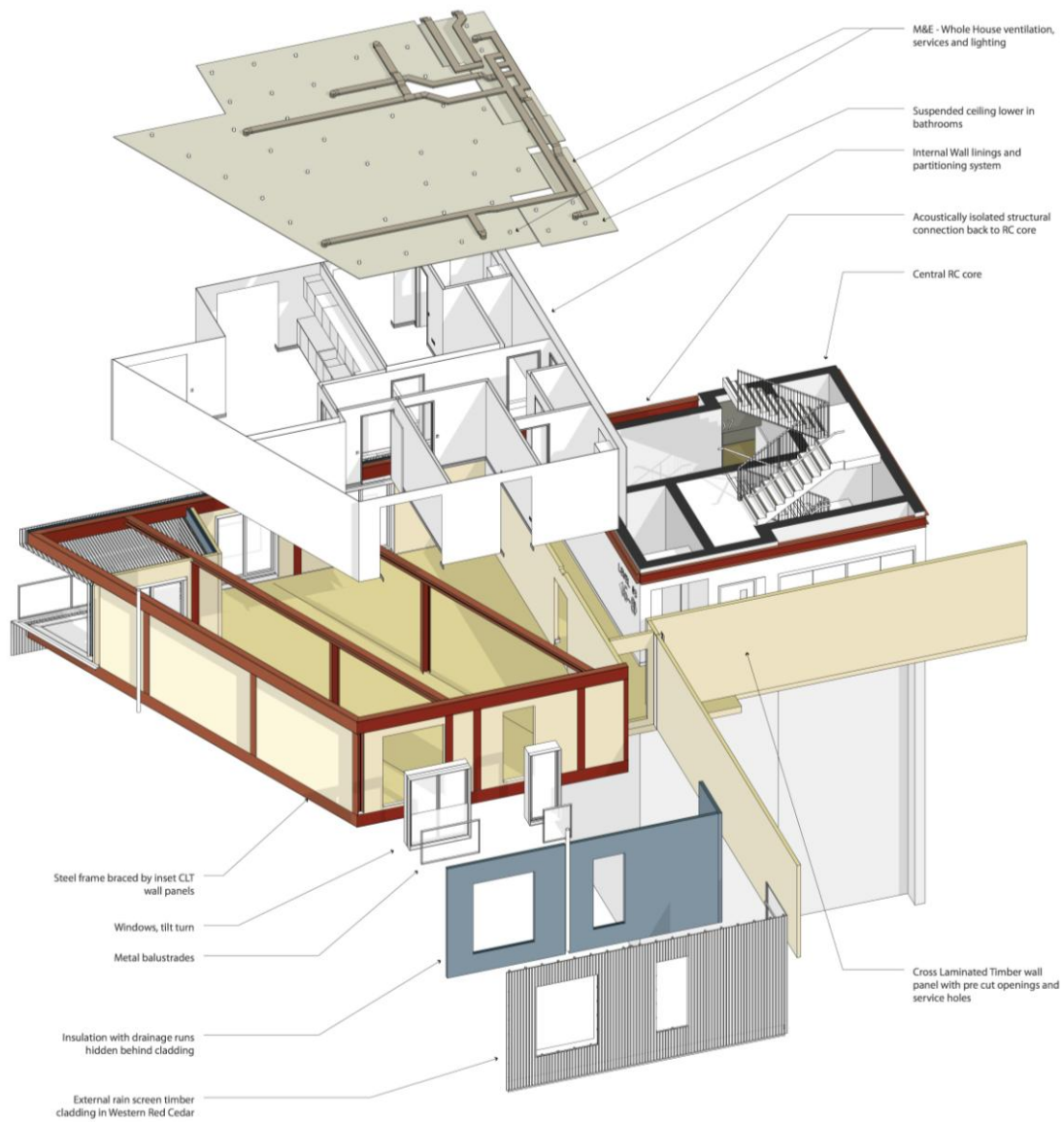


Image 6: 3d Exploded isometric drawing showing the construction components of the scheme.

5. Progress to date

The structure has reached its full height and progress is already being made to lining/cladding and window installation below. To follow are some up to date progress shots.





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